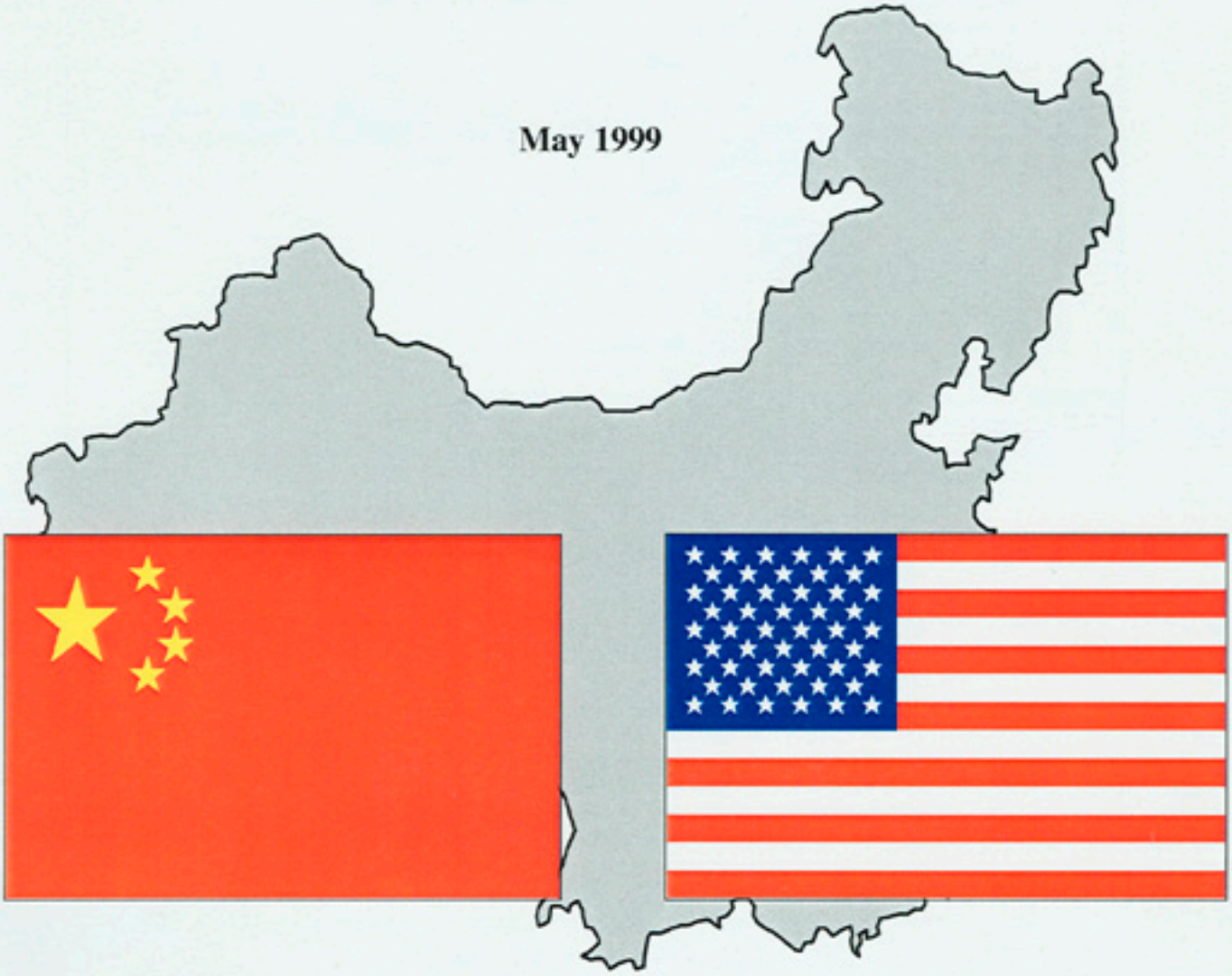
The Chinese Academy of Sciences

Selected Translated Abstracts of Chinese-Language Climate Change Publications

May 1999



Institute of Geography
Chinese Academy of Sciences

Atmospheric Sciences Research Center
State University of New York at Albany

Carbon Dioxide Information Analysis Center
Oak Ridge National Laboratory

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ORNL/CDIAC-117

Selected Translated Abstracts of Chinese-Language Climate Change Publications

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Environmental Sciences Division
Publication No. 4857
May 1999

Prepared for the
Environmental Sciences Division
Office of Biological and Environmental Research
U.S. Department of Energy
Budget Activity Number KP 12 04 01 0

Prepared by the
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LOCKHEED MARTIN ENERGY RESEARCH CORP.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-96OR22464

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ORNL/CDIAC-117

中文气候变化研究论文选摘

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编 辑

资助单位： 美国能源部生物与环境研究办公室环境科学部

经费预算文号：KP 12 04 01 0

管理单位： 洛克希德能源研究公司

美国能源部委托，管理授权文号：DE-AC05-96OR22464

主持单位： 美国奥克瑞奇国家实验室环境科学部CO_2信息分析中心

环境科学部1999年5月出版

出版文号：4857

Abstract

Ge Quansheng, Zhang Peiyuan, Liu Xiuping, Zhang Xueqing, Chen Yuan, Peng Guitang, Zheng Jingyun, W.-C. Wang, R. M. Cushman, and M. D. Burtis. 1999. Selected Translated Abstracts of Chinese-Language Climate Change Publications. ORNL/CDIAC-117. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee. 369 p.

This report contains English-translated abstracts of important Chinese-language literature concerning global climate change for the years 1995–1998. This body of literature includes the topics of adaptation, ancient climate change, climate variation, the East Asia monsoon, historical climate change, impacts, modeling, and radiation and trace-gas emissions. In addition to the bibliographic citations and abstracts translated into English, this report presents the original citations and abstracts in Chinese. Author and title indexes are included to assist the reader in locating abstracts of particular interest.

葛全胜，张丕远，刘秀萍，张雪芹，陈媛，彭桂堂，郑景云，王维强，罗伯特·M·卡斯曼，马伟尔·D·博帝斯，1999，中文气候变化研究论文选摘，ORNL/CDIAC-117，
美国奥克瑞奇国家实 验室CO_2信息分析中心，共369页。

本文摘收集了有关学者在1995-1998年间以中文发表的全球气候变化主要研究论文。
内容涉及：古气候变化，历史气候变化，现代气候变化，东亚季风，气候变化的影响，气候变化的模拟，痕量气体排放与辐射，全球气候变化的适应对策等8个方面。本文摘以中英文对照形式编排，同时刊出这些论文的中英文摘要以及论文出处。为方便读者，本文摘的最后部分还列出了作者与文章名的索引。

Introduction

On 19 August 1987, the U.S. Department of Energy and the People's Republic of China's Academy of Sciences signed Annex III to the Protocol on Fossil Energy Research and Development on Cooperation in the Field of Atmospheric Trace Gases. This formal agreement followed two years of informal scientific exchanges to further research on the global and regional climate changes that could result from fossil-fuel combustion. Research under the agreement comprises four tasks: (1) analysis of climate models; (2) preparation and analysis of paleo-, historical, and modern instrumental climate data; (3) comparisons between model output and data to study the relationship between large- and regional-scale climate; and (4) measurement of emissions to the atmosphere from rice paddy fields. The background to this agreement and progress resulting from the joint research program are described by Koomanoff et al.[1] and Riches et al.[2]

Whereas much of the Chinese literature on climate change, including that resulting from the bilateral agreement, is available in English to western researchers (e.g., Zhang[3]), other important Chinese-language literature is not. The purpose of this compilation is to acquaint western climate researchers with the wealth of recent Chinese climate-change literature by providing translations into English of the abstracts of Chinese-language literature (published between 1995 and 1998), in the areas of adaptation, ancient climate, climate variation, the East Asia monsoon, historical climate change, impacts, modeling, and radiation and trace-gas emission.

On behalf of the Carbon Dioxide Information Analysis Center (CDIAC) at Oak Ridge National Laboratory, the Atmospheric Sciences Research Center (ASRC) of the State University of New York at Albany, and the Institute of Geography of the Chinese Academy of Sciences, we thank Fred Koomanoff and Mike Riches of the U.S. Department of Energy, Office of Energy Research, who developed and directed the joint agreement on behalf of the United States; Zhao Jianping of the Chinese Academy of Sciences, who developed and directed the joint agreement on behalf of the People's Republic of China; and Linda O'Hara of ORNL Publishing Services, who edited the English-language abstracts in this report.

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May 1999

[1] Koomanoff, F. A., D. Ye, J. Zhao, M. R. Riches, W. -C. Wang, and S. Tao. 1988. The United States Department of Energy and the People's Republic of China's Chinese Academy of Sciences Joint Research on the Greenhouse Effect. Bull. Am. Meteorol. Soc. 69:1301-08.

[2] Riches, M. R., J. Zhao, W. -C. Wang, and S. Tao. 1992. The United States Department of Energy and the People's Republic of China's Academy of Sciences Joint Research on the Greenhouse Effect: 1985-1991 Research Progress. Bull. Am. Meteorol. Soc. 73:585-94.

[3] Zhang, X. -H. 1990. Dynamical framework of IAP nine-level atmospheric general circulation model. Adv. Atmos. Sci. 7:67-77.

简要介绍

1987年8月19日，美国能源部与中国科学院签署了《化石能源研究与发展协定》第三个附件“大气痕量气体领域合作研究备忘录”。其后两年，随着双方在化石燃料燃烧导致的全球与区域气候变化研究领域的交流与合作研究不断深入，双方签署了正式的合作研究协议。该协议的研究内容包括：(1)气候模式的诊断分析；(2)古气候资料、历史气候资料及现代气候资料的整理与分析；(3)全球与区域的气候关系及模式结果与资料之间的对比分析；(4)稻田排放监测。有关该协议的背景、细节与其它合作研究进展，Koomanoff等[1]和Riches 等[2]已有另文论述。

虽然已有一些中文的气候变化研究文献，包括上述协议的合作研究成果，已被译成可供西方学者参阅的英文（如张学洪[3]，1990），但其它的大部分同类研究仍主要以中文发表。编辑本文摘的主要目的是：通过编译1995-
1998年间以中文发表的全球气候变化（特别是古气候变化，历史气候变化，现代气候变化，东亚季风，气候变化的影响，气候变化的模拟，痕量气体排放与辐射，全球气候变化的适应对策等）主要研究论文摘要，让西方的气候变化研究学者能够全面了解中国的气候变化研究进展，进一步促进中西方的学术交流。

在此，我们代表美国奥克瑞奇国家实验室环境科学部CO_2信息分析中心，美国纽约州立大学奥尔巴尼校区大气科学研究中心和中国科学院地理研究所，对美国能源部能源研究办公室的Fred Koomanoff 和 Mike Riches（倡议并签署上述合作协议的美国代表），中国科学院的赵剑萍（倡议并签署上述合作协议的中国代表），ORNL出版社的Linda O'Hara（本文摘的英文责任编辑）表示感谢。

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一九九九年五月

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[2] Riches, M. R., J. Zhao, W. -C. Wang, and S. Tao. 1992. The United States Department of Energy and the People's Republic of China's Academy of Sciences Joint Research on the Greenhouse Effect: 1985-1991 Research Progress. Bull. Am. Meteorol. Soc. 73:585-94.

[3] Zhang, X. -H. 1990. Dynamical framework of IAP nine-level atmospheric general circulation model. Adv. Atmos. Sci. 7:67-77.

1. 气象学报*
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CN 62- 1072/P
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CN 62-1072/P
International Periodical No. Q440

16. 中国沙漠*
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CN 62-1070/P

16. Journal of Desert Research*
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CN 62-1070/P

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Domestic Periodical No. ISSN 1003-7578
CN 15-1112

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国内刊号：ISSN 1000-6923
CN 11-2201/X

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Sponsored by Chinese Society for Environment
Domestic Periodical No. ISSN 1000-6923
CN 11-2201/X

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21. Acta Oceanologica Sinica*
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CN 11-2055/P
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CN 11-1784/N
国际刊号：M 40B

22. Chinese Science Bulletin*
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International Periodical No. M40B

23. 中国科学*
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24. 地学前缘
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国内刊号：ISSN 1005-2321
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23. Science in China*
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Sponsored by the Chinese Academy of Sciences
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Domestic Periodical No. ISSN 1000-3134
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International Periodical No. M40B

24. Earth Science Frontiers
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Domestic Periodical No. ISSN 1005-2321
CN 11-3370/P

25. Scientia Meteorologica Sinica
(started in 1982, Quarterly)
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*中文核心期刊。

*Core journals in Chinese

Adaptation

许炯心，1995，我国东部季风区不同自然带年径流特征及人类活动影响的比较研究，地理研究，14(3):33-42

本文通过对我国东部季风区不同自然带年径流量与气候因子关系的分析，揭示径流深随纬度和经度变化的规律。通过对不同自然带中人类活动对河川径流的干预强度的比较，得出应在半干旱地区加强水资源保护，推行节水措施。

关键词：径流地带性
人类活动对径流影响 比较研究
中国

Xu Jiongxin. 1995. A comparative study on the zonal differences in river runoff and human influence in China. Geographical Research 14(3):33-42.

The relationship between zonal differences in river runoff and climatic index in monsoon-influenced China is analyzed. The analysis examines the regulation of runoff according to changes in latitude and longitude. Through the comparison of the influence and intensity of human activities on river runoff of different zones, it is concluded that water resources should be protected and that water-saving measures should be carried out in semi-arid regions.

Keywords: zonality of river runoff, influence of human activities on runoff, comparative study, China

唐守顺等，1995，皖南山核桃生产气候资源的开发利用，气象，21(1):48-51

本文分析了影响山核桃生长的气候条件，提出了趋利避害，争取高产的建议，为合理利用气候资源提供了参考依据。

关键词：山核桃 气候资源
开发利用

Tang Shoushun et al. 1995. Utilization of climatic resources for production of walnuts in Southern Anhui Province. Meteorological Monthly 21(1):48-51.

On the basis of analyses of climatic factors that affect growth of walnuts, the paper provides suggestions for the reasonable utilization of the climatic resources.

Keywords: walnut, climatic resources, utilization

郭建平等，1995，东北地区农业气候生产潜力及其开发利用对策，气象，21(2):3-9

本文根据东北地区100个气象台站1971－1990年气象和产量等资料研究了东北地区主要粮食作物的气候适应性和气候生产潜力。结果表明，东北地区中部平原区的气候生产潜力较高，50°N以北地区和东部长白山天池附近最低。文章还用线性规划对东北地区部分县的主要农作物结构提出调整意见。

关键词：东北地区 生产潜力 结构调整 对策

Guo Jianping et al. 1995. Agroclimatic potentiality and its countermeasures for development and application in Northeastern China. Meteorological Monthly 21(2):3-9.

The climatic adaptability and potential productivity of main grain crops are studied using documents of meteorology and crop yield from 100 meteorological stations in Northeastern China between 1971 and 1990. The climatic productive potentiality is higher for the middle plain of Northeastern China and is lowest to the north of 50° N and in regions near Tianchi Lake of Changbaishan Mountain. Lastly, structural adjustments of main crops in some counties of Northeastern China are pointed out using linear programming.

Keywords: Northeastern China, productive potentiality, structural adjustment, countermeasure

胡斯团，黄大文，张儒林，1995，南海北部热带气旋移向突变的气候特征，气象，21(8):23-25

本文根据1970－1990年进入预报研究区（15－25°N，125°E以西）的热带气旋移向变化情况，分析移向发生突变的季节变化与地理分布等方面的气候特征。通过对热带气旋移向的突变与副热带高压活动、海岸地形关系的研究得到一些有意义的结果，为寻找预报判据提供了气候特征的依据。

关键词：热带气旋 移向突变 气候特征

Hu Situan, Huang Dawen, and Zhang Rulin. 1995. The climatic characteristic of sudden change in track of tropical cyclone over the north part of the South Sea. Meteorological Monthly 21(8):23-25.

Based on data (1970 to 1990) of tropical cyclones with sudden changes in direction that entered the area of concern (15 to 25° N,Western of 125° E), climatic features, such as seasonal and geographical distributions, are shown. The relationsips between the sudden change in track and the activity of a subtropical high and terrain factors are discussed. The results are helpful in forecasting sudden change in track of tropical cyclones.

Keywords: tropical cyclone, sudden change in track, climatic feature

徐国昌，1995，绿洲气候资源和绿洲建设，干旱区资源与环境，9(4):138-145

本文根据绿洲气候资源的两重性及其变化趋势，讨论了绿洲气候生态的巨大潜力与生态环境的脆弱性，并提出绿洲开发对策。

关键词：绿洲 气候资源 绿洲建设

Xu Guochang. 1995. Climatic resources and oasis construction. Journal of Arid Land Resources and Environment 9(4):138-145.

The dual nature of the climatic resources of oases and their tendency to change are analyzed in the paper. The author discusses the great climate production, the latent capacity, and the fragile ecological environment of oases. According to the features of the oasis climatic resources, some strategies for oasis development are suggested.

Keywords: oasis, climatic resources, oasis construction

Ancient Climate Change

吴胜光，韩辉友，俞锦标，1995，贵州晴隆碧痕营晚第四系及古环境研究，地理研究，14(2):49-55

本文对贵州晴隆碧痕营湖相发育的晚第四系的古环境作出了分析，距今3万－2万年前后的温暖期，洼地附近的山地上生长着以落叶阔叶为主的针阔混交林，小有波动，当时的年均温较现在低1－6°C；在气温较今约低2－6°C距今3－2.6万年前后，是含高比例水青冈的针阔混交林，在距今2.3万年前后，气温较今低1－3°C，附近山地生长常绿阔叶、落叶混交林；在距今2.6-2.3万年和距今2.3万年以后一段时期，针阔混交林发育；在向冰期转化过程中，气候干冷，蕨类植物蔓生；湖相层之后是混杂泥砾堆积。

关键词：碧痕营 晚第四系 古环境 孢粉

Wu Shengguang, Han Huiyou, and Yu Jinbiao. 1995. Analysis of the Late Quaternary sediments and paleoenvironment in Bihenying, Qinglong County, Guizhou Province. Geographical Research 14(2):49-55.

The paper presents an analysis of the ancient environment of lacustrine deposit formed in the Late Quaternary in Bihenying, Qinglong County, southwest Guizhou Province. From 30 ka BP to 20 ka BP, the annual mean temperature was 1-6°C lower than that of today, mixed deciduous broadleaf and coniferous forests were growing on the hill land, with little variation between deciduous broadleaf forest and mixed coniferous forests. From 30 ka BP to 26 ka BP, the annual mean temperature was 2 to 6°C lower than that of today and there were mixed deciduous broadleaf and coniferous trees with a high proportion of Fagus. Around 23 ka BP, the temperature was 1-3°C lower than that of today, and there were mixed deciduous and evergreen trees. From 26 ka BP to 23 ka BP, and after 23 ka BP, the mixed broadleaf and coniferous forests were growing there. After that period, the climate turned dry and cold and pteridophyte grew widely. In the full glacial period, lacustrine deposition stopped and was replaced by the chaotic sediments of mud and gravel.

Keywords: Bihenying, Late Quaternary system, Paleoenvironment, pollen and spore

*董光荣*等，1995，150Ka以来中国北方沙漠、沙地演化和气候变化，中国科学（B辑），25(12)：1302-1312

本文根据气候带、沙丘活动程度和地层沉积相组合特点，将中国北方沙漠和沙地分为东部、西部、中部和西北部4个沙区，从时间和空间两方面讨论了150Ka以来中国北方沙漠、沙地演化和气候变化。

关键词：沙漠 沙地演化 气候变化

Dong Guangrong et al. 1995. The desert and sandy land evolution and climatic changes in the north of China since 150 ka BP. Science in China (Series B) 25(12):1302-1312.

On the basis of the characteristics of the climate belt, level of dune moving, and deposit of stratum, the authors divide the desert and sandy land of the north of China into four regions. These are eastern part, western part, middle part, and northwestern part. The authors also discuss desert evolution, sandy land evolution, and climatic changes for 150 ka BP in the North of China in time and space.

Keywords: desert, sandy land evolution, climatic changes

章新平，姚檀栋，1995，青藏高原降水中$\delta^{18}O$与温度和降水量的关系，地理科学，15(1):1-7

本文分析了青藏高原降水中的$\delta^{18}O$含量的变化特征，以及$\delta^{18}O$与局地气象要素的关系。结果表明，$\delta^{18}O$与气温存在正相关关系，$\delta^{18}O$随气温和降水量的变化而变化。

关键词：青藏高原 $\delta^{18}O$ 温度 降水量

Zhang Xinping and Yao Tandong. 1995. The relationship between $\delta^{18}O$ in precipitation and temperature and precipitation in Qinghai-Xizang Plateau. Sciencia Geographica Sinica 15(1):1-7.

The authors analyzed the variation feature of $\delta^{18}O$ in the Qinghai-Xizang Plateau and the relationship between $\delta^{18}O$ and regional weather factors. The results show that there are positive relations between $\delta^{18}O$ and temperature. The amounts of $\delta^{18}O$ are changeable with temperature and precipitation.

Keywords: Qinghai-Xizang Plateau, $\delta^{18}O$, temperature, precipitation

白光润，1995，从泥炭分布的演化过程分析中国东部和日本一万年来的干湿变迁，地理科学，15(1):30-38

本文认为水热条件决定了泥炭的空间分布。作者通过分析现代泥炭分布和相应的泥炭形成时期的气候条件的关系，确立了泥炭分布与水热关系模式：Z=5.7K+12－T。由此得出中国东部和日本一万年来的干湿变迁特点。

关键词：泥炭形成水热系统指数 泥炭分布历史演化 干湿变迁

Bai Guangrun. 1995. Humid and arid fluctuation during the last 10,000 years reconstructed from the peat formation in eastern China and Japan. Scientia Geographica Sinica 15(1):30-38.

Based on an analysis of the relationship between present peat distribution and the climatic condition of peat formation, a model was set up to explain the relationship between peat distribution and humid and thermal conditions: Z = 5.7K + 12−T. Humid and arid fluctuations during the last 10,000 years are reconstructed according to the research.

Keywords: hydrothermal system index of peat formation, historical evolution of peat distribution, humid and arid fluctuation

*李森*等，1995，浑善达克沙地全新世沉积特征与环境演变，中国沙漠，15(4)：323-331

本文根据浑善达克沙地全新世沉积中的粒度、化学元素、孢粉及披毛犀化石等环境变化证据，将全新世气候划分为8个旋回或三个演变阶段：升温波动期（10—7.1KaBP）、温暖期（7.1—3.2KaBP）和温干冷干频繁波动期（3.2KaBP至今）。

关键词：浑善达克沙地 全新世 沙质古土壤 气候旋回 环境演变

Li Sen et al. Holocene deposits and environmental evolution of Otingdag sandy land. Journal of Desert Research 15(4):323-331.

According to data of grain-size variation, chemical element composition, pollen-spore assemblage, and rhinoceros fossils that were included in Holocene deposits of Otingdag sandy land, the climate of the Holocene is divided into eight cycles and three evolutionary stages, namely, a temperature-rising fluctuation period from 10 to 7.1 ka BP, and a warm period from 7.1 to 3.2 ka BP, and warm-dry and cool-dry fluctuation period from 3.2 ka BP to the present.

Keywords: Otingdag sandy land, Holocene, sandy paleosol, climatic cycle, environmental evolution

*孙东怀*等，1995，全新世气候适宜期黄土高原及黄土/沙漠过渡区年降水量的初步恢复，中国沙漠，15(4):339-344

本文通过黄土高原不同地区的全新世黄土—古土壤剖面磁化率测量数据以及磁化率与降水量的转换函数，初步恢复了全新世气候适宜期黄土高原及黄土/沙漠过渡区年降水量的分布状况。

关键词：全新世 古气候要素 磁化率 黄土

Sun Donghuai et al. 1995. Preliminary reconstruction of annual rainfall in Loess Plateau and Loess-Desert transitional regions in suitable climatic period of Holocene. Journal of Desert Research 15(4):339-344.

On the basis of the susceptibility-rainfall conversion function and data of the determination of the magnetic susceptibilities of typical Holocene loess-paleosol profiles in different areas of the Loess Plateau, the suitable climatic period of Holocene and the rainfall distribution of the Loess Plateau and Loess-Desert transitional areas were preliminarily reconstructed.

Keywords: Holocene, Paleoclimatic element, susceptibility, Loess

*高全洲*等，1995，晚更新世以来巴丹吉林南缘地区沙漠演化，中国沙漠，15(4):345-352

受东亚季风降水尾闾摆动的影响，巴丹吉林沙漠南缘地区在晚更新世以来的演化中表现出微弱的波动性质。全球冰期气候波动主宰着本区沙漠的演化方向，青藏高原的隆起使该区变得更加干旱。

关键词：巴丹吉林沙漠 演化 晚更新世 风成砂

Gao Quanzhou et al. 1995. Evolution of southern fringe of Badain Jaran Desert since Late Pleistocene. Journal of Desert Research 15(4):345-352.

Affected by the shifting East Asia Monsoon, the Badain Jaran Desert has undergone a series of changes characterized by fluctuation. The tendency of evolution of the desert is governed by its glacier climate. The uplift of Qinghai-Xizang Plateau reduces humidity and makes the temperature lower in the area.

Keywords: Badain Jaran Desert, evolution, Late Pleistocene, eolian sand

*崔之久*等，1995，昆仑山垭口区新石器时代人类活动遗迹的发现及其环境意义，科学通报，40(7):624-627

本文依据昆仑山垭口区新石器时代人类活动遗迹的特点，研究了古代气候和环境变迁，得出气候变迁影响着人类活动。由此，作者认为，高山区冷期可能长而稳定，由冷变暖缓慢，暖期较短，转入冷期较快。

关键词：昆仑山垭口 古代人类 灰烬层

Cui Zhijiu et al. 1995. The find of traces of human activities during New Stone Age in Kunlun Pass and its environmental significance. Chinese Science Bulletin 40(7):624-627.

Based on the characteristics of traces of human activities of the New Stone Age in Kunlun Pass, the authors studied ancient climate and environmental changes and believes that human activities were affected by environmental changes. On that basis the author concluded that the alpine cold period was long and steady and turned warm slowly; the warm period was short and turned more quickly to the cold period.

Keywords: Kunlun Pass, ancient human being, ashes layer

*施雅风，郑本兴*等，1995，青藏高原中东部最大冰期时代高度与气候环境探讨，冰川冻土，17(2):97-112

本文应用多种资料推断出最大冰期出现时间相当与深海氧同位素18－16阶段（0.72-0.52MaBP)，当时青藏高原低于现代1000m左右，在唐古拉山、阿尼玛卿山、果洛山与稻城海马子4个山区，冰川面积达4000Km^2，为现代冰川面积的18倍，平衡线高度为3450－4250m，夏季平均温度为2.3-3.4℃，年降水量为1260－1960mm，是现代平衡线上降水量的1.8-3.2倍。

关键词：最大冰期　青藏高原抬升 气候

Shi Yafeng and Zheng Benxing et al. 1995. Research on altitude and climatic environment in the middle and eastern part of Tibetan Plateau during Quaternary Maximum Glaciation. Journal of Glaciology and Geocreology 17(2):97-112.

Based on various data, the authors analyzed the altitude and climatic environment during Quaternary maximum glaciation. The results indicate that the time of the appearance of the Quaternary maximum glaciation corresponds to the deep sea core oxygen isotopic stages 18-16 (0.72 to 0.52 MaBP). At that time the height of the Plateau was approximately 1000 m lower than that at present; the total glacierized area of Tanggular, A'nyemaquen, Gologrand, and Daocheng Haizi was 4000 km^2; 18 times larger than that at present, the equilibrium line altitude varied from 3450 to 4250 m, the average air temperature in summer varied from 2.3 to 3.4° C, and the annual precipitation varied from 1260 to 1960 mm, 1.8 to 3.2 times more than that at present at the equilibrium line altitude.

Keywords: Quaternary maximum glaciation, climate, uplift of Tibetan Plateau

刘光锈等，1995，孢粉记录揭示的2万年以来若而盖地区的气候变化，冰川冻土，17(2):132-137

根据若而盖黑河牧场DC剖面的孢粉记录，作者认为本次冰期晚阶段若而盖高原的气候表现为不稳定，冷暖变化频繁，与全球变化基本一致。本文还分析了该地区20000年来的冷暖变化情况。

关键词：孢粉记录 若而盖 气候变化

Liu Guangxiu et al. 1995. The vegetation and climatic changes in Zoige during the last 20,000 years determined by pollen records. Journal of Glaciology and Geocryology 17(2):132-137.

According to the pollen records from Zoige, the climate in this area fluctuated frequently between warm and cold, coinciding with global changes during the last 20,000 years. The authors analyze the roles of the climatic change from warm to cold in detail.

Keywords: pollen records, Zoige, climate change

徐道明，沈永平，1995，青藏高原的泛冰盖遗迹与冰期，冰川冻土，17（3）：213-229

本文利用多年野外考察资料研究青藏高原的古冰川遗迹，认为青藏高原曾经历过泛冰盖时期，将古冰川遗迹划分为晚更新世早晚（100-30KaB.P.和20-10KaB.P.）两个时期。另外，还讨论了冰期划分、冰盖形成条件等问题。

关键词：冰盖遗迹 泛冰盖 末次冰期 青藏高原

Xu Daoming and Shen Yongping. 1995. On ancient ice-sheet and ice age in the Tibetan Plateau. Journal of Glaciology and Geocryology 17(3):213-229.

Data suggest that the Tibetan Plateau was inundated by ice. The ancient ice sheet can be divided into two ages: early stadium (100 to 30 ka BP) and late stadium (20 to 10 ka BP) of the Last Glaciation. In addition, problems concerning the dividing method of the glacier and the formation condition of the ice-sheet are discussed.

Keywords: ice sheets landforms, coalescing ice-sheet, Last Glaciation, Tibetan Plateau

Climate Variation

曾昭美，章名立，季劲军，1995，近百年来全球不同冷、暖期温度分布及环流特征，地理学报，50(2):147-159

本文利用全球格点气温、海面温度、海平面气压等资料，分析了不同冷暖期之间温度距平场的分布特点、区域和季节差异以及海、陆变化的不同步性等，对本世纪以来四个不同冷暖时期（1906－1915，1936－1945，1966－1975，1979－1988年）的温度场和地面气温场作出总结。在温度的纬向谐波分析中发现冬季暖期，中高纬度超长波活动盛行。

关键词：海面温度 海面气压 谐波分析 温度距平

Zeng Zhaomei, Zhang Mingli, and Ji Jinjun. 1995. The patterns of temperature and sea level pressure in various cold and warm periods within recent 100 years. Acta Geographica Sinica 50(2):147-159.

The patterns of global temperature and sea level pressure during four special periods (1906-1915, 1936-1945, 1966-1975, and 1979-1988) are studied in the article. The results of harmonic analysis on zone temperature field show that the ultra-long wave was active during the warm winter period.

Keywords: sea-surface temperature, sea level pressure, harmonic analysis, temperature anomaly

秦大河，任贾文，效存德，1995，揭示气候变化的南极冰盖研究新进展，地理学报，50(2):178-184

本文研究了南极冰盖与海平面及全球变化的联系，认为南极冰盖是记录全球变化信息的良好载体，具有信息量大、时间序列长、保真性能强、分辨率高等独特优点。南极冰盖与全球变化研究这一领域将会以高起点、多学科互相交叉、渗透为特色，成为未来南极研究的热点。

关键词：南极冰盖 全球变化 环境气候记录 海平面变化 大气环流

Qin Dahe, Ren Jiawen, and Xiao Cunde. 1995. Progress in the research on Antarctic Ice Sheet in relation to global change. Acta Geographica Sinica 50(2):178-184.

The relationship between the Antarctic ice sheet and global change, including sea-level changes, was analyzed. The global change information derived from the ice sheet is unique because of its wide range of direct and proxy measures, long time-scale, and high resolution and fidelity. More widespread international and multidiscipline cooperation will be emphasized in future research programs.

Keywords: Antarctic ice sheets, global change, environmental climatic record, sea level change, atmospheric circulation

周霞，1995，
天山北坡中段气候垂直分异研究，
干旱区地理18(2):52-60

本文根据天山北坡中段气候要素垂直分布差异、热量和水分指标以及植被和土壤的垂直分布差异，将天山北坡中段划分出四个垂直气候带：（1）山前冲积扇、冲积平原温带；（2）中低山寒温带；（3）亚高山一高山寒带；（4）高山冰雪带。
关键词：天山北坡中段
气候要素垂直分布 垂直气候带

Zhou Xia. 1995. Vertical climatic difference in the middle part of the northern slope of the Tianshan Mountains. Arid Land Geography 18(2):52-60.

On the basis of the outstanding differences in the vertical distribution of climatic elements, the indexes of heat and moisture, and vertical distribution of vegetation and soil, the middle part of northern slope of the Tianshan Mountains can be divided into four vertical climatic zones: (1) Front mountain-alluvial plain temperate zone; (2) low-middle mountain cold-temperate zone; (3) sub-high and high mountain frigid zone; and (4) high mountain snow-ice zone.

Keywords: middle part of northern slope of Tianshan Mountains, vertical distribution of climatic elements, vertical climatic zone

周子康，刘为伦，1995，浙江台风（热带风暴）灾害的若干特点，地理研究，14(2):56-63

本文根据1949－1992年的气象、水文和灾害资料分析了浙江台风灾害的五个特点：1、台风日期与天文大潮期相遇机率高，使得沿海地区潮灾严重；2、台风大风是浙江沿海城市台风灾害危害的主因之一，且其危害具有连锁反应倾向；3、直接和继发性灾害叠加是台风对浙江农业危害的特点；4、台风灾害区的地理分布具有山脉走向性；5、台风重灾年呈阶段性年际分布。
关键词：台风 灾害

Zhou Zikang and Liu Weilun. 1995. Some characteristics of the typhoon disaster in Zhejiang Province. Geographical Research 14(2):56-63.

From an analysis of the data of atmosphere, hydrology, and disaster during 1949-1992, the characteristics of the typhoon disaster in Zhejiang Province are as follows: (1) Typhoon often have a high coincidence with the astronomical spring tide and bring heavy tide damage to the coastal areas of Zhejiang Province. (2) Typhoon is one of the main causes of disasters of coastal city in Zhejiang. (3) The conjunction of direct damage and successive damage is the characteristic of the damages to agriculture caused by typhoons. (4) The distribution of typhoon disaster regions has the characteristics of paralleling to the mountain ranges. (5) The distribution of heavy disaster years caused by typhoons in Zhejiang has a periodic character.

Keywords: typhoon, disaster

葛全胜，王维强，1995，人口压力，气候变化与太平天国运动，地理研究，14(4):32-41

本文通过史料分析，论证了人地矛盾的激化，以及在此基础上气候异常造成的全国农业大范围连年歉收，对中国历史上著名的太平天国运动（1851－1864）的爆发，起着特别激发作用。

关键词：人口压力 气候变化 太平天国运动

Ge Quansheng and Wang Weiqiang. 1995. Population pressure, climate change, and the Taiping Rebellion. Geographical Research 14(4):32-41.

Based on historical data, the authors considered that the conflict between the quick growth of population and the shortage of cultivated land, and climate change and its negative impact on agriculture played a special role in triggering the outbreak of the Taiping Rebellion (1851-1864).

Keywords: population pressure, climate change, Taiping Rebellion

于希贤，1995，对《徐霞客游记》中戊寅年（1638）滇中超长雨期的初步研究，地理研究，14(4):85-90

本文对《徐霞客游记》记载的公元1638年发生的现代气象记录滇中高原从未有的超长雨期进行研究，为认识全球环境变化提供了依据。

关键词：徐霞客 超长雨期

Yu Xixian. 1995. A study on the extra-long autumn rain in the central part of Yunnan in 1638 based on Xu Xiake's Travels. Geographical Research 14(4):85-90.

According to the records of sunny and rainy days in Xu Xiake's Travels, there was continuous heavy rain in 1638. No such extra-long autumn rains are recorded in the present meteorological records of the central part of Yunnan. This study provides materials for research of global changes.

Keywords: Xu Xiake, extra-long heavy rain

陈育峰，张强，1995，气候周期与天体活动周期的对应性及其区域特征的初步探讨，地理研究，14(4):91-96

本文初步探讨了各区域气候周期与天体活动周期间的对应性及区域特征。气候变化周期与天体活动周期之间有着密切的成因联系和对应关系。天体活动对地球气候系统的影响以及区域气候对天体活动的响应都表现出较强的区域差异。

关键词：气候周期 天体活动 区域差异

Chen Yufeng and Zhang Qiang. 1995. A preliminary discussion on periodical correspondence between climate and celestial activities and its regional characteristics. Geographical Research 14(4):91-96.

The authors discuss the regional characteristics and correspondence between periodical linkage and celestial activities. There is a close periodical correspondence between climate and celestial activities. There are also strong regional characteristics in both the impacts of celestial activities on Earth's climatic system and in the responses of regional climate to celestial activities.

Keywords: climate periodicity, celestial activity, regional characteristics

孙安健，刘小宁，1995，华南春季低温冷害气候特征研究，气象，21(3):25-29

本文根据华南地区48个台站1951－1990年2－3月气象资料，讨论了华南春季低温冷害的气候特征，认为其特征如下：1、春季低温冷害愈向南愈向2月份集中，且随纬度和海拔的升高而加重；2、冷害过程的初日和终日的年际波动较大；3、华南春季低温冷害过程多为湿冷型，混合型次之，干冷型最少；4、春季低温冷害过程频率的峰值呈现周期振动。

关键词：华南 春季 低温冷害

Sun Anjian and Liu Xiaoning. 1995. The climate characteristic of spring cool damage in South China. Meteorological Monthly 21(3):25-29.

According to the analysis of meteorological data in February and March from 1951 to 1990 at the 48 stations in South China, the authors discuss climate features of spring cool damage in detail. The results show that: (1) Spring low-temperature disaster is concentrated in February toward the south of China and increases with increasing latitude and height above sea level. (2) The interannual fluctuations of beginning and ending date of spring cool damage vary greatly. (3) The dominating pattern is moist-cool for spring cool damage and is a mixed pattern of moist-cool as well as dry-cool pattern in turn. (4) The peak values of pentad frequency of spring cool damage show an oscillation.

Keywords: South China, spring, low temperature with cool damage

陈峪，1995，1994年我国天气气候特点，气象，21(4):22-24

1994年，我国南北大部降水丰富，中部地区降水偏少。全国有南北两条明显多雨带，大部分地区气温偏高。总的看来，1994年气候年景为一般偏差。

关键词：天气气候 气候年景

Chen Yu. 1995. The features of weather/climate in China in 1994. Meteorological Monthly 21(4):22-24.

There was plentiful precipitation in both south and north China in 1994, whereas the middle part was dry. There were two rainy belts in north and south China. The temperature of most of the country was higher than normal. In general, the climate of the year was a little worse than normal condition.

Keywords: weather/climate, climate of the year

何敏，1995，1994年北半球环流特征及其影响，气象，21(4):25-28

本文分析了1994年北半球主要环流特征，其特征表现为：1、500hPa偏强西伸，盛夏异常偏北；2、欧亚地区盛行纬向环流，北半球极涡向极地收缩，强度偏弱；3、盛夏时东亚中纬度地区维持稳定的高压脊，西风带锋区位置偏北；4、夏季南亚高压强度偏强，位置偏北，东伸明显；5、热带海洋异常，形成厄尔尼诺事件。北半球大气环流和热带海洋的异常对我国天气气候产生了明显影响。

关键词：环流特征 厄尔尼诺 天气气候

He Min. 1995. General circulation over the Northern Hemisphere in 1994 and its impact. Meteorological Monthly 21(4):25-28.

The analysis of general circulation features over the Northern Hemisphere in 1994 shows that: (1) The subtropical high over the west Pacific extends west, is stronger than normal, and moves northward abnormally in midsummer. (2) It is dominated by Eurasian zonal circulation, and the Polar vortex in the Northern Hemisphere is weaker in strength than normal and shrank to the area of the pole. (3) In the mid-latitude of East Asia, high-pressure systems keep stable in summer, and the westerly frontal zone moves northward. (4) The South Asia high is stronger in summer, farther to the northward than normal and extents to the east. (5) An El Niño event is forming over the tropical Pacific. The abnormality of both the atmospheric circulation and the tropical ocean exerts a significant impact on the weather and climate in China.

Keywords: circulation, El Niño, weather and climate

庄丽莉，1995，1994年世界气候概况，气象，21(4):29-32

本文分析了1994年世界气候概况。总的来说，这一年世界气候普遍偏暖，有些地区的平均气温比常年偏高0.5-1.0℃，北半球中纬度地区夏季受高温热浪冲击。年内全球旱、涝频繁，在澳大利亚和印度尼西亚等地区发生的干旱自1991年来已持续了4年，这与1991年来发生的长厄尔尼诺/南方涛动事件紧密相关。

关键词：世界气候 热浪 厄尔尼诺/南方涛动

Zhuang Lili. 1995. The world climate in 1994. Meteorological Monthly 21(4):29-32.

The world climate was generally warmer than normal in 1994. Large sections of the middle latitudes in the Northern Hemisphere were hit by heat waves during this summer. Many regions experienced climate events such as severe drought or serious flood, frequently in some areas of the world. In Australia and Indonesia the persistent droughts were associated with the long El Niño Southern Oscillation (ENSO) events that have occurred several times since 1991.

Keywords: the world climate, heat wave, ENSO

赵振国，陈国珍，1995，对流层月平均环流的持续性，气象，21(5):3-8

本文分析了北半球对流层环流持续性的时空变化规律及其影响持续性的各种因素。结果表明，环流的持续性，高层比低层好，低纬度比中高纬度好，东半球比西半球好，冬夏季比春秋季好。持续性还存在着准2年、4年和6.5年的周期变化，这些准周期分别与QBO及厄尔尼诺现象和太阳活动的周期振荡、火山爆发等相联系。

关键词：环流 持续性 时空变化 影响因素

Zhao Zhenguo and Chen Guozhen. 1995. The persistence of monthly mean atmospheric circulation in the troposphere in the Northern Hemisphere. Meteorological Monthly 21(5):3-8.

The temporal and spatial characteristics of the persistence of monthly mean atmospheric circulation in the troposphere over the Northern Hemisphere are analyzed. The results show that the persistence is higher in the upper-troposphere than in the low-troposphere, in low-latitude than in high-latitude, in the Eastern Hemisphere rather than in the Western Hemisphere, and in winter and summer than in spring and autumn. It found persistent links with solar activities, Qiaso-Biennial Oscillation (QBO), El Niño, and volcanic activities. Quasi-oscillations of 2 years, 4 years, and 6.5 years of the persistence are closely connected with the above-mentioned factors.

Keywords: atmospheric circulation, persistence, time and space feature, influencing factors

杨义文，王慕真，1995，我国5月降水的气候特点和长期变化，气象，21(5):31-35

本文通过中央气象台长期科160站月降水资料分析了中国5月份降水的基本气候特点和长期变化。强调了5月份降水预报业务的重要性，明确了5月份南北方降水长期变化的阶段性及其反位相振荡现象对5月份降水长期预报业务具有重要意义。

关键词：5月降水 气候特点 长期变化

Yang Yiwen and Wang Muzhen. 1995. Climate feature and long-range changes of rainfall of May in China. Meteorological Monthly 21(5):31-35.

Based on the analysis of monthly rainfall data of 160 stations in China, the climate feature and the long-scale changes of rainfall in May are analyzed in the paper. The importance of rainfall forecasting of May is emphasized. The rainfall stage feature of South China-North China and their opposite phase are significant for long range-rainfall forecasting in May.

Keywords: rainfall of May, climate feature, long-scale changes

盛永宽，1995，短期气候（月、季、年）逐月降水预测系统研究，气象，21(6):3-8

本文介绍了短期气候逐月降水预测系统。论述了把气候模式与人工神经网络结合起来开发气候预测支持系统的必要性和可能性，并详细讨论了系统结构。然后，提出有关预测结果分析和进一步完善该系统的看法。

关键词：气候模式 神经网络 降水预测系统

Sheng Yongkuan. 1995. Study on short-term climatic monthly rainfall prediction system. Meteorological Monthly 21(6):3-8.

A short-term climate prediction system for monthly rainfall is introduced in this paper. The author mainly deals with the necessity and possibility of combining a climate model and artificial neural network to develop a Climate Prediction Support System. The structure of the systems also is discussed in detail. Then some views on the analysis of prediction results and further improvements are proposed.

Keywords: climate model, neural network, rainfall prediction system

王谦，1995
黄淮海平原极限干旱历史概率特征研究，气象，21(6):9-12

本文根据相依水分序列、独立水分序列极限干旱历时确切概率密度函数及其特征，分析了黄淮海平原5个代表点30年逐旬降水序列和逐年时段降水序列极限干旱历时概率分布特征。
关键词：相依序列 独立序列 极限干旱历时 黄淮海平原 概率分布

Wang Qian. 1995. The study on the probability feature of critical drought duration in Huang-Huai-Hai Plain. Meteorological Monthly 21(6):9-12.

On the basis of the probability distribution function (PDF) of both dependent and independent series, the probability features of critical droughts, duration of precipitation for ten-day periods, and year-to-year seasonal periods were analyzed at five stations on the Huang-Huai-Hai Plain.

Keywords: dependent series, independent series, critical drought duration, probability features, Huang-Huai-Hai Plain

张家诚，张先恭，魏凤英，1995，中国及邻近地区冬到夏的季节变化，气象，21(7):3-8

本文分析了北半球季节变化的敏感区—南亚地区在季节转变过程中的热力学与环流变化特征。为了更好的反映季节变化特征，文章设计计算了南支西风指数，并将副高面积指数分南北两区统计。结果表明，这个指数组对梅雨与华北雨季有天气气候学意义。同时，作者还找到了这个指数组对我国一些地区旱涝的前期指标。
关键词：季节变化 环流指数 旱涝预报

Zhang Jiacheng, Zhang Xiangong, and Wei Fengying. 1995. Seasonal change from winter to summer for circulation and rainfall in China and contiguous regions. Meteorological Monthly 21(7):3-8.

South Asia is a region in the Northern Hemisphere that is sensitive to seasonal change. Annual variations of thermal and atmospheric circulation peculiarities of South Asia are analyzed in this paper. For better representation of seasonal change, an index of the southern branch of westerly is proposed, and a new regional index of subtropical highs is analyzed for the northern and southern regions. The results show that there is a strong link between these indexes and the MeiYu and the rainy season of North China. A series of earlier indexes of serious drought and flood are also used with reference to long-range weather forecasting.

Keywords: seasonal variation, index of atmospheric circulation, drought/flood forecasting

孙寿全，魏文秀，1995，热带气旋与河北特大暴雨，气象，21(7):34-37

本文利用1965－1994年的资料分析了河北特大暴雨与太平洋热带气旋的关系，将热带气旋影响的河北特大暴雨分为三种类型，并对其中快速发展型进行了进一步的分析和探讨。

关键词：特大暴雨 热带气旋 西风槽

Sun Shouquan and Wei Wenxiu. 1995. Tropical cyclones and heavy rainfall in Hebei Province. Meteorological Monthly 21(7):34-37.

Based on analysis of data from 1965 to 1994, the authors discuss the relationship between the heavy rainfall in Hebei Province and the tropical cyclones over the west Pacific. Three types of the tropical cyclones impacting on the heavy rainfall in Hebei Province are given, and their rapid development types are analyzed.

Keywords: heavy rainfall, tropical cyclone, westerly trough

李月洪，1995，我国干旱半干旱区降水场及其与北极海冰的关系，气象，21(9):11-15

用复经验正交函数（CEOF）方法将我国干旱半干旱区45个代表站1950－1992年间的月降水距平场划分为三种主要的分布类型并分析它们的分布特征。文章揭示了北极海冰状况与干旱半干旱区降水的密切关系，分析海冰与极涡、西太平洋副热带高压等大气环流的关系以了解其可能的天气学影响过程。

关键词：降水 干旱半干旱区 北极海冰

Li Yuehong. 1995. The characteristics of precipitation in the dry and semidry region of China and their connection with Arctic sea ice. Metrorological Monthly. 21(9):11-15.

The temporal and spatial distribution of precipitation in the dry and semidry region of China are divided into three types by use of the complex empirical orthogonal functions (CEOF) analysis of data for 45 stations from 1950 to 1992. The relationship between the precipitation patterns and Arctic Sea ice is also analyzed. Finally, the possible influences of physical processes are discussed.

Keywords: precipitation, dry and semidry region, Arctic Sea Ice

张尚印，刘小宁，孙安健，1995，秋季华南低温冷害的气候特征，气象，21(9):21-24

本文根据1951－1990年9－10月华南48个气象台站资料分析了低温冷害天气气候特点。结果表明，低温冷害频率自北往南递减，从沿海向内陆增加。总数量由北向南递减，南北差别较大。灾害的持续时间和强度也有相应规律。强低温冷害年有9年，主要集中在1966－1980年。
关键词：低温冷害 气候特征 频数

Zhang Shangyin, Liu Xiaoning, and Sun Anjian. 1995. The climatic characteristic of chilling damage in South China during autumn. Meteorological Monthly 21(9):21-24.

Based on analysis of data of 48 stations, from September to October 1951-1990, the paper analyzes the climatic character of chilling damage in autumn in South China. The results show that the mean frequency of chilling damage decreased from north to south and increased from coast to inland in South China. Continuous time of the chilling damage process shortens rapidly from the north to the south. There were 9 years of strong chilling damage, most of which happened during 1966-1980.

Keywords: chilling damage, climatic characters, frequency

李栋梁，姚辉，1995，中国西北夏季降水量与500hPa纬偏场的特征分析，气象，21(11):22-26

利用西北五省129个测站30年6－8月的降水资料，以EOF方法分解，从不同方面分析其特征向量和载荷量的空间分布特征，将中国西北夏季降水量场分成5种空间分布型。利用相应的时间系数与同期欧亚500hPa纬偏场进行遥相关及典型场的对比分析，给出中国西北夏季降水类型所对应的环流场特征。
关键词：自然正交函数分解
西北夏季降水 欧亚纬偏场 遥相关

Li Dongliang and Yao Hui. 1995. The characteristic analysis of summer precipitation and 500 hPa latitudinal deviation field. Meteorological Monthly 21(11):22-26.

With data from 129 representative stations of five provinces of Northwestern China from June to August for 30 years, the total precipitation is analyzed by the empirical orthogonal functions (EOF) method. The summer precipitation fields are classified into five patterns of spatial distribution. Comparison between teleconnection and typical field of the time coefficient and simultaneous Eurasian 500 hPa latitudinal deviation field indicates a circulation field that corresponds to the summer precipitation patterns in Northwest China.

Keywords: natural orthogonal function resolution, summer precipitation in northwest China, Eurasian latitudinal deviation field, teleconnection

*许晨海*等，1995，南大洋海冰月际变化的一些特征，气象，21(11):38-41

本文根据1973－1986年的资料对海冰面积指数的月际变化特征进行了分析。50°S以南与60－69.75°S间海域海冰面积月际变化特征相似，海冰月际变化在某些地区有纬向传播趋势。一般说来，9月份海冰最多，2月份海冰最少，但有些地区可与上述情况相差1个月。

关键词：南大洋 海冰 月际变化

Xu Chenhai et al. 1995. Some features of the inter-monthly sea ice variation in the southern oceans. Meteorological Monthly 21(11):38-41.

Based on the area index data of sea ice from 1973 to 1986, the intermonthly sea ice variation in the southern oceans is analyzed. The results show that the inter-monthly variation pattern of sea ice area in the latitude belt north of 50° S is similar to that of 60-69.75° S. The variation of sea ice show a tendency of eastward (or westward) propagation in certain areas. Generally, the quantity of sea ice reaches the maximum in September and minimum in February. But at certain longitudes, the months extreme values occurred could move up or delay for one month.

Keywords: the southern ocean, sea ice, inter-monthly variation

陈兴芳，1995，1994年西太平洋副高异常变化及其成因分析,气象，21(12):3-7

本文分析了1994年副高异常的气候特征及其成因。1994年副高季节性北跳早，盛夏位置稳定偏北。副高的这些特点与气候背景和海气相互作用有关。作者还讨论了副高异常对海温距平场的影响。

关键词：副热带高压 气候特征 异常变化 成因分析

Chen Xingfang. 1995. The anomalous change of subtropical high and the cause of its formation in the West Pacific. Meteorological Monthly 21(12):3-7.

The anomalous climatic characteristic of the subtropical high and the cause of its formation in the West Pacific in 1994 are analyzed. The seasonal northward jump of the subtropical high is earlier than normal with strong intensity, and its position is persistently farther north in midsummer. Such characteristics are associated with the climatic backgrounds and the ocean-atmosphere interaction. In addition, the sea surface temperature (SST) anomaly field that corresponds to the subtropical high anomaly is discussed.

Keywords: Subtropical high, climatic characteristic, anomalous change, analysis of formation cause

施雅风，张祥松，1995，气候变化对西北干旱区地表水资源的影响和未来趋势，中国科学（B辑），25(9):968-977

中国西北部干旱区地表水资源主要孕育于6大山系，分为积雪、冰川、河流、湖泊4类。现代气候正处于暖干化，预计2030年左右，西北山区升温1℃，降水与蒸发都有相当量的增加，但地表水资源的变化总趋势是萎缩的。

关键词：气候变化 水资源 冰川 积雪 湖泊

Shi Yafeng and Zhang Xiangsong. 1995. The effect on water resource by climate change and its trend. Science in China (Series B) 25(9):968-977.

Groundwater resources are mainly formed in six main mountains in Northwestern China and include four types: snow, glacier, river, and lakes. The current climate is turning to warm/dry, the temperature in the northwestern mountain area will raise 1°C by the 2030s. The precipitation and vapor are both increasing, but the general trend of groundwater resources is decreasing.

Keywords: climate change, water resource, glacier, snow, lakes

丁永建，1995，近40年来全球冰川波动对气候变化的反应，中国科学（B辑），25(10):1093-1098

近40年来全球冰川波动资料表明，冰川波动具有区域性特点，冰川波动与气候变化具有对应关系。全球范围内，大冰川（长度>5公里）波动滞后气候变化约8年，小冰川（长度≤5公里）则滞后约2年左右。

关键词：冰川波动 气候变化 冰川物质平衡

Ding Yongjian. 1995. Reaction of climate change of global glacier fluctuation for recent 40 years. Science in China (Series B) 25(10):1093-1098.

The regional characteristics of glacier fluctuation are analyzed with the research on data of global glacier fluctuation for the last 40 years. There is a corresponding relationship between glacier fluctuation and climate change. The glacier fluctuation is 8 years behind climatic changes for long glaciers (>5km), and 2 years behind for short glaciers (≤5km).

Keywords: glacier fluctuation, climate change, material balance of glacier

*姚檀栋*等，1995，古里雅冰芯中小冰期以来的气候变化，中国科学（B辑），25(10):1110-1114

本文论述了小冰期以来古里雅冰芯所反映的气候变化特征。400多年来，17世纪和19世纪是寒冷少雨期，18世纪和20世纪是温暖多雨期。温度和降水的对应关系与季风对本区的影响具有内在联系。

关键词：古里雅 冰芯 气候变化

Yao Tandong et al. 1995. The climatic change from the Little Ice Age represented by ice core of Guliya. Science in China (Series B) 25(10):1110-1114.

The climatic change from the Little Ice Age (LIA) that can be derived from the ice core of the Guliya Ice Cap is discussed in this paper. According to the 400 year record, the climate was cold and dry in the 17th and 19th century, and warm and humid in the 18th century and 20th century. The relationship between temperature and precipitation shows an inter-association with monsoons.

Keywords: Guliya, ice core, climatic change

郑景云，张丕远，1995，近500年冷暖变化对我国旱涝分区的影响，地理科学，15(2):101-108

本文利用我国东部及南部85个站点的旱涝资料对近500多年我国的旱涝状况进行了分区，并对我国冷暖时期旱涝分区变化状况进行分析。我国东部地区存在两条明显的旱涝分界线：不同的冷暖时期，旱涝分界线的位置有所不同，暖期北移，冷期南移。

关键词：冷暖变化 旱涝分区 影响

Zheng Jingyun and Zhang Peiyuan. 1995. The impact of temperature change for the last 500 years on the regional division of drought/flood in China. Scientia Geographica Sinica 15(2):101-108.

Based on drought/flood data of 85 stations in the east and south of China, the authors study the demarcations of drought/flood for the last 500 years. The regional divisions of drought/flood in China during cold and warm periods are discussed. There are two main demarcations of drought and flood in the east of China. In the cold or warm period, the demarcations of flood and drought in the east of China have marked differences. The demarcations and the regions of drought/flood shifted south in the cold period and moved north during the warm period.

Keywords: changes of warm or cold, regional division of drought/flood, impact

丁永建，刘凤景，1995，近三十年来青海湖流域气候变化对水量平衡的影响及其趋势预测，地理科学，15(2):128-135

本文通过对青海湖流域气候和水文要素变化的分析，研究了近三十年来气候变化对青海湖水量平衡的影响。结果表明，水量平衡与降水和气温密切相关，近三十年来青海湖的水位下降与降水量减少有关，气温影响着地面和水面的蒸发。现代气候正在向湿、暖转变，青海湖的水量平衡将会保持现状，甚至会稍有回升。文章还论述了地下冰融对水量平衡的影响。

关键词：气候变化　降水　气温　流域水量平衡要素

Ding Yongjian and Liu Fengjing. 1995. Effect of climatic change of water balance of Qinghai Lake basin for the last 30 years and possible trends. Scientia Geographica Sinica 15(2):128-135.

Through the research of the data series on climate and hydrology in the Qinghai Lake basin, the effects of climatic change on water balance for the last 30 years are discussed. The results show that there is a close relationship between average precipitation and temperature and water balance. The lowering of the Qinghai Lake level for the recent 30 years is related to the decrease of precipitation, and evaporation from ground and surface water is influenced by temperature changes. The climate tends to be wet and warm. The water balance in the Qinghai Lake basin can maintain its present condition, and the level of the lake may even rise slightly. The authors also deal with the effects of melting underground ice on the water balance.

Keywords: climatic change, precipitation, air temperature, water balance elements

陈家其，施能，1995，全球增暖下我国旱涝灾害可能情景的初步研究，地理科学，15(3):201-207

本文在竺可桢对历史冷暖期划分的基础上，研究历史冷暖时期我国旱涝分布特征。对我国近500年旱涝等级资料加以计算，结论认为，随气候变暖，中国大部分地区涝灾将增加。

关键词：气候增暖　旱涝灾害　灾害预测

Chen Jiaqi and Shi Ning. 1995. The preliminary study on possible serious floods and droughts in China under conditions of global warming. Scientia Geographica Sinica 15(3):201-207.

The drought/flood distribution characteristics of the last 500 years in China are studied, and the period is divided into several alternately cold and warm periods according to Prof. Zhu Kezhen's historical climatic division. The averages of flood/drought degree in the last 500 years are calculated. The results show that disasterous floods probably will increase in many parts of China under conditions of global warming.

Keywords: climate warming, disaster of flood and drought, disaster forecast

杨世伦，陈吉余，1995，太湖流域洪涝灾害的形成和演变，地理科学，15(4)：307-314

本文研究了太湖流域洪涝灾害的形成和演变，认为其成因除与充沛而集中的雨量和碟形洼地地势有关外，还与海平面的相对上升、长江三角洲的向海推进及人口激增有关。研究表明，下一世纪流域的降水量增加，洪涝的威胁呈增长趋势。
关键词：太湖流域　洪涝灾害　成因

Yang Shilun and Chen Jiyu. 1995. Factors controlling floods in the Taihu Lake drainage area. Scientia Geographica Sinica 15(4):307-314.

The formation and evolution of floods in the Taihu Lake drainage area are discussed. Except for rainfall and relief, the formation factors of floods are associated with the rise of sea level, the advance of the Changjiang River delta to coastline, and the increasing population density. The rainfall of the drainage area will increase and the threat of flood will be aggravated in the next century.

Keywords: Taihu Lake drainage area, flood disaster, cause

*王式功*等，1995，我国西北地区黑风暴的成因和对策，中国沙漠，15(1): 9-30

本文分析了我国西北地区沙尘暴的时、空分布特征和黑风暴天气发生的宏观气候背景及下垫面条件。以1993年5月5日发生的黑风暴天气过程为例，研究了造成黑风暴天气的大尺度环流形势、主要天气系统和中尺度系统。并提出预报着眼点和防灾、减灾对策。
关键词：西北地区　黑风暴　成因与对策

Wang Shigong et al. 1995. Study on the formative causes and countermeasures of the catastrophic sandstorm in Northwest China. Journal of Desert Research 15(1):19-30.

In the paper, the catastrophic sandstorm that happened in Northeast China on 5 May 1993 is studied in terms of the time and space characteristics, climate conditions, and underlying surface conditions. The authors also analyze large-range circulation, main atmospheric system, and middle-range system. Suggestions for a warning system are given and countermeasures for forecasting and preventing future disasters.

Keywords: Northwest China, catastrophic sandstorm, formative causes and countermeasures

*杨佐涛*等，1995，塔克拉玛干沙漠腹地的气候表现，中国沙漠，15(3):293-298

本文对塔克拉玛干沙漠腹地和边缘气候资料进行对比分析，认为从沙漠外缘至腹地温度呈升高趋势，降水趋势不稳定。但愈深入沙漠内部，湿度越低，蒸发越大。

关键词：塔克拉玛干沙漠
气象要素

Yang Zuotao et al. 1995. Characteristics of the weather in the hinterland of the Taklimakan Desert. Journal of Desert Research. 15(3):293-298.

This comparison between the meteorological data of the hinterland of the Taklimakan Desert and the fringe area of the desert shows that the temperature rises from the edge to the hinterland of the desert. Precipitation has no distinctive trend. But the humidity becomes lower and the evaporation becomes higher nearer to the hinterland of the desert.

Keywords: Taklimakan Desert, meteorological factor

王谦，陈景玲，1995，黄淮海平原干旱历时的概率特征研究，农业气象，16(1):23-26

本文研究了用旬降水量表示干旱历时概率分布的可行性以及黄淮海平原干旱历时的概率特征。另外，还应用Sen的方法分析了黄淮海平原季节性干旱的年际历时的概率分布。

关键词：干旱历时 概率特征
黄淮海平原

Wang Qian and Chen Jingling. 1995. Probability feature of drought duration in Huang-Huai-Hai Plain. Agricultural Meteorology 16(1):23-26.

The authors analyzed the possibility of using precipitation of a ten-day period to examine drought duration and the probability features of drought duration of the Huang-Huai-Hai Plain. They also deal with yearly probability distribution of seasonal drought duration in the Huang-Huai-Hai Plain by applying Sen's method.

Keywords: drought duration, probability feature, Huang-Huai-Hai Plain

*解思梅*等，1995，南北两极海冰的相互关系，科学通报，40(7):632-635

本文使用NAVY－NOAA Joint Ice Center (JIC)
提供的SIGID海冰资料，研究两极海冰之间的涛动关系。通过对南北两极海冰变化周期的分析，发现两极海冰之间存在着强烈的相互作用，形成了纬向加纵向的海冰涛动关系。这种涛动关系在特性上与大气中存在的涛动关系相似，这与两极作为冷源对气候的影响是一致的。
关键词：南极 北极 海冰相互作用

Xie Simei et al. 1995. Relationship between sea ice of the Antarctic and Arctic. Chinese Science Bulletin 40(7):632-635.

According to Sea Ice Grid (SIGRID) sea ice data provided by the U.S. Navy/National Oceanic and Atomspheric Administration (NAVY/NOAA) Joint Ice Center (JIC), the relationship between oscillations of sea ice of the two poles is studied. Through the analysis of the change cycle of sea ice of the two poles, it was concluded that there is intense interaction between sea ice of the two poles, which causes the oscillation both of altitude and longitude. The oscillations have high coincidence with oscillation in atmosphere because of the influence on climate by the cooling action of the two poles.

Keywords: Antarctic, Arctic, interaction between sea ice

*韩建康*等，1995，南极南设德兰群岛近百年平均气温变化趋势，冰川冻土，17(3):268-273

本文建立了南设德兰群岛1904年以来的年均气温变化序列（MAAT）。由5年滑动平均分析可知，该地区以本世纪50年代为界，后期比前期明显变暖，增温变幅为0.8℃左右。其相对寒冷阶段为1910－1920年间、20、40和50年代末。50年代中期和80年代为最暖期。
关键词：南设德兰群岛 年均气温变化趋势

Han Jiankang et al. 1995. Change trends of the mean annual air temperature in the last 100 years in the South Shetland Island, Antarctic. Journal of Glaciology and Geocryology 17(3):268-273.

The series of mean annual air temperature (MAAT) in the South Shetland Island since 1904 were set up. It indicates that an 0.8°C warming started in the 1950s according to the five-year moving average curves of the MAAT. The comparatively cold periods were in the middle of the 1910-1920s, the end of the 1920s, the end of the 1940s, and the end of the 1950s. The warmer periods were the mid-1950s and 1980s.

Keywords: South Shetland Islands, MAAT, change trend

赵振国，1995，夏季青藏高原位势高度场的长期振荡与气候变化，气象学报，53(1):108-114

本文根据北半球500hPa月平均位势高度场资料，研究了夏季（6—8月）青藏高原位势高度场的长期振荡及其与两大洋副热带环流的相互联系，以及这种长期变化对全球和中国气候的影响。
关键词：青藏高原位势高度 长期振荡 气候变化

Zhao Zhenguo. 1995. Long term oscillation of the geopotential height over the Qinghai-Xizang Plateau in summer and its relationship to climate change. Acta Meteorologica Sinica 53(1):108-114.

Based on monthly 500 hPa height data in the Northern Hemisphere, the author studied the long-term change of the geopotential height over the Qinghai-Xizang Plateau in summer and its relationship with long-term oscillation of the subtropical circulation over the eastern Pacific and Atlantic. Additionally, the relationship of the geopotential height over the Qinghai-Xizang Plateau to the climate changes of China and the other regions in the world is also analyzed.

Keywords: geopotential height over the Qinghai-Xizang Plateau, long-term oscillation, climatic change

魏民，仇永炎，1995，全球500hPa角动量与EP通量的季节变化，气象学报，53（2）：238-246

本文利用ECMWF提供的资料（1980—1988年）分析了500hPa全球东西风带的角动量和EP通量的季节过渡。结果表明，角动量和EP通量都存在相应的季节性急变。季节性急变的发生时间在东西风带有所不同。
关键词：角动量 EP通量 季节变化

Wei Min and Qiu Yongyan. 1995. On the seasonal transition in global angular momentum and EP-flux at 500 hPa. Acta Meteorologica Sinica 53(2):238-246.

Based on the data provided from the European Centre for Medium-Range Weather Forecasts (ECMWF) from 1980 to 1988, the seasonal transition of angular momentum and Eliassen-Palm (EP)-flux for the easterly and westerly in the Northern and Southern Hemispheres are analyzed. It is found that there is a seasonal sudden change occurring to both the angular momentum and the EP-flux. The time of this seasonal sudden change is different in the easterly than in the westerly.

Keywords: angular momentum, EP-flux, seasonal transition

*施能*等，1995，中国近100年来4个年代际的气候变化特征，气象学报，53(4):431-439

本文研究了本世纪中国年平均气温、年降水量的气候趋势和4个年代际的气候变化特征及差异。结果认为，20世纪中国西北、东北、华北明显变暖，降水趋势值不大，以负趋势为主。在数十年尺度的暖背景下，大部分地区降水偏少。相应的降水特征是，除了黄河以南及江淮流域降水比40年代多以外，其他大部分地区降水偏少。

关键词：气候变化 冷暖时段 气候趋势系数

Shi Ning et al. 1995. Four-phase climate change features in the last 100 years over China. Acta Meteorologica Sinica 53(4):431-439.

The climate trend of the annual average air temperature and total annual rainfall and the four-phase climate features and differences in the present century are studied. The results indicate that the Northwest, Northeast and North China have become notably warmer this century and the rainfall trend is negative, but not significant. On the scale of tens of years there was considerably less rainfall in most of China in the warm background than in the cold background. The corresponding rainfall feature is that most areas experienced much less rainfall except south of the Huanghe River and over reaches of the Changjiang and Huaihe Rivers.

Keywords: climate change, cold-warm period, climatic trend coefficient

*田荣湘*等，1995，中国西北干旱区年降雨量的时空变化，高原气象，14(1):90-95

本文研究了西北地区年降雨量的变化规律，把中国西部划分为6个降雨量性质不相关的区。通过对西北3个区的分析，把年降雨量划分为8种不同的空间分布类型。分析表明，西风系统是控制中国西北干旱区的天气系统的主要因素。在过去的30年间，西北干旱区的气候并非都是变得越来越干，不同的地区变化情况不同。

关键词：中国西北干旱区 年降雨量

Tian Rongxiang et al. 1995. Spatial and temporal variation of annual rainfall in the northwest arid areas of China. Plateau Meteorology 14(1):90-95.

The variation of precipitation over 30 years is studied in this paper. West China is divided into six independent rainfall regions on the basis of annual rainfall during 30 years for 68 stations. Eight types of different spatial distribution of rainfall are divided by analysis for 3 areas in Northwest China. The results show that the control weather system in the arid area of Northwest China is mainly a westerly system. In the past 30 years, not all the northwest regions became arid; climate change was different in different areas.

Keywords: the northwest arid areas of China, annual rainfall

*李栋梁*等，1995，中国夏季月平均气温异常研究，高原气象，14(2)165-175

本文根据1951－1990年历年月平均气温标准化距平资料，研究了中国40年夏季温度异常的空间结构及时间演变特征。结果表明，中国夏季温度异常在空间上主要有6个类型：长江中下游、华南、东北、青藏高原、西北和华北。旋转主分量的时间变化趋势反映了中国各主要气候区夏季气温的异常特点。40年来的基本趋势是：长江中下游由热一凉；华南、西北由热一凉一热；东北、华北、青藏高原由凉一热。夏季月平均气温的持续性较好，但周期性较差。在同位相的短周期振动中西北、华北均比华南地区超前变化。
关键词：夏季气温异常 时空变化 旋转主成分分析 交叉谱

Li Dongliang et al. 1995. A study on the anomalous variation of monthly mean temperature during summer in China. Plateau Meteorology 14(2):165-175.

The spatial structure and temporal feature of summer temperature anomalies are studied. Six types of summer temperature anomaly are classified as follows: the middle and lower reaches of the Yangtze River, South China, Northeast China, the Qinghai-Xizang Plateau, Northwest China, and North China. Analyzing the temporal tendency of rotated empirical orthogal function (REOF) mirrors the anomalous features of summer temperature over the main climatic areas in China. The basic variation tendencies of 40 years are that the middle and lower reaches of the Yangtze River vary from warm to cool; South China and Northwest China from warm to cool to warm; Northeast China, North China and the Qinghai-Xizang Plateau, from cool to warm. There is a good persistence in the summer mean temperature, but the periodicity is not obvious. In the short-period oscillations of the same phase, Northwest China appears to experience variation before other areas.

Keywords: summer temperature anomaly, temporal and spatial variation, rotated empirical orthogonal function (REOF), cross spectrum

马柱国，1995，地温异常与1991年江淮大水、江南大旱关系的初步分析，高原气象，14(2):185-191

本文根据江淮主涝区深层(1.6m, 3.3m)地温距平场资料，研究了下垫面热力异常与洪涝灾害的关系。结果表明，江淮流域特大洪涝对应前期地温持续异常高温，江南大旱对应前期地温持续异常低温。前期地温的持续异常高温对应汛期多雨，前期地温的持续异常低温对应汛期少雨。
关键词：地温距平 持续异常 降水距平百分率

Ma Zhuguo. 1995. A preliminary analysis of the relationship between the anomalies of soil temperature and either floods in the Yangtze-Huai River reaches or strong drought south of the Yangtze River in the summer of 1991. Plateau Meteorology 14(2):185-191.

The relationship between the thermal anomaly of underlying surface and flood disasters is studied by using the soil temperature data of seasonal mean soil temperature at the depths of 3.2 m and 1.6 m in the Yangtze-Huai River reaches. The results indicate that the range of floods corresponds to the long duration of high soil temperatures in the area, and that the range of strong drought corresponds to the long duration of low soil temperatures south of the Yangtze River. Meanwhile, the durable anomaly of high soil temperature at an early stage corresponds to an increase in rain in the same area, and the durable

anomaly of low soil temperature at an early stage corresponds to drought in the same area.

Keywords: the departure of soil temperature, the durable anomaly, the percentage of precipitation departure

马晓波，1995，50年来蒙古国与北半球的气温变化，高原气象，14(3):348-358

本文利用蒙古25个台站52年月平均气温资料分析了蒙古的气温变化趋势，并与北半球进行了比较。结果表明，52年来蒙古年平均气温呈上升趋势，50年代是蒙古相对较冷的时期。北半球自1940年以来年气候变暖，60年代和70年代为较冷时期，其余为暖期。蒙古气温分布主要有3种类型：全暖、西暖东凉和北暖南凉。气候变暖主要表现在冬季变暖。冬季变暖夏季变凉不仅是我国，也是蒙古及北半球50年来的气候特点之一。

关键词：蒙古国 北半球 气温变化

Ma Xiaobo. 1995. Air temperature variations in Mongolia and the Northern Hemisphere for recent 50 Years. Plateau Meteorology 14(3):348-358.

Monthly mean air temperature variations at 25 stations in Mongolia are studied and are compared with Northern Hemisphere air temperature (NHT). It is found that the annual mean air temperature of 52 years in Mongolia is increasing. The 1950s are the cool period in Mongolia, other periods are warm. But in the Northern Hemisphere, the period of the 1960s-1970s is cool, and other periods are warm. Three kinds of variation in Mongolia are: warm, west warm and east cool, and north warm and south cool. Climate warming mainly shows in winter. Warmer winter and cooler summer are one of the climate characteristics for the most recent 50 years not only in China but also in Mongolia and the Northern Hemisphere.

Keywords: Mongolia, the Northern Hemisphere, air temperature variation

*汤懋苍*等，1995，冬季亚洲高压的中心位置何在，高原气象，14(3): 379-384

本文用保风投影法分析了冬季亚洲高压，认为在冬季整个蒙古高原、青藏高原和黄土高原为高压控制，高压中心有三个，其中最强中心位于青藏高原主体南部，另外两个中心较弱，一个位于蒙古西北部，一个位于祁连山地区。作者认为应将“蒙古高压”改称为“亚洲高压”或“高原高压”更符合实际。

关键词：亚洲高压　冬季
气压分析法

Tang Maocang et al. 1995. Where is the center location of the Asian high pressure in winter. Plateau Meteorology 14(3):379-384.

The Asian high in winter was analyzed using the wind-conserved projection method. The result shows that the Mongolian Plateau, Tibetan Plateau, and Loess Plateau are under the control of high pressure with three centers in winter. The highest center is in the southern part of the Tibetan Plateau, and the other two centers are located in the northwest part of Mongolia and the Qilian mountain area, respectively. The writers believe that it is more reasonable to call the high an Asian high or Plateau high than a Mongolian high.

Keywords: Asian high, in winter, pressure analysis method

魏凤英，曹鸿兴，1995，中国、北半球和全球的气温突变分析及其趋势预测研究，大气科学，19(2):140-148

本文采用均值差异假设检验研究了中国、北半球和全球气温历史序列的突变现象，分析了气温的突变指数。研究证明，按照分析出的突变点将气温序列分段建模，效果优于整段序列的模型。研究表明，本文叙述的均生函数累加延拓的时序建模方案，对气温序列有很好的拟合和预测效果。

关键词：突变　趋势预测
均生函数

Wei Fengying and Cao Hongxing. 1995. Detection of abrupt changes and trend predictions of the air temperature in China, the Northern Hemisphere, and the world. Scientia Atmospherica Sinica 19(2):140-148.

Abrupt changes of yearly air temperature series on China, the Northern Hemisphere, and the world are detected with a statistical test. The abrupt change indexes of the three temperature series are analyzed. The results show that the models of several periods, which are divided from the temperature series by the points of the abrupt changes, are far better than the model of the whole temperature series. It indicates that the modeling scheme based on integrating an extension series of the mean generating function is feasible for the simulation and prediction of the temperature series.

Keywords: abrupt changes, trend prediction, mean generating function

*李栋梁*等，1995，我国西北地区冬季平均气温的气候特征，大气科学，19(2):192-199

本文选取中国西北五省的资料分析了最近30－40年西北地区冬季平均温度的时间分布特征及变化趋势。结果表明，西北地区冬季平均气温变化在空间上具有很好的一致性，但也存在空间分布的差异。30－40年来西北地区冬季气温总趋势是在变动中逐渐变暖的，青藏高原及个别高山站冬季气温变化趋势与此有所不同。西北地区冬季气温年际变化具有8年周期。

关键词：西北地区 气温变化 主成分分析 冬暖

Li Dongliang et al. 1995. Climatic features of the mean temperature in Northwest China during wintertime. Scientia Atmospherica Sinica 19(2):192-199.

The distribution and variations in the winter mean air temperature during the last 30 to 40 years in Northwest China are studied by main component analysis using the data of five provinces of Northwest China. Results show that the mean temperature variations are spatially well consistent in winter and that differences in the spatial distributions of temperature variation also exist. Analysis indicates that the general trend of the winter temperature change in Northwest China has been a gradual warming with fluctuations for the last 30 to 40 years. In contrast, the Qinghai-Tibetan Plateau and very few mountain stations have experienced a different trend. The annual variation of the winter temperature in Northwest China had a quasi-eight-year periodic oscillation.

Keywords: Northwest China, air temperature variation, main component analysis, warm winter

*林学春*等，1995，中国近百年温度序列，大气科学，19(5)：525-532

根据1873－1990年全国温度资料，讨论了近百年全国温度序列的气候变化，指出中国近百年温度变化与北半球的变化很相似，都有两个增暖时段即40年代和80年代的增温。北半球平均温度80年代要比40年代高，而中国平均温度80年代要比40年代低。

关键词：温度序列 气候变化

Lin Xuechun et al. 1995. Series of average air temperature over China for the last 100-year period. Scientia Atmospherica Sinica 19(5):525-532.

Based on the analysis of the mean temperature data in China for the period of 1873-1990, the climatic variations of the temperature in the recent 100 years are discussed. It points out that the variations of the mean temperature over China are similar to those over the Northern Hemisphere. There are two periods in the last 100 years in which temperature was higher (i.e., the 1940s and 1980s). The mean temperature of the Northern Hemisphere in the 1980s is higher than that in the 1940s, but the mean temperature of China in the 1980s is lower than that in the 1940s.

Keywords: temperature series, climatic change

王绍武，叶瑾琳，1995，近百年全球气候变暖的分析，大气科学，19(5):545-553

本文根据1880－1991年资料对比分析了IPCC, Vinnikov, Jones及Hansen的北半球，南半球及全球共12个地面温度序列，以及中国的气温序列。1890年代，1920年代中及70年代末有3次突然气候变暖。分析表明，近百年来气候呈变暖趋势，总的变暖趋势与CO_2浓度及太阳活动有密切关系。火山活动也可能有一定作用。前两次突变可能与火山活动沉寂有关，最后一次突然变暖则可能是温室效应加剧的结果。
关键词：气候变暖 气候突变 温室效应

Wang Shaowu and Ye Jinlin. 1995. An analysis of global warming during the last one hundred years. Scientia Atmospherica Sinica 19(5):545-553.

Data from the 1880-1991 annual surface temperature series of the Intergovernmental Panel on Climate Change (IPCC), Vinnikov, Jones, and Hansen for the hemisphere and the globe and that for China are analyzed. The climatic changes have a warmer tendency. And abrupt warming was found in the 1890s, the middle of 1920s, and the end of 1970s. Solar activity and concentration of CO_2 are closely correlated with the temperature variations. Volcanism also contributed to the warming. However, the abrupt warming in the 1890s and 1920s may have been caused by the cessation of volcanic eruptions, and the abrupt warming end of the 1970s seems to relate to the enhanced greenhouse effect, though the intensification of solar activity may also play a part.

Keywords: global warming, abrupt change of climate, greenhouse effect

*井传才*等，1995，1993年世界气候异常原因及大气对东传型ENSO事件响应的诊断分析，热带气象学报，11(1):57-65

本文通过对1993年全球大气及热带海洋异常状况的诊断分析，揭示了1993年世界气象灾害频频发生的原因。结论认为，大气环流的异常变化对1993年东传型ENSO事件的响应几乎同步。1991、1993年两次东传型ENSO事件在短期内相继发生使副高持续异常，达到近40多年来最强，同时引起西风带槽脊异常变化。1992年赤道中太平洋异常暖水的长期滞留是1993年西太平洋副高脊线位置偏南并显著西伸的原因。

Jing Chuancai et al. 1995. A diagnostic analysis of the cause for anomalous world climate in 1993 and the characteristics of the atmosphere corresponding to eastward-transmitting ENSO event. Journal of Tropical Meteorology 11(1):57-65.

Through the analysis of the variability of global atmospheric and tropical oceanic anomalies, the main cause for the world meteorological catastrophe in 1993 is confirmed. The anomalous variation of atmosphere circulation has an almost synchronous response to the eastward-transmitting El Niño Southern Oscillation (ENSO) events of 1991 and 1993. The two eastward-transmitting ENSO events of 1991 and 1993 within a short period caused the persistence of anomalous variation of the subtropical high and made the subtropical high the strongest one for about 40 years. They also caused variation of the trough and ridge of the westerly belt. The persistence of anomalous warm water in the central equatorial Pacific in 1992 is the effect factor that caused the

关键词：气象灾害　ENSO事件
PNA相关型　大气环流

position of the subtropical high ridgeline in the western Pacific to move to the south and the westward stretch ridge point of the subtropical high to move to the west in 1993.

Keywords: meteorological catastrophe, ENSO event, correlation type of Pacific-North American (PNA), atmosphere circulation

丁治英，陈久康，1995，有效位能和冷空气活动与台风暴雨增幅的研究，热带气象学报，11(1):80-85

本文分析了台风范围的总有效位能、涡旋有效位能，找出了台风暴雨增幅原因。冷空气处在台风外围时有效位能释放最多，暴雨增幅最大。冷空气侵入台风中心后，非绝热加热迅速减小，不利于降水增幅。

关键词：有效位能　台风　暴雨增幅

Ding Zhiying and Chen Jiukang. 1995. A study on the relationship between enhancement of typhoon rain and available potential energy and cold air. Journal of Tropical Meteorology 11(1):80-85.

The total and vortex available potential energy are studied using results of a numerical simulation. The causative factor of rain enhancement is revealed. It is found that the release and enhancement of potential energy are at their maximum when cold air from a typhoon causes the maximum enhancement of heavy rains. The enhancement of heavy rains is checked when cold air enters the eye thereby greatly reducing adiabatic heating.

Keywords: available potential energy, typhoon, heavy rains, enhancement

施能，曹鸿兴，1995，与厄尔尼诺有关的北半球100hPa大气环流异常，热带气象学报，11(2):106-114

本文研究了北半球100hPa冬季遥相关现象。结论认为，当厄尔尼诺发展到盛期（冬季）时，100hPa出现PNA型，这种对应关系比500hPa好些。并且在厄尔尼诺发生年春季，100hPa高度比反厄尔尼诺年大范围偏低，发生前的冬季也有此明显特征。

Shi Ning and Cao Hongxing. 1995. The Northern Hemisphere 100 hPa atmospheric circulation anomaly related to El Niño. Journal of Tropical Meteorology 11(2):106-114.

The northern winter 100-hPa teleconnection patterns are studied, and it is discovered that a Pacific-North American (PNA) flow pattern occurs at 100 hPa in northern winter. When El Niño is at the prime of the season (in winter), a vigorous PNA pattern occurs at 100 hPa at a better corresponding rate than at 500 hPa. In the spring of El Niño years, the 100 hPa height is lower over a large area than in La Niña years; similar significant features are seen in preceding winters.

关键词：100hPa高度场 PNA遥相关 厄尔尼诺 环流异常 强度指数

Keywords: 100 hPa height field, PNA teleconnection, El Niño, circulation anomaly, intensity index

叶愈源，赵文兰，1995，近百年长江中游旱涝的变化，热带气象学报，11(2):181-186

利用史料和1951－1990年汉口站与全国160站雨量记录重建的近百年长江中游区平均逐年旱涝等级指数序列研究了旱涝变化特征。20世纪气候表现为前涝后旱，分为6个交替出现的旱涝阶段，具有22年、5－6年和2－3年的准周期振动。
关键词：气候变化 旱涝 近百年 长江中游

Ye Yuyuan and Zhao Wenlan. 1995. Variations of floods and drought in the middle reaches of Changjiang River Valley during the last 100 years. Journal of Tropical Meteorology 11(2):181-186.

On the basis on historical data and rain gauge records of Hankou station and 160 stations of China during 1951-1990, an index series of mean year-to-year categories for drought and flood in the middle reaches of the Changjiang River Valley is reconstructed to study the variation characteristics. It is found that flooding mostly occurs in the early part of this century whereas drought dominates the latter half. There are 6 stages of drought and flood periods and quasi-periodic oscillations of 22 years, 5-6 years, and 2-3 years.

Keywords: climatic change, drought and flood, the last 100 years, middle reaches of Changjiang river valley

李崇银，1995，热带大气季节内振荡的几个基本问题，热带气象学报，11(3):276-288

在一系列资料分析、数值模拟试验和理论研究的基础上，研究了热带大气季节内振荡的地域特征、空间尺度特征、水平传播特征、与中高纬度大气季节内振荡的联系、同El Nino间的相互作用以及热带大气季节内振荡的动力学机制。
关键词：热带大气 季节内振荡 El Nino 相互作用 动力学机制

Li Chongyin. 1995. Some fundamental problems of intraseasonal oscillation in the tropical atmosphere. Journal of Tropical Meteorology 11(3):276-288.

Some fundamental problems of intraseasonal oscillation in the atmosphere are studied based on a series of data analyses, numerical simulations, and theoretical studies. Topics include regional location, spatial scale and horizontal propagation, intraseasonal oscillation in the mid-high latitudes, the interaction between El Niño and tropical intraseasonal oscillation, and some dynamical mechanisms that excite tropical atmospheric intraseasonal oscillation.

Keywords: tropical atmosphere, intraseasonal oscillation, interaction with El Niño, dynamical mechanism

*张光智*等，1995，近百年西北太平洋热带气旋年频数的变化特征，热带气象学报，11(4):315-323

本文利用1884－1988年西北太平洋热带气旋年频数资料，分析了热带气旋年频数的多年变化及其与海温、南方涛动指数、太阳黑子数和环流型日数等的统计关系。结果认为，热带气旋年频数的变化具有明显的21年、31年、15年和6年左右的周期和持续期平均为12年左右的阶段变化。在1931、1959和1977年有三次较明显的转折。热带气旋年频数在厄尔尼诺年有冬春季偏少、夏秋季偏多的趋势。在平流层西风位相时，北半球纬向环流的异常发展及太阳活动的增强有助于热带气旋的生成和发展。

关键词：热带气旋 厄尔尼诺 环境变量

Zhang Guangzhi et al. 1995. A study on the variations of annual frequency for tropical cyclones in the Northwest Pacific during the last hundred years. Journal of Tropical Meteorology 11(4):315-323.

The variation of annual frequency of tropical cyclones (TC) and its relationship with sea surface temperatures (SST), the Southern Oscillation Index, sunspot relative number, and number of days for specific circulation patterns were studied using data from 1884-1988 of annual frequency for Northwest Pacific TC occurrence. It indicates obvious periods of 21, 31, 15, and 6 years and sustaining periods lasting 12 years in average in the variation of annual TC frequency. There are three well-defined processes of inflexion over the past hundred years: 1931, 1959, and 1977. The results also suggest that there is an insignificant statistical tendency of annual TC frequency decreasing (increasing) in winter/spring (summer/autumn) in the El Niño years. When the stratosphere was in the zonally westerly phrase, the northern zonal circulation would abnormally develop and solar activity would enhance the generation and development of a TC.

Keywords: tropical cyclone, EL Niño, environmental variable

East Asia Monsoon

严中伟，Nicole Petit-Maire，1995，关于全球冷暖和亚、非夏季风区干湿变迁之联系的一个述评，地理学报，50(5):471-479

本文根据多种资料分析结果研究不同时间尺度上全球热状况对中国东部和其他低纬度亚非夏季风影响区干湿变迁的宏观控制作用。气候对全球变化的反映因时间尺度不同而异，在百年以上时间尺度上，全球暖而夏季风强从而导致有关区域多雨偏湿，全球冷则夏季风区域多偏干；但较短时间尺度上的全球性冷暖波动不会使夏季风系统和干湿状况产生一致响应。

Yan Zhongwei and Nicole Petit-Maire. 1995. On the relationship between global thermal variations and the wet/dry alterations in the Asian and African monsoon areas. Acta Geographica Sinica 50(5):471-479.

On the basis of various data analyses, this paper studies the impacts of past global warm/cold variations on the humidity changes along the low-latitudinal summer monsoon range in Asia and Africa. The regional climates respond differently to global changes at different time-scales. The summer monsoons are generally stronger during global warmer periods at a time-scale longer than 100 years, thus leading to wetter conditions. At short time-scales, the relationship between the summer monsoon and warm/cold variations becomes weaker.

关键词：全球变化　区域干湿变迁　夏季风

Keywords: global change, regional wet/dry alternation, summer monsoon

张信宝，1995，晚更新世以来的季风变化对晋陕蒙接壤区现代侵蚀的影响，中国沙漠，15(3):207-209

本文研究了晚更新世以来冰期冬季风和间冰期夏季风对黄土高原地区的影响，认为沙黄土和较多降水的组合，使晋陕蒙接壤区成为黄土高原现代侵蚀最剧烈的地区。
关键词：晋陕蒙接壤区　季风　侵蚀

Zhang Xinbao. 1995. The influence on monsoon climate changes since the late Pleistocene on current erosion in the JinShanMeng contiguous region of the Loess Plateau. Journal of Desert Research 15(3):207-209.

The paper focuses on the effect on the Loess Plateau of the winter monsoon in glacial period and summer monsoon in interglacial. During the interglacial period of Holocene, the combination of an erodible surface layer and high precipitation resulted in the current soil erosion in the Jin-Shan-Meng contiguous region which is the severest in the Loess Plateau.

Keywords: JinShanMeng contiguous region, monsoon, erosion

孙淑清，孙柏民，1995，东亚冬季风环流异常与中国江淮流域夏季旱涝天气的关系，气象学报，53(4):440-450

本文分析了长江淮河流域夏季旱涝各10年的资料，结果认为，旱涝年前冬东亚冬季风环流存在着差别，长江淮河流域夏季旱年前冬，欧亚中高纬呈经向型环流，寒潮活动频繁，东亚沿海中低纬冷涌活动强烈，跨赤道气流加强，南海至菲律宾地区的对流活动活跃。涝年前冬基本上为相反形势。
关键词：冬季风　大气环流　旱涝

Sun Shuqing and Sun Baimin. 1995. The relationship between the anomalous winter monsoon circulation over East Asia and summer drought/flooding in the Yangtze and Huaihe River Valleys. Acta Meteorologica Sinica 53(4):440-450.

Data from ten cases of abnormal drought or flooding summers in the lower-middle reaches of the Yangtze River and Huaihe River valleys are analyzed. It is noted that there are two kinds of winter monsoon circulation with respect to summer drought and flooding. In winters preceding a drought year, the flow pattern in the mid-high latitudes shows a strong meridional circulation over Eurasia, a cold surge in middle and lower latitudes, and convective activity over the southern part of the South China Sea and the Philippines so that the cross-equatorial current towards the Southern Hemisphere is greatly strengthened. On the contrary, in winters

preceeding a flooding year, those factors are much weaker.

Keywords: winter monsoon, general circulation, drought/flooding

黄士松，汤明敏，1995，我国南方初夏汛期和东亚夏季风环流，热带气象学报，11(3):203-213

本文根据低层夏季风热力学性质与流场演变特点讨论了我国南方初夏汛期同夏季风活动的联系，分析了东亚夏季风环流建立过程的阶段性和类型，认为汛期的开始与结束同夏季风前沿位置变动一致。夏季风发展时期低纬大气环流的演变过程可归纳为4类。

关键词：华南前汛期 梅雨期 东亚夏季风 季风环流建立过程 季风体系结构

Huang Shisong and Tang Mingmin. 1995. The early summer flood periods of South China and the summer monsoon circulation of East Asia. Journal of Tropical Meteorology 11(3):203-213.

The relationship between the early summer flood periods of southern China and the activities of the summer monsoon is analyzed on the basis of thermodynamic characteristics of the summer monsoon and the change of the lower layer wind fields. The establishment processes of the summer monsoon circulation of East Asia are investigated. The establishment processes of the monsoon circulation from the very beginning of the arrival of the monsoon to the period of greatest of development are classified into four categories.

Keywords: first flood period of South China, the plum rains period, the summer monsoon circulation of East Asia, the establishment processes of the monsoon circulation, monsoon regime structure

喻世华,杨维武，1995，季节内西太平洋副高异常进退的诊断研究，热带气象学报，11(3):214-222

本文对两次季节内西太平洋副高的异常进退进行了诊断研究。结论认为，季节内西太平洋副高异常进退是整个北太平洋副高异常进退的结果，表现为东太平洋副高的活动，相应西太平洋副高也有一次活动过程。东太平洋副高的异常进退是被南亚季风区到太平洋信风区的异常加热造成的东太平洋对流层上部辐散风场汇合下沉区的变化所激发。

关键词：副热带高压 异常进退 遥相关关系 诊断研究

Yu Shihua and Yang Weiwu. 1995. Diagnostic study of intraseasonal anomalous progression and retrogression of a subtropical high over the Western Pacific. Journal of Tropical Meteorology 11(3):214-222.

The authors study two intraseasonal progressive and retrogressive processes of an anomalous subtropical high in the Western Pacific. The anomalous progression and retrogression of this high are the result of an anomalous subtropical high in the Northern Pacific and are intraseasonally teleconnected with one in the Eastern Pacific. The anomalous progression and retrogression of the subtropical high in the Eastern Pacific is the result of anomalous heating through the monsoon area in South Asia and the trade-wind zone in the Pacific Ocean.

Keywords: subtropical high, anomalous progression and retrogression, teleconnection, diagnostic study

王永中，夏友龙，1995，基本流和切变流影响下的南亚季风，热带气象学报，11(3):231-239

采用赤道平衡模式及低阶谱方法，建立了描写南亚冬夏季风的非线性方程，分析了基本气流、一次切变流和二次切变流对南亚季风形成、转换和强度的影响，指出一次切变流对南亚季风影响与基本流及二次切变流对南亚季风的影响明显不同。

关键词：南亚季风 低阶谱方法 切变流

Wang Yongzhong and Xia Youlong. 1995. South Asia monsoon affected by basic and shear flow. Journal of Tropical Meteorology 11(3):231-239.

The nonlinear equation describing the winter and summer monsoon in South Asia is built by using equatorial balanced model and low-order spectral method. The effects of the basic flow, and first-order and second-order shear on the formation, transformation, and intensity of the monsoon in South Asia are discussed. The results show that there is an evident difference between the influence of first-order shear on monsoons in South Asia and that of the basic flow and second-order shear on monsoons in South Asia.

Keywords: monsoon in South Asia, low order spectral method, shear flow

江宁波，罗会邦，1995，南海夏季风爆发前后亚洲地区的大尺度环流突变，热带气象学报，11(4):289-296

本文用1980－1986年的ECMWF资料分析了南海季风爆发前后大气环流突变的平均特征。南海季风的爆发一般发生在5月10日前后，大气环流出现一次明显突变—高空南亚高压骤然北跳。青藏高原东南坡的加热对南海季风的爆发可能比较重要。

关键词：南海夏季风 爆发 东亚地区 大气环流突变

Jiang Ningbo and Luo Huibang. 1995. Circulation evolution in Asia around the time of the burst of summer monsoon over the South China Sea. Journal of Tropical Meteorology 11(4):289-296.

Based on an analysis of European Centre for Medium-Range Weather Forecasts (ECMWF) data of 1980-1986, the average characteristic of the time evolution of the general circulation over the South China Sea is studied. The first transition occurs around 10 May, characterized by the sudden movement of the center of the South Asian High. It is found that the heating of the southeast of the Qinghai-Xizang Plateau may be important to the first transition over the South China Sea.

Keywords: summer monsoon over the South China Sea, burst, East Asia, transition of atmospheric circulation

余斌，黄荣辉，1995，热带对流活动与低频波流相互作用，热带气象学报，11(4):297-305

本文利用ECMWF客观分析资料和诊断分析的方法研究了1983/1984和1986/1987两年冬季中纬度地区低频波流间的相互作用特征，认为热带地区对流活动的差异对于这种相互作用具有重要影响。

关键词：热带对流 低频波动 波流相互作用

Yu Bin and Huang Ronghui. 1995. Relationships between different tropical convective activities and low-frequency wave mean flow interactions. Journal of Tropical Meteorology 11(4):297-305.

Based on European Centre for Medium-Range Weather Forecasts (ECMWF) objective analysis data, the interaction characteristics of frequency wave and mean flow in the mid-latitude during the winter years 1983-1984 and 1986-1987 have been studied using a diagnostic analysis method. The authors point out that tropical convective activity has an important effect on the frequency wave/mean flow interaction process.

Keywords: tropical convection, low-frequency fluctuation, wave-mean flow interaction

*何金海*等，1995，中国东部地区降水季节内变化的季节锁相，热带气象学报11(4):370-374

本文用中国东部地区30年逐日降水资料分析了中国东部地区降水的季节锁相特征在江淮流域和华南地区的不同表现，研究了它同东亚季风季节内变化的联系。结果表明，江淮梅雨同华南夏季风降水都具有季节锁相特征，前者呈单峰分布，后者呈双峰分布，二者降水量的季内变化均具有20—25天的周期振荡特征。江淮流域降水的峰值和华南地区的第一个峰值主要受副热带季风影响，华南地区的第二个降水峰值受南海热带季风影响。

关键词：中国东部 降水 气候特征 季节锁相 季内变化

He Jinhai et al. 1995. Seasonal interlock of the intraseasonal variations of rainfall in East China. Journal of Tropical Meteorology 11(4):370-374.

Based on the daily rainfall data for 30 years in East China, the seasonal interlock characteristics of precipitation in the Yangtze-Huaihe River Reach and South China and their association with seasonal variations of the East Asian monsoon are analyzed. Both the Jianghuai MeiYu and South China summer monsoon rains have seasonal interlock characteristics; the former shows a single-peak distribution whereas the latter displays a double-peak distribution. Intraseasonal variations of precipitation in both areas show a periodic oscillation of 15 to 25 days. The peak value of precipitation in the Yangtze-Huaihe River Reach and the first peak value in South China are mainly affected by the subtropical monsoon. The second peak value of precipitation in South China is influenced by the South China Sea tropical monsoon and closely related to the tropical cyclone activities in the corresponding period.

Keywords: East China, precipitation, climatic characteristics, seasonal interlock, intraseasonal variation

Historical Climate Change

邵亚军，李保生，1995，克里雅河上游流域黄土中孢粉组合与环境，中国沙漠，15(1):37-41

本文认为，末次冰期以来克里雅河上游流域黄土堆积的植被类型属荒漠草原类型，以耐旱的麻黄、藜、蒿等草本植物为主，但也出现过云杉、冷杉、松属等针叶树组成的疏林草原。说明从那时以来的黄土堆积过程中，在总的持续干旱的荒漠草原环境下也存在相对的干湿波动。

关键词：克里雅河上游流域 黄土孢子花粉 荒漠草原植被 干旱环境

Shao Yajun and Li Baosheng. 1995. The Loess sporo-pollens and the environment of the upper reach of Keriya River. Journal of Desert Research 15(1):37-41.

The authors note that the vegetation in the upper reach of the Keriya River is mainly composed of the desert-steppe herb, such as drought-resistant *Ephedra*, *Chenopodiaceae*, and *Artemisea*, since the last glacial age. However, there are also traces of a sparse-tree steppe environment composed of *Picea, Abies, and Pinus*. It is suggested that relatively dry and humid fluctuations occurred in the persistent arid desert-steppe environment.

Keywords: upper reaches of Keriya River, loess sporo-pollens, desert-steppe vegetation, arid environment

*刘光秀*等，1995，全新世大暖期若而盖的植被与气候，冰川冻土，17(3):247-249

本文根据若而盖DC剖面系统的孢粉记录和^{14}C测年，认为该区全新世大暖期发生于9-3KaBP，当时气候湿润；植被类型为针叶阔叶混交林。大约在7-6KaBP间，气候变暖，落叶阔叶树种增加，标志着全新世大暖期。6-5 KaBP间，植被稀疏，说明此间有一次气温变冷的波动。

关键词：植被 气候 全新世大暖期若而盖

Liu Guangxiu et al. 1995. The vegetation and climate of Holocene Megathermal in Zoige, Northwestern Sichuan, China. Journal of Glaciology and Geocryology 17(3):247-249.

Based on an analysis of the pollen record and carbon-14 dating in Zoige, it is suggested that the Holocene megathermal took place about 9 to 3 ka BP, having vegetation of coniferous and deciduous broadleaf mixed forest, while climate is warmer and wetter in this area. About 7 to 6 ka BP, broadleaf vegetation increased indicating the maximum of the Holocene megathermal. The absence of pollen about 6 to 5 ka BP represents a cooling change in climate.

Keywords: vegetation, climate, Holocene megathermal, Zoige

Impacts

张福春，1995，气候变化对中国木本植物物候的可能影响，地理学报，50(5):402-410

本文通过对近30年的物候资料和气候资料的统计分析，得出气温是影响中国木本植物物候的主要因子，建立了物候与年平均气温的线性统计模式。计算出气温每升高1°C，上半年的物候提前3-4日,下半年则推迟3-4日，年绿叶期延长6-8日。当CO_2倍增，年均温上升1.0-1.8°C时，绿叶期将比现在延长8-12日，且北方物候现象的提前或推迟幅度较南方大。

关键词：气候变化 物候 全球变化 植物生态学

Zhang Fuchun. 1995. Effects of global warming on plant phenological events in China. Acta Geographical Sinica 50(5):402-410.

Based on the data of the past 30 years, the effects of global warming on phenological events of China are discussed. Atmospheric temperature is the most important factor influencing plant phenophase. The author establishes a linear model that contains only phenophase and annual mean temperature factors. The calculated result indicates that under a 1°C rise of annual mean temperature, phenological events of trees in spring in China will occur about 3 to 4 days earlier but may be postponed for 3 to 4 days in autumn. The greenleaf stage will be prolonged for 6 to 8 days. It also assumes the scenario of a doubled carbon dioxide content in the next century which carries a 1.0 to 1.8°C rise in the annual mean temperature in China, with the greenleaf stage prolonged for 10 to 12 days. Moreover, the time of phenological events in the northern part of China will increase more than that in the southern part.

Keywords: climate change, phenology, global warming, plant ecology

丁登山，1995，论气候在西非萨赫勒地带荒漠化中的作用—兼谈近期人类活动影响，干旱区地理，18(3):25-31

本文讨论了气候在荒漠化中的作用，认为气候在荒漠化中的作用具有复杂性，包括了直接作用和间接作用，在单独起作用的同时，又与人类过渡的经济活动因素相结合发挥作用。文章还认为，近几十年来，西非撒赫勒地带的迅速荒漠化，主要由人类过渡的经济活动造成。

关键词：撒赫勒地带 荒漠化 气候

Ding Dengshan. 1995. On the effect of climate on desertification in the Sahel, West Africa: With discussion on the effect of human activities. Arid Land Geography 18(3):25-31.

The effect of climate on desertification in the Sahel in West Africa is discussed in this paper. Climate has complicated effects on desertification, including both direct and indirect ones. Climate not only can play a role on the desertification by itself but also in conjunction with excessive human economic activities. The paper concludes that rapid desertification in the area for the last several decades was mainly caused by excessive human economic activities.

Keywords: Sahel, desertification, climate

温跨达，1995，未来气候对南疆东部的影响，干旱区地理，18(4):61-64

本文分析了南疆东部的气候变化趋势。气候变化呈变暖趋势，导致土壤湿度下降，冰川融化加剧。这将对南疆东部水资源和农业产生一定的影响。文章最后提出一些对策和建议。

关键词：未来气候 气候变化 南疆东部

Wen Kuada. 1995. Effect of future climate on the eastern part of South XinJiang. Arid Land Geography 18(4):61-64.

With a rise in air temperature, the climate will warm in the eastern part of South XinJiang. Soil humidity will decrease and the melting of glaciers in the Eastern Kunlun Mountain and the Altan Mountain will become extreme. The climate change will affect the condition of water resources and growth period of crops. Countermeasures and suggestions are given.

Keywords: future climate, climate change, east part of South XinJiang

*卫林*等，1995，气候变化对我国红松林的影响，地理研究，14(1):17-26

本文根据红松的生长特点和环境因子对树木生长影响的作用规律，建立能反映红松年生长量与水热因子之间关系的W－T模式，由此分析气候变化对红松生长量与分布的影响。结论认为，气温升高时，红松适生范围与生长量大幅度减少。在预测气候变化范围内，红松不会退出我国的东北部地区。

关键词：气候变化 红松林

Wei Lin et al. 1995. The influence of climate changes on Korean pine forest in China. Geographical Research 14(1):17-26.

Based on the distribution and ecological characteristics of Korean Pine and the effects of environmental factors on tree growth, the author sets up a W-T model to analyze the influence of various climate changes on the growth and distribution and the annual growth of Korean Pine. The results show that the suitable area and the growth of Korean Pine will greatly decrease when temperature rises. In the currently predicted ranges of climate changes, the Korean Pine would not recede from northeast China.

Keywords: climate change, Korean Pine forest

李曾中，1995，大气环流及南极海冰变异与热带风暴生成，气象，21(1):19-22

本文根据1973－1981、1980－1986年格点资料及1973－1978年年际海冰资料及其它常规资料，研究了西北太平洋地区热带风暴生成与全球大气环流及南极海冰年际变异的关系。结果表明，在东半球地区，南北两半球热带风暴的多寡与该地区越赤道气流的强弱相一致，尤其与45°E处越赤道气流关系密切。同时，也与南极海冰北界的年际变异直接有关。南极的“暖冬”、“冷夏”现象与西北太平洋地区热带风暴生成总数也相一致。

关键词：越赤道气流 南极海冰 热带风暴

Li Zengzhong. 1995. Genesis of tropical cyclone with atmospheric circulation and variation of Antarctic sea ice. Meteorological Monthly 21(1):19-22.

Based on the data of surface wind during 1973-1981, 1980-1986, and the Antarctic sea ice data of surface wind during 1973-1978 as well as conventional data, the relationship between the genesis of the tropical cyclones over the northwestern Pacific and the interannual variation of the global atmospheric circulation as well as the northern edge of the Antarctic sea ice are studied. It concludes that, over the region of the Eastern Hemisphere, the annual frequency of the tropical cyclones of the two hemispheres is connected closely with the intensity of the cross equatorial-flow (Eastern Hemisphere), particularly with that at 45° E. At the same time, the frequency is closely linked to the interannual variation of the northern edge of the Antarctic sea ice. When there is a warmer winter and colder summer in the Antarctic, there will be a higher annual frequency of tropical cyclones over the northwestern Pacific.

Keywords: Cross-equatorial, Antarctic sea ice, tropical cyclone

林敬凡，熊杰伟，鲁心正，1995，气候条件对烤烟质量的影响，气象，21(1):44-47

根据襄城县气候与烤烟资料，分析了与烤烟质量相关显著的气候因子。认为降水日数是影响烤烟质量的重要气候因子。当8月降水日数<10天
、4－8月降水日数<41天时，烤烟质量较高，反之烤烟质量下降。
关键词：烤烟 气候质量 气候指标

Lin Jingfan, Xiong Jiewei, and Lu Xinzheng. 1995. Influences of climatic condition on quality of flue-cured tobacco. Meteorological Monthly 21(1):44-47.

On the basis of data on climate and flue-cured tobacco of Xiangcheng County, the paper analyzed climate factors related with quality of flue-cured tobacco. The result shows that precipitation is the most important factor that affects the quality of tobacco. The quality of the flue-cured tobacco is best when rainy days from the April to August are fewer than 41 days.

Keywords: flue-cured tobacco, climate quality, climate index

吴金栋，太华杰，1995，1993年夏季低温及其对农业的影响，气象，21(2):19-22

本文根据农业气候学和农业气象学基本原理，分析1993年夏季气候“凉夏”特点，以期达到在农业生产中减灾的目的。
关键词：夏季低温 日照 影响

Wu Jindong and Tai Huajie. 1995. Low summer temperature of 1993 and its impacts on agriculture. Meteorological Monthly 21(2):19-22.

Using the basic principles of agroclimatology and agrometeorology, the authors analyze the climate characteristics of the cool summer in 1993 to diminish the disasters in agricultural production in recent research.

Keywords: cool summer, sunshine, impacts

*王淼*等，1995，大气增温对长白山林木直径生长的影响，应用生态学报，6(2):128-132

本文将长白山林木年轮样品对照气象资料进行整理分析，结果表明，年均温的增长使得年轮宽度增加，其增长加快主要和夜间增温有关；增温还会使阔叶树比例增高。
关键词：年轮 全球变化
阔叶红松林

Wang Miao et al. 1995. Effect of rise in air-temperature on tree ring growth of forest on Changbai Mountain. Chinese Journal of Applied Ecology 6(2):128-132.

The authors analyzed the tree-ring widths of forests of Changbai Mountain and meteorological data. The results show that the annual tree-ring width increases when the average annual air temperature increases. The accelerated growth is positively related to the temperature rise at night rather than at daytime. With the increase of the temperature, the proportion of deciduous tree species in the standing composition of the deciduous-Korean pine forest will increase.

Keywords: annual tree-ring, global change, deciduous-Korean pine forest

陈昌毓，1995，甘肃干旱半干旱地区降水特征及其对农业的影响，干旱区资源与环境，9(1):25-33

Chen Changyu. 1995. Characteristics of precipitation and their effects on agricultural production in Gansu. Journal of Arid Land Resources and Environment 9(1):25-33.

本文根据甘肃干旱半干旱地区多年降水资料分析其降水资源的特征以及这些降水特征对农业生产的利弊影响，并提出了农业生产充分利用降水资源的途径。

关键词：甘肃干旱半干旱区 降水特征 农业生产 降水变率

On the basis of data on precipitation in the Gansu arid and semi-arid zone, the main characteristics of precipitation and their influences on agricultural production have been analyzed. Measures for making full use of rainfall resources to promote agriculture are suggested.

Keywords: Gansu arid and semi-arid zone, characteristics of precipitation, agricultural production, variability of precipitation

*周学东*等，1995，江苏北部沿海防护林体系的区域性气候效应，中国农业气象，16(1):40-43

Zhou Xuedong et al. 1995. The effect of protective shelterbelt system in Duffing County on regional climate. Agricultural Meteorology 16(1):40-43.

本文利用多元统计回归方法分析江苏北部沿海防护林系的气候资料，得出森林环境的时、空变化对区域性气候产生的影响：防护林具有落叶期升温降湿，生长期降温增湿的效应，使所在区域的风速和蒸发量有全年减小的趋势。

关键词：江苏北部沿海地区 防护林 多元统计回归 区域性气候效应

The authors studied the temporal and spatial effects on regional climate of protective shelterbelt system in northern coastlines of Jiangsu using the method of statistical regression. The results show that temperature increased and humidity decreased in the fall, and that temperature decreased and humidity increased in growing period of leaves. Wind velocity and evaporation also decreased conspicuously in the protective shelterbelt region.

Keywords: northern coastlines of Jiangsu, protective shelterbelt system, statistic regression, effect on regional climate

邢如楠，巢纪平，1995，热带海洋对风应力异常的响应，海洋学报，16(2):44-50

本文针对南方涛动循环中东太平洋信风变化的特征，研究了热带海洋对气候风应力脉动的响应。结果表明，南方涛动高指数与拉尼娜相对应，低指数与厄尔尼诺相对应，南方涛动影响了全球范围内的气候变化。

关键词：热带海洋 南方涛动 风应力异常 模拟

Xing Runan and Chao Jiping. 1995. Effects of abnormal wind stress on tropical ocean. Acta Oceanologica Sinica. 16(2):44-50.

The effects on the tropical ocean caused by abnormal wind stress are studied on the basis of characteristics of Eastern Pacific trade wind change in Southern Oscillation (SO) circulation. It concludes that the high index of ENSO corresponds to La Niña and low index corresponds to El Niño. SO influences climate changes of the whole globe.

Keywords: tropical ocean, SO, abnormal wind stress, analogy

姚建群，陆菊中，1995，两类反埃尔尼诺年对低纬大气环流及我国天气的影响，海洋学报，17(3):102-109

本文将1949－1987年各次反厄尔尼诺年划分为两类：东－中类型和中－东类型。近40年中，第一类占主要地位。作者还对不同过程类别的低纬大气环流及其气候异常进行了分析。

关键词：反厄尔尼诺 海温 长波辐射 大气环流

Yao Jianqun and Lu Juzhong. 1995. Effects of anti-El Niño on low-latitude atmospheric circulation and weather of China. Acta Oceanologica Sinica 17(3):102-109.

The authors analyzed characteristics of anti-El Niño between 1949-1987 and divided them into two sorts: east-middle and middle-east. The east-middle sort occupied the main position during last 40 years. Different low-latitude atmospheric circulation and abnormal climatic changes were also analyzed in the paper.

Keywords: Anti-El Niño, sea surface temperature, outgoing longwave radiation, air circulation

*谢自楚*等，1995，蒙贡—台加山的冰川及其变化特征，冰川冻土，17(2):113-119

蒙贡—台加山是亚洲中心部位的独立冰川作用中心，拥有36条冰川，总面积达27.8km^2，具有亚大陆型冰川特征，主要接收西风环流及地方性环流造成的降水补给。小冰期最盛以来，冰川面积已减少近半，雪线高度也升高了。近30年来，冰川退缩速度更快，冰川物质平衡有10年左右的波动变化，目前处于负平衡状态，但有两条山谷冰川在1992—1993年突然前进。与亚洲中部其他山系相比，本区冰川动态变化独特，说明不同地区冰川对于全球性气候的响应过程比较复杂。

关键词：冰川变化 物质平衡 蒙贡—台加山

Xie Zichu et al. 1995. Glaciers and their fluctuations in Mt. Mungun-Tayga. Journal of Glaciology and Geocryology 17(2):113-119.

The Mungun-Tayga is an independent glaciated region near the center of Asia. There are 36 glaciers with an area of 27.8 km^2. The glaciers have characteristics of subcontinent type of glaciers. The main supply comes from westerly and local circulations. Since the maximum of the little Ice Age, the area of glaciers has been reduced nearly by half, and the altitudes of terminal and snow line have increased. Over recent 30 years, the retreating rate of glacier has increased, there is a fluctuation of glacier mass balance with a period of about 10 years, and the glaciers are in negative balance now. However, two glaciers advanced suddenly from 1992 to 1993. It is found that the glacier change is distinctive in this region in comparison with those in other mountains in central Asia, which means that the response of glacier to global change is complicated in different regions.

Keywords: glacier change, mass balance, Mt. Mungun-Tayga

*朱林楠*等，1995，青藏高原东部的冻土退化，冰川冻土，17(2):120-124

本文从冻土与现代气候关系出发，理论上确定了青藏高原东部冻土的分区界限。以丰富的资料分析了不同冻土区内诸多现象呈退化的一致性，结论认为，受气候变暖的影响，退化是青藏高原东部冻土变化的基本趋势。

关键词：青藏高原东部 冻土 退化

Zhu Linnan et al. 1995. Permafrost degeneration in the east of the Tibetan Plateau. Journal of Glaciology and Geocryology 17(2):120-124.

Based on the relationship between permafrost and modern climate, the zoning boundaries of permafrost east of the Tibetan Plateau are theoretically determined. Many phenomena in different regions have the same tendency to degeneration. It is concluded that corresponding to the warm trend of climate, the basic trend of the permafrost changing in the plateau is degeneration.

Keywords: the east of Tibetan Plateau, permafrost, degeneration

李培基，1995，高亚洲积雪分布，冰川冻土，17(4):290-298

本文根据1978－1987年SMMR微波气候积雪深度资料，1973－1989年NOAA周积雪面积图，以及青藏高原60个基本气象台站1957－1992年逐月积雪深度、密度和月积雪日数记录，分析得出亚洲高原积雪时空分布特征。这对探测全球气候环境变化、诊断积雪与气候相互作用，以及预测海面上升具有重要意义。
关键词：高亚洲 积雪 分布 区划

Li Peiji. 1995. Distribution of snow cover over high Asia. Journal of Glaciology and Geocryology 17(4):290-298.

Based on information concerning microwave-derived Pentad snow-depth chart employing data from the Scanning Multichannel Microwave Radiometer (SMMR)(1978-1987), operational National Oceanic and Atmospheric Administration (NOAA) digitized weekly snow cover extent charts (1973-1989), and daily records of snow depth and number of snow cover days at 60 primary synoptic stations (1957-1992), seasonal and regional distribution characteristics of snow cover over high Asia are presented. The results are valuable in studying the global changes, analyzing the interaction between snow and climate, and forecasting sea level.

Keywords: high Asia, snow cover, distribution, regionalization

严中伟，1995，华北旱涝变化的混沌性质分析，气象学报，53(2):232-237

本文利用华北海河流域700多年的旱涝等级序列分析了历史旱涝变化的混沌性质。通过分析系统的局部Kolmogorov熵，发现偏旱态和偏涝态的可预报性基本相同，从较长时间尺度看，干旱期的旱涝预报比湿润期要更困难些。
关键词：历史气候 混沌 分数维 可预报性

Yan Zhongwei. 1995. Some chaotic features of the wet/dry fluctuations in North China. Acta Meteorologica Sinica. 53(2):232-237.

Based on the historical wet/dry grade series of North China for 700 years, some nonlinear features of the regional wet/dry fluctuations are analyzed. Through the local Kolmogorov-entropy analysis, the K-entropy of the smoothed series is small, but that for those drier phase points seems much smaller. It implies that, at the long time-scale, climate prediction in the drier period is more difficult than that in the wetter one.

Keywords: historical climate, chaos, fractal dimension, predictability

*王谦谦*等，1995，1991年夏季江淮洪涝成因的数值试验—西太平洋海温异常的影响，气象学报，53(增刊):595-603

本文利用海温距平分布和球圈范围的初始方程模式，研究了1991年夏季江淮流域洪涝灾害与海温距平分布的关系。结果表明，西太平洋面积不大的海温负距平是造成当年洪涝的重要因素之一。另外，作者对海温异常的影响机制也作了讨论。
关键词：洪涝 海面温度异常 数值试验

Wang Qianqian et al. 1995. Numerical experiments on the causes of the floods in the valleys of the Changjiang and Huaihe Rivers in the summer of 1991: The effects of sea surface temperature anomalies over the Western Pacific. Acta Meteorologica Sinica 53 (Supplement): 595-603.

The relationship between the sea surface temperature anomalies and the floods in the Changjing and Huaihe valleys in the summer of 1991 is studied using data of the sea surface temperature anomalies and a numerical primitive equation model with a zonal domain. Results show that the negative sea surface temperature anomalies with a moderate large area to the west coast of the Western Pacific are the important factors of the floods in that year. Additionally, the mechanism of the effects of sea surface temperature anomalies is discussed in detail.

Keywords: floods, sea-surface temperature anomalies, numerical experiments

胡增臻，1995，黄河中上游7月份旱涝成因的数值模拟，气象学报，53（增刊）：653-662

本文介绍了黄河中上游7月份旱涝数值模拟试验，将对旱涝成因诊断分析的结果加入到AGCM（大气环流模式）气候平均初始场中。模式成功地模拟出了黄河中上游的降水和大气环流的主要特征，证实了诊断分析得出的结论，也说明用AGCM做旱涝预报是可能的。
关键词：黄河中上游 旱涝成因 数值模拟

Hu Zengzhen. 1995. Numerical simulation of the cause of droughts/floods in upper-middle reaches of the Yellow River Valley in China in July. Acta Meteorologica Sinica 53 (Supplement):653-662.

The numerical simulation experiment of droughts/floods in the upper-middle reaches of the Yellow River Valley in July is presented. The analysis of formation cause of droughts/floods was put into an Atmospheric General Circulation Model (AGCM). The main characteristics of general circulation and precipitation of droughts/floods in upper-middle reaches of Yellow River were simulated perfectly by the model. The numerical simulation, for one thing, proves the results from the diagnosis analysis and points out the possibility of doing droughts/floods prediction by AGCM.

Keywords: upper-middle reaches of Yellow River, cause of droughts/floods, numerical simulation

韦志刚，吕世华，1995，青藏高原积雪的分布特征及其对地面反照率的影响，高原气象，14(1):67-73

根据1983年7月至1990年6月青藏高原主体58个格点积雪资料，对高原主体积雪的分布特征进行EOF分析，认为青藏高原主体积雪分布以西部、南部为主，中部、北部和东部积雪相对较少。且西部、南部的积雪变化与中部、北部和东部的积雪变化趋势存在反位相关系。另外，还对积雪对高原地面反照率的影响作了简单分析。

关键词：青藏高原 积雪 地面反照率

Wei Zhigang and Lu Shihua. 1995. Distribution of snow cover on the Qinghai-Xizang Plateau and its influence on surface albedo. Plateau Meteorology 14(1):67-73.

Based on a 58-grid-point data set of snow cover on the Qinghai-Xizang Plateau for July 1983 to June 1990, the distribution characteristics of snow cover on the Plateau are analyzed by using the Empirical Orthoganl Function (EOF) method. The results show that the main of snow cover on the Qinghai-Xizang Plateau is in the west and south of the Plateau. There is an opposite variation of snow cover between the western, southern parts and the middle, northern, eastern parts of the Qinghai-Xizang Plateau. The authors also discussed the surface albedo of snow cover on the Plateau.

Keywords: the Qinghai-Xizang Plateau, snow cover, surface albedo

钱永甫，董粱，1995，包络地形对气候模拟特征的影响，高原气象，14(2):129-140

本文应用p-σ混合坐标系球带模式用不同包络度的地形进行数值试验，研究了不同包络度地形对冬夏季气候模拟特征的影响。气候模拟特征有海陆和地形的共同作用决定，地形包络度的影响是次要的。但采用较大包络度的地形可在一定程度上改善气候模拟结果，尤其是在冬季。包络度值要取得恰当，否则反而不利。不同地区可用不同的包络地形。

关键词：气候数值模拟 地形包络度

Qian Yongfu and Dong Liang. 1995. The effects of envelope degrees of topography on the simulated properties of climate. Plateau Meteorology 14(2):129-140.

The authors carry out a numerical test of different envelope degrees of topography, using a primitive equation model with a zonal domain and a p-σ incorporated vertical coordinate system to study the effects of the envelope degrees of topography on the simulated properties of climate. Findings show that the effects of the land-sea and the topographic distributions primarily determine the simulated properties of climate and that the envelope degree of the topography has a secondary effect. However, the topography with a larger envelope degree can improve the simulations to some extent, especially in winter-time and should be taken into account in order to get better simulations. Otherwise, omission could lead to problems. Different envelope degrees of topography can be adopted in different areas.

Keywords: numerical modelings of climate, envelope degrees of topography

罗勇，1995，青藏高原冬春季雪盖对东亚夏季大气环流影响的研究，高原气象，14(4):505-512

本文分析了青藏高原积雪的基本特征，总结了高原冬季雪盖在东亚夏季气候形成与异常中的重要作用。同时还总结了高原冬春季积雪对东亚夏季大气环流影响的诊断研究和数值试验进展，提出了高原冬春季雪盖影响气候的可能机制的概念模式。

关键词：青藏高原 雪盖 气候影响

Luo Yong. 1995. Studies on the effect of snow cover over the Qinghai-Xizang Plateau in winter and spring on general circulation over East Asia in summer. Plateau Meteorology 14(4):505-512.

The characteristics of snow cover over the Qinghai-Xizang Plateau are analyzed and the important influences of snow cover over the Plateau in winter and spring on the climate formation and anomaly in East Asia in summer are revealed. The advances of diagnosis and numerical experiment on the effects of snow cover over the Plateau in winter and spring on general circulation in East Asia in summer are also summarized. The concept of a possibly effective analysis of snow cover over the Plateau on climate is proposed.

Keywords: the Qinghai-Xizang Plateau, snow cover, climate effect

符淙斌，叶笃正，1995，全球变化和我国未来的生存环境，大气科学，19(1):116-126

本文在分析我国生存环境的主要特点的基础上，研究了生存环境中自然、社会和经济活动引发的长期变化中的科学问题及其与全球变化的关系，并提出我国全球变化研究的总体设想、主要内容和目标建议。

关键词：全球变化 生存环境 中国

Fu Congbin and Ye Duzheng. 1995. Global change and the future trend of ecological environment evolution in China. Scientia Atmospherica Sinica 19(1):116-126.

The authors analyze the characteristics of the ecological environment in China, the major scientific issues of ecological environmental changes caused by activities of nature, society, and economy; and their relationship with global change. Some proposals for the general framework, main objectives, and research tasks of global change studies in China are offered.

Keywords: global change, ecological environment, China

刘永强，丁一汇，1995，ENSO事件对我国季节降水和温度的影响，大气科学，19(2):200-208

本文对ENSO导致的我国不同季节降水和温度异常进行分析，结果表明，ENSO当年我国以少雨、低温为主，次年则相反。降水和温度异常季节变化也基本呈相反趋势。长江中下游地区显著降水异常并不发生在夏季，而在ENSO当年春、秋季和次年春季；东北地区最显著的低温也不在夏季，而在ENSO当年秋季至次年春季。作者还对目前ENSO影响研究中的有关问题提出了看法。
关键词：ENSO 降水和温度异常 季节变化 合成分析

Liu Yongqiang and Ding Yihui. 1995. Reappraisal of influence of ENSO events on seasonal precipitation and temperature in China. Scientia Atmospherica Sinica 19(2):200-208.

Seasonal precipitation and temperature in China during El Niño Southern Oscillation (ENSO) events in last 40 years are analyzed. The rainfall and temperature are lower than normal in an ENSO year and almost the opposite anomalies occur in the following year. The seasonal rainfall and temperature departures evolve with almost opposite phases. The seasonal rainfall anomalies in the middle and lower reaches of the Yangtze River with certain level of statistical confidence occur in spring and autumn of the ENSO year and in spring of the following year, rather than in summer. The most significant cooling in Northeast China also appears in autumn of the ENSO year through spring of the following year, rather than in the summers. In addition, some results on ENSO influence previously obtained are reappraised on the basis of the present analysis.

Keywords: ENSO, precipitation and temperature anomaly, seasonal variation, composite analysis

贺海晏，1995，台风移动规律研究1—非绝热加热与水平温度分布的影响，热带气象学报，11(1):1-9

本文建立了一个支配台风中心移动的基本方程，考虑了各种可能影响台风移动的强迫因子。分析表明，非轴对称的非绝热引导作用可使台风改变速度或方向；温度场上的冷区对台风有吸引作用。
关键词：台风移动 局地流场引导 非绝热引导 冷区吸引作用

He Haiyan. 1995. A study on typhoon movement. 1. The effect of diabatic heating and horizontal temperature distribution. Journal of Tropical Meteorology 11(1):1-9.

A basic equation governing the movement of a typhoon has been built. The role of several forcing factors that cause the current deviation of a typhoon from the steering are considered. It is shown that diabatic steering can accelerate or slow down a typhoon or turn its direction. And the region of cold air in a temperature field may speed up a typhoon.

Keywords: typhoon movement, local steering flow, diabatic steering, attracting of cold region

周学群，张翔，1995，200hPa辐散环流对台风路径的影响，热带气象学报，11(1):18-25

本文分析了影响海南的四类台风路径所对应的200hPa辐散风场和速度势场的特征。200hPa辐散风场对台风路径有一定的制约作用，它决定着台风路径的中期趋势，影响着台风未来的路径。从高层辐散风场诊断台风的移动方向有一定的可行性。

关键词：200hPa高度 辐散环流 台风路径 引导气流

Zhou Xuequn and Zhang Xiang. 1995. Influence of 200 hPa divergent circulation on the tracks of tropical cyclones. Journal of Tropical Meteorology 11(1):18-25.

The characteristics of 200 hPa divergent wind and velocity potential are analyzed for four kinds of tropical cyclones' tracks that have an impact on the South China Sea. It is believed that the difference of monsoon circulation in 200 hPa divergence wind field may affect the medium-range movement characteristic of tropical cyclones' tracks and the direction in the movement.

Keywords: 200 hPa height, divergent circulation, typhoon track, steering flow

冯锦全，陈多，1995，我国近海热带气旋强度突变的气候特征分析，热带气象学报，11(1):35-42

本文对1970－1991年在我国近海发生强度突变的热带气旋进行了分类统计。平均每年有8－9个热带气旋已到我国近海时发生强度突变，其中突然减弱的居多。突然增强只发生在5－10月，主要出现在浙闽沿海、南海中部。珠江口外西侧到北部湾北部的粤桂南部沿海及巴士海峡东侧。突然减弱在5－12月均可发生，海域分布较广。

关键词：近海热带气旋 强度突变 气候特征 峰值

Feng Jinquan and Chen Duo. 1995. Analysis of climatic characteristics accompanying sudden intensity changes in offshore tropical cyclones in China. Journal of Tropical Meteorology 11(1):35-42.

Classification statistics are presented for the tropical cyclones in offshore Chinese waters based on data from 1970 to 1991. There are 8 to 9 tropical cyclones on average per year whose intensity changes abruptly as they move toward the offshore. Most of them abruptly weaken. The more intense ones occur in May through October and are seen over waters offshore of the Zhejiang and Fujian Provinces, the central South China Sea, waters from the Pearl River mouth across the Beibuwan Bay, and the eastern Bashi Channel. The weaker ones occur during May through December and appear over a vast area.

Keywords: offshore tropical cyclones, sudden intensity changes, climatic characteristics

刘春霞，容广埙，1995，台风突然加强与环境关系的气候分析，热带气象学报，11(1):51-56

本文用气候统计方法对1949－1992年影响我国的西太平洋台风资料进行分类并给出各类的时空分布特点及高低层平均环境场。结论认为，影响我国的突然加强的台风主要出现在每年的7－10月份，并集中在南海中部，可分为三类。台风突然加强主要受低纬环流和天气系统的影响。

关键词：台风 突然加强 环境流场 统计

Liu Chunxia and Rong Guangxun. 1995. The climatic analysis of the relationship between the explosive development of a typhoon and its environmental flow field. Journal of Tropical Meteorology 11(1):51-56.

Based on an analysis of the data of typhoons occurring in the western Pacific during 1949-1992, a classification is made using climatic statistics. The results show that the explosive intensification of typhoons mainly occurs in the South China Sea from July to September every year and concentrates in the middle of the South China Sea. This explosive development may be classified into 3 patterns. Their explosive mainly results from the circulation and weather systems in the low latitude.

Keywords: typhoon, explosive development, environmental flow field, statistics

贺海晏，杨平章，1995，台风移动规律研究2—小地形与边界层的动力作用，热带气象学报，11(2):97-105

本文分析了小地形（地形高度与台风系统的垂直厚度相比为小量）的抬升作用和边界层的摩擦作用对台风移动影响的定性特征。结果认为，较高地势和边界层摩擦辐合引起的艾克曼抽吸都有利于台风发展。

关键词：台风移动 地形强迫 艾克曼引导气流

He Haiyan and Yang Pingzhang. 1995. A study on typhoon movement. 2. Dynamical role of small topography and the boundary layer. Journal of Tropical Meteorology 11(2):97-105.

The dynamic effects of small topography (in the sense of the characteristic height of the topography as compared with the vertical thickness of the system of motion) and the Ekman pumping caused by the frictional convergence in the boundary layer on the motion of a typhoon are qualitatively discussed. The results show that the topographical ridge and the Ekman pumping at the top of the boundary layer can prompt the development of a typhoon.

Keywords: typhoon movement, topographical forcing, Ekman steering current

吕克利，布和朝鲁，1995，大尺度凝结加热与暖锋锋生，热带气象学报，11(2):170-175

在假湿绝热假定下，推导出简化的半地转湿锋生模式，并用该模式讨论了大尺度凝结加热对暖锋锋生过程的影响。研究结果表明，大尺度凝结加热对暖锋锋生过程具有明显的加强作用。

关键词：半地转模式 大尺度加热 暖锋锋生

Lu Keli and Buhe Chaolu. 1995. Large-scale condensation heating and warm front frontogenesis. Journal of Tropical Meteorology 11(2):170-175.

A simplified semigeostrophic frontogenesis model with inclusion of large-scale condensation latent heat is built. Based on this model, the effects of latent heat release on the frontogenesis of a warm front are discussed. It is believed that because of the large-scale condensation heating, the warm front is intensified and made more characteristic of a mesoscale system.

Keywords: semigeostrophic model, large-scale heating, warm front, frontogenesis

贺海晏，董惠菁，1995，台风移动规律的研究3—台风与外界水平动量交换的影响，热带气象学报，11(3): 193-202

本文分析了流场半非对称台风的流入层和流出层与外界的水平动量交换影响台风移动的定性特征。作者认为，半非对称因素可以导致台风动量变化从而改变了台风的运动方向。主要流入通道或主要流出通道位于台风右（左）侧时，有利于台风加速、左折（减速、右折）；当主要流入通道或主要流出通道位于台风后部（前部）侧时，有利于台风加速、右折（减速、左折）。

关键词：台风移动　水平动量交换　半非对称台风

He Haiyan and Dong Huijing. 1995. A study on typhoon movement. 3. Effect of the horizonatal momentum exchange between typhoon and environment. Journal of Tropical Meteorology 11(3):193-202.

Two semi-asymmetric flow patterns of typhoons are chosen to qualitatively determine the effect of the exchange of horizontal momentum between inflow layers on the motion of typhoons. The authors believe that the asymmetric flow component could cause a net momentum input into or output from a typhoon and change typhoon movements in respect to speed and direction. A typhoon with major inflow or outflow channels on its right (left) side would tend to accelerate and turn left (decelerate and turn right). On the other hand, a typhoon with major inflow or outflow channels in the front (rear) semi-circle would tend to accelerate and turn right (decelerate and turn left).

Keywords: typhoon movement, horizontal momentum exchange, semi-asymmetric typhoon

Modeling

王良健，1995，GM（1，1）模型在湖南严重干旱预报上的应用，干旱区地理，18(1):83-86

本文利用湖南省解放以来的几次严重干旱资料，建立了GM（1，1）模型。该预测模型精度为第一级“Good”，可以预测以后干旱年分的出现。
关键词：GM（1，1）模型应用 干旱预报 湖南省

Wang Liangjian. 1995. Application of the model GM (Global Model) (1,1) to forecast the serious aridity in Hunan Province. Arid Land Geography 18(1):83-86.

The author analyzes the data of several aridity disasters in Hunan Province since the Liberation and sets up models of GM (1,1). The precision of the model is excellent. The next arid disasters can be forecasted using calculation of the gray system.

Keyword: Model GM (1,1), aridity forecast, Hunan Province

吴祥定，刘洪滨，潘一民，1995，采用条件分位数调整法合并二类气候代用资料的初步分析，地理研究，14(3):52-68

本文采用条件分位数调整法，合并华山树木年轮年表和西安旱涝等级序列二类气候代用资料，最大限度地利用了在年轮资料中的连续变化信息，并使历史文献资料相互补充，从而使合并出来的序列更有助于对过去气候的重建。
关键词：条件分位数 气候代用资料

Wu Xiangding, Liu Hongbin, and Pan Yimin. 1995. The analysis of proxy data using conditional quantile. Geographical Research 14(3):52-68.

Based on two kinds of proxy data (tree-ring-width chronology at Huashan and the wetness/dryness grade series around Xi'an), the paper combines two types of proxy climate records. With comparison and correction of the two data sets, various statistical models can be developed from individual and combined series. Among them, the best-combined model produced by the conditional quantile adjustment method can be selected for reconstruction of ancient climate.

Keywords: conditional quantile, climate, proxy data

彭乃志，傅抱璞，梁旭，1995，宁夏气温的数学模拟及多年变化特征，地理研究，14(3): 83-87

对宁夏气温的空间变化规律、数学模拟以及气温的多年变化特征的研究表明，宁夏气温的地区分布呈南低北高；用海拔高度、地理纬度、经度模拟当地气温的空间分布，具有很高的精度；宁夏气温多年变化普遍存在着10-12年或2.2-2.5年的变化周期。

关键词：气温 数学模拟 功率谱 宁夏

Peng Naizhi, Fu Baopu, and Liang Xu. 1995. The mathematical modeling and the year-to-year change of temperature in Ningxia. Geographical Research 14(3):83-87.

The result of research on the spatial and temporal changes in temperature in Ningxia shows that the temperature in the south of Ningxia is lower than that in the north. The exactitude of reckoning temperature by using height, latitude, and longitude is very good. Year-to-year changes of temperature have 10 to 12 years and 2.2 to 2.5-year cycles.

Keywords: temperature, mathematical modeling, power spectrum, Ningxia

李恺心，姜晓艳，1995，多准则模糊决策方法在旱涝趋势预报中的应用，气象，21(2):16-18

本文应用多准则模糊决策方法，对各种旱涝趋势预报方法作出总的评价，进行了最佳预报方法排序，作为最终预报的依据。

关键词：多准则 模糊决策 旱涝趋势 预报

Li Kaixin and Jiang Xiaoyan. 1995. The application of multi-criterion fuzzy decision to the long term forecast of dryness/wetness trends. Meteorological Monthly 21(2):16-18.

Based on the method of multi-criterion fuzzy decision analyzed, a general appraisal on methods of long-term forecasting of dryness/wetness trends is made according to forecasting accuracy. As a result, an order of optimum forecast methods as a basic principle for the final forecast is obtained.

Keywords: multi-criterion, fuzzy decision, dryness/wetness trends, forecast

*陈伟民，陈永卫*等，1995，微机实时气象资料应用支持系统，气象，21(2):43-47

本文介绍了实时气象资料支持系统的特点。该系统包括资料预处理、客观分析、物理量诊断及图形显示三部分，操作简便，分析质量高，省时省力且增大了预报信息量，是进行天气预报分析的有力工具。
关键词：微机 实时资料分析 诊断 图像显示

Chen Weimin, Chen Yongwei, et al. 1995. The application of supporting system of real-time meteorological data to microcomputer. Meteorological Monthly 21(2):43-47.

The Real-Time Meteorological Data Application Supporting System is introduced. The system includes real-time meteorological data processing, objective analysis, and diagnosis. It is simple to operate and its analysis is accurate. As a useful tool for synoptic research, the system can increase information for operational forecasts.

Keywords: microcomputer, real-time data analysis, diagnosis/configuration display

罗勇，1995，从时间序列中提取维数信息，气象，21(4):16-21

.本文介绍了分形和分维的概念、性质和意义，重点讨论从一维时间序列中提取维数信息的方法。另外还给出了分形与分维在天气和气候分析中的应用。
关键词：分形与分维 ENSO系统 时间序列

Luo Yong. 1995. Computation of fractal dimension from time series. Meteorological Monthly 21(4):16-21.

The conceptions and characteristics of fractals and fractal dimension are introduced. The computational method fractal dimension of a dynamic system from one variable time series is mainly discussed. The utilization of fractal dimension in weather and climate analyses is given.

Keywords: fractals and fractal dimension, ENSO, time series.

顾节经，1995，气候变化对作物产量影响的动态统计评价模式，气象，21(4):50-53

本文介绍了气候变化对作物产量的动态统计评价模式，该模式用于探索作物生育期内以旬为时间单位的气候变化对作物产量形成的影响规律，可及时连续地进行农业生产的气候影响评价。在建模过程中引用了三项式产量预报模型、特殊影响因子诊断分析和选取最佳积分回归方程等方法，并在使用中取得了较满意的结果。

关键词：气候变化 作物产量 评价模式

Gu Jiejing. 1995. A dynamic-statistical model for the assessment of the effects of climatic change on crop yield. Meteorological Monthly 21(4):50-53.

A dynamic statistical model, developed to study the effects of climate change on crop yield in the time scale of 10 days, is introduced. The model is valuable for assessing the climatic effect on agricultural activities so that sustainable development and timely responses can be made. To make the model more suitable for practical use, the following methods were used during its development: three-term crop yield forecast model, diagnostic analysis for special factors, and choice of best integral regression equation. Satisfactory results were achieved in the test model.

Keywords: climatic change, crop yield, assessmental model

郑洪初，1995，用CAR模型作年旱涝长期天气预报的研究，气象，21(7):51-53

采用特殊的CARMA模型即带受控制项的自回归模型（CAR）对年旱涝时间序列的动态系统建模。得到用三个受控制量描述的安康市的年旱涝演变规律的CAR模拟，模型精度高。

关键词：旱涝 长期预报 CAR模型

Zheng Hongchu. 1995. The research on annual drought and long-term flood prediction by CAR Model. Meteorological Monthly 21(7):51-53.

Using the controlled auto-regression (CAR) model, a special Consortium for Applied Research on Market Access (CARMA) model, the dynamic system of the time series of annual drought and flood in Ankang Prefecture in Shanxi Province is modeled. The CAR prediction model of three controlled variables has been obtained, and it is applied to predict annual drought/flood tendency in the Ankang region. Its accuracy is good.

Keywords: drought and flood, long-term prediction, CAR model

刘小宁，孙安健，1995，年降水量序列非均一性检验方法探讨，气象，21(8)：3-6

以我国400余站1951－1990年降水量序列为基础，利用比值法检验其非均一性问题。结果表明，该方法较为有效，我国台站迁移及雨量器的改变是引起年降水序列非均一的主要原因。

关键词：年降水量序列 非均一性 检验

Liu Xiaoning and Sun Anjian. 1995. Research of inhomogeneity test of annual precipitation series. Meteorological Monthly 21(8):3-6.

Based on data of annual precipitation series from 1951 to 1990 for 400 stations in China, the inhomogineity has been tested by using the ratio method. The results show that this method is effective to evaluate the inhomogeneity of annual precipitation series. Changes of stations and gauges are major cause of the inhomogeneity of the annual precipitation series.

Keywords: annual precipitation series, inhomogeneity, test

李小泉，1995，美国长期天气预报业务的新发展—发布气候展望，气象，21(9):49-52

美国天气局从1995年1月开始发布预见期为一年的业务性气候展望，本文对其科学依据、预报方法、预报制作与预报准确性等作出简要介绍。

关键词：发布气候展望 科学依据 预报方法 预报制作 准确率

Li Xiaoquan. 1995. New development of the long range forecast operation of the National Weather Service in the United States: Issuing climate outlooks. Meteorological Monthly 21(9):49-52.

The author deals with the long-lead seasonal forecast, which has been issued by the National Weather Service of the United States since January 1995. The scientific basis, major methods, operational procedures for producing climate outlooks, and the forecast skill are introduced briefly.

Keywords: issuing climate outlooks, scientific basis, forecast methods, operational procedure, forecasting skill

陆文杰，1995，鄂尔多斯高原及周边地区地面温度的计算研究，气象，21(11)：11-16

本文利用NOAA－AVHRR资料，采用一种分裂窗方法计算鄂尔多斯高原及周边地区的地面温度。与实测资料相比，夜间计算差值在±1℃以内的占80%，白天占67%，最大差值为-3.8℃。
该方法是一种可行的宏观地表监测手段。
关键词：地面温度 分裂窗方法 发射率

Lu Wenjie. 1995. The research on calculation of land surface temperature on the Ordos Plateau and the surrounding area. Meteorological Monthly 21(11):11-16.

Based on National Oceanic and Atmospheric Administration (NOAA)-advanced very high resolution radiometer (AVHRR) data, the land surface temperature of the Ordos Plateau and the surrounding area is calculated by means of a split-window method. The comparison between the computed results and the data from observations of local stations indicates that the difference is about 80% with 1°C in the nighttime, and 67% in the daytime with a maximum difference of -3.8°C. As a macro-monitoring measure, this method is acceptable in estimating land surface temperature.

Keywords: land surface temperature, split-window method, emissivity

俞炳启，胡洛林，1995，用模糊均生函数作区域夏季旱涝预测，气象，21(12):32-34

本文运用模糊均生函数（FMGF）建模方案建立南京、镇江地区夏季旱涝趋势预测模型，拟合效果理想，与实况较为接近。
关键词：模糊均生函数 旱涝 预测

Yu Bingqi and Hu Luolin. 1995. Regional prediction of summer floods/drought with fuzzy mean generating function model. Meteorological Monthly 21(12):32-34.

The authors set up a prediction model for summer floods/droughts in the Nanjing-Zhenjiang region by fuzzy mean generating function. The model is satisfactory especially in case of severe floods/droughts.

Keywords: fuzzy mean generating function, floods/droughts, prediction

陈仲全，张正栋，徐国昌，1995，干旱指数与旱灾测防系统，中国沙漠，15(1):10-18

本文研究了干旱过程系统、干旱指数与旱灾测防系统问题。研究这一问题的核心是环境湿润状态和经济社会水分供需平衡的结构与动态；减消旱灾的关键是监测、预报与工程调控系统。该项研究对减小旱灾、保护环境、发展经济社会意义重大。

关键词：干旱指数 旱灾指数 旱灾测防系统

Chen Zhongquan, Zhang Zhengdong, and Xu Guochang. 1995. Arid index and systems for drought observation and prevention. Journal of Desert Research 15(1):10-18.

The article mainly deals with the problems of the arid index, a system of arid processes and systems for drought observation and prevention. The main subjects for the research of these systems are the environmental water status and the structure and dynamics of water supply-demand balance. The key problems for eliminating drought are observation, predication, and engineering control.

Keywords: arid index, index of drought, the systems of observation and prevention of drought

吕世华，陈玉春，1995，绿洲和沙漠下垫面状态对大气边界层特征影响的数值模拟，中国沙漠，15(2): 116-123

本文将两维高分辨率边界层数值模式与一个包括植被和土壤层的生物—大气能量传输模式（BATS）耦合，模拟绿洲和沙漠下垫面状态对大气边界层特征的影响。绿洲对大气产生“冷湿效应”形成上空的冷湿气柱，沙漠则对大气呈“暖干效应”形成热干气柱。绿洲上的冷湿气流在沙漠边缘形成降水，沙漠上的暖干气流则使沙漠下游的绿洲降水与整个绿洲相比偏少。

关键词：两维数值模式 大气边界层 沙漠 绿洲

Lu Shihua and Chen Yuchun. 1995. The numerical simulation of the features of the planetary boundary layer of an Oasis and the Gobi Desert in the arid region. Journal of Desert Research 15(2):116-123.

A two-dimension high-resolution model coupling with the Biosphere-Atmosphere Transfer Scheme (BATS) was used to simulate and research the influence of the planetary boundary layer of an oasis and underlying surface on precipitation and other factors. The oases have a cold-wet effect on the atmosphere, which causes a cold-wet air column above the oasis area. And the Gobi has a hot-dry effect on the atmosphere, which causes a hot-dry air column above it. The cold-wet air brings precipitation when it passes over the desert, and the hot-dry air makes the lower reach of the oasis dryer than the average level of the oasis.

Keywords: two-dimension numerical model, the planetary boundary layer, desert, oasis

*刘树华*等，1995，植被对近地面层水热交换影响的参数化模型，应用生态学报，6(2):149-154

本文提出了一个研究植被和土壤特性对近地面层水热交换和能量平衡的参数化模型，该参数化模型可应用与中尺度气象模拟、气候模拟和环境生态学的研究。

关键词：参数化模型
土壤—植被—大气系统 能量平衡

Liu Shuhua et al. 1995. A parameterized model on moisture-heat exchange at the near-ground layer. Chinese Journal of Applied Ecology 6(2):149-154.

The authors advance a parameterized model to study the influence of vegetation and soil on the moisture-heat exchange at the near-ground layer and energy balance. The parameterized model can be used to study mesoscale meteorological modeling, climate modeling, and environmental ecology.

Keywords: parameterized model, soil-vegetation-atmosphere system, energy balance

*喻本德*等，1995，用参数方程的方法计算氟氯碳化合物的臭氧消耗潜势，环境科学学报，15(2):129-134

本文根据同类氟氯碳化合物的臭氧消耗潜势（ODP）之间的差异和ODP与有关参数的内在联系建立了两类求算HCFCs、CFCs的ODP的参数方程。当ODP计算值小于0.05时，准确度较高，ODP值大于0.05时，误差较大，但数值本身仍有较好的参考价值。

关键词：臭氧消耗潜势 臭氧
氟氯碳化合物 平流层化学

Yu Bende et al. 1995. Calculation of ozone depletion of halocarbons using parametric equations. Acta Scientiae Circumstantiae 15(2):129-134.

Two kinds of parametric equations are set up to calculate the ozone-depleting potential (ODP) of hydrochlorofluorocarbons (HCFCs) and chlorofluorocarbons (CFCs) on the basis of a study on the differences in the ODP of some kinds of halocarbons and the relationship between ODP and relevant parameters The equations are more accurate when the ODP is lower than 0.05. When ODP is higher than 0.05, the result is also valuable.

Keywords: ozone depletion potential, ozone, halocarbons, stratospheric chemistry

*杨修群*等，1995，夏季赤道中东太平洋海温和北极海冰异常对大气环流影响的数值模拟，海洋学报，17(1): 24-31

本文对赤道中东太平洋海温偏暖、北极不同区域海冰偏多以及海温偏暖同时海冰偏多对夏季北半球大气环流的影响进行了研究，结果表明，海冰和赤道海温任何一方的变异均可显著影响大气环流。最后，还证明了赤道和极地之间的热力差是决定大气环流的最基本因子。
关键词：太平洋海温 北极海冰 热力差 数值模拟

Yang Xiuqun et al. 1995. Numeral analogy of the influence of abnormal phenomena of summer sea temperature of the equatorial eastern Pacific and sea ice of the Arctic on atmospheric circulation. Acta Oceanologica Sinica 17(1):24-31.

The sea temperature of the equatorial eastern Pacific, and sea-ice conditions in different regions of the Arctic and their effects on the summer circulation of the Northern Hemisphere are studied in the paper. The results show that each kind of abnormal change of sea ice or tropical sea temperature can affect atmospheric circulation remarkably. It is also proved that thermal difference between equator and arctic is a basic factor in determining atmosphere circulation.

Keywords: Pacific sea temperature, Arctic sea ice, thermal difference, numerical analogy

*马开玉*等，1995，厄尔尼诺循环的反馈机制探讨，海洋学报，17(3): 41-46

本文探讨了赤道太平洋（11°S－11°N，120°E－90°W）近40年历次厄尔尼诺和拉尼娜期间各气象因子的差异，认为包括动力、热力和水文过程的两种正反馈和负反馈机制相互影响，促成了厄尔尼诺循环。
关键词：厄尔尼诺循环 反馈机制 海－气耦合

Ma Kaiyu et al. 1995. Research on the feedback mechanism of El Niño circulation. Acta Oceanologica Sinica 17(3):41-46.

The authors deal with differences of meterorologic factors of El Niño and La Niña for the last 40 years in the equatorial Pacific region 11°S to 11°N and 120°E to 90°W. The authors consider that it is the interaction of positive and negative feedback mechanisms including dynamic, thermodynamic, and hydrologic processes that formed El Niño circulation.

Keywords: El Niño circulation, feedback mechanism, air-sea interaction cycle

王宁练，1995，冰川平衡线变化的主导气候因子灰色关联分析，冰川冻土，17(1):8-15

本文应用灰色关联分析理论对乌鲁木齐河源1号冰川东、西支冰川平衡线与气候因子之间的关系进行了研究。结果表明，夏季平均气温是影响平衡线波动的主导气候因子；不同时期降水量对冰川平衡线波动的影响程度不同。

关键词：灰色关联分析 平衡线 气候因子

Wang Ninglian. 1995. Gray relational analysis of the leading climatic factor influencing the changes of the equilibrium line. Journal of Glaciology and Geocryology 17(1):8-15.

The relations between climatic factors and the equilibrium lines of the east and west branches of Glacier No. 1 in the headwaters of the Urumqi River in the Tianshan Mountains are analyzed by using of the theory of gray relational analysis. The results suggest that summer mean air temperature is the leading climatic factor that dominates the fluctuation of the equilibrium line, and that there are differences in the influences of precipitation during different periods in a balance year on the changes of the equilibrium line.

Keywords: gray relational analysis, equilibrium line, climatic factors

袁玉江，李江风，1995，天山西部树轮年表的响应函数，冰川冻土，17(2):170-177

本文应用响应函数分析技术对新疆伊犁地区树轮年表中的气候信息作出分析并得出结论。这种方法极有助于对该区气候对森林的影响的认识和对温湿气候区树木年轮气候信息的提取。

关键词：树木年轮表 响应函数

Yuan Yujiang and Li Jiangfeng. 1995. The response functions of tree-ring chronologies in the Western Tianshan Mountain. Journal of Glaciology and Geocryology 17(2):170-177.

The authors analyzed the climatic information from tree-ring chronologies in Ili prefecture using the analytical technique of response function. The results are useful in understanding the effect of climate on the prefectures' forest and to extracting the climatic information from the tree rings in warm and wet regions.

Keyword: tree-ring chronology, response function

*林振山*等，1995，天津局地气候的反演建模及其研究，气象学报，53(1):115-121

本文在对天津月平均温度T、气压P和雨量R的时间序列资料分析的基础上，反演出一组近似描写天津（T—P—R）局地气候的动力方程，同时还对其演化特性及内部相互作用机制进行了研究。

关键词：时间序列 反演建模 演化特性 相互作用

Lin Zhenshan et al. 1995. The retrieved model of Tianjin local climate. Acta Meteorologica Sinica 53(1):115-121.

A set of equations, which indicate the local climate of Tianjin, are retrieved based on the analysis of the data of a time series of monthly mean temperature, pressure, and rainfall in Tianjin. The evolution characteristics and the interaction of the systems are also discussed.

Keywords: time series, modeling, evolution character, interior interaction

屠伟铭，张跃堂，1995，全球最优插值客观分析，气象学报，53(2):148-156

本文分析了国家气象中心实时运行的全球资料同化系统中的客观分析方案，该方案采用最优插值统计方法对天气中长期预报和科研给出数值形式的全球分析值。在两年的应用中，该方案为T42中期数值预报谱模式提供了较好的初始场资料。

关键词：全球最优插值 统计分析 检验

Tu Weiming and Zhang Yuetang. 1995. The global optimum interpolation objective analysis. Acta Meteorologica Sinica 53(2):148-156.

The objective analysis scheme, which is used in the Global Data Assimilation system, running in real-time at the National Meteorological Center (NMC) of SMA, is described in the paper. Through the optimum interpolating statistical method, the scheme produces the global analysis values in numerical form for long-term and medium-term weather prediction and research. In the two years of operation, a better initial condition has been developed for the spectral forecasting model, with a wave spectral function of 42, in the medium-range numerical weather prediction.

Keywords: global optimum interpolation, statistical analysis, verification

*刘玉宝*等，1995，中尺度山脉对流群的动力和微物理数值模拟，气象学报，53(2):157-167

本文应用中国强风暴实验室MBG（Meso-Beta - Gamma）非静力模式模拟了该计划中1990年5月3日一次对流降水过程。模拟结果揭示了大山脉气流强迫与对流环流相互作用的一些基本特点。此外，作者还对采取细致的雹云微物理参数化和采取简单的暖云微物理参数化的方法进行对比试验。

关键词：非静力模式 中尺度 云微物理结构

Liu Yubao et al. 1995. A numerical simulation of the dynamics and microphysics of convective precipitation over a meso-scale mountain. Acta Meteorologica Sicina 53(2):157-167.

The May 3, 1990 precipitation processes over Asia Mountain are simulated in two dimensions by the MBG (Meso-Beta-Gamma) model of the Climate Anomaly Monitoring System (CAMS) of the People's Republic of China (PRC). The results showed the basic features of interactions between the clouds and orographic forcing. In addition, the distribution, evolution, sizes, top heights, updrafts, and precipitation growth, etc. of the modeling cumulonimbus clouds were generally consistent with field observation of the Saudi Arabian Cloud Physics Experiment (SACPEX) projects.

Keywords: non-hydrostatic model, meso-scale, precipitation, microphysical structure of cloud

*刘辉*等，1995，北半球阻塞高压的维持1：准地转和Ertel位涡分析，气象学报，53(2):177-185

本文从北半球不同地区的4个阻塞高压个例，研究了阻塞高压维持机制及其地域性差异。相对涡度输送的差异导致了300hPa位涡低值区的维持机制的地域性差异。等熵面Ertel位涡分析表明，阻高区域330K时间平均等熵位涡低值区的维持机制与300hPa时间平均准地转位涡低值区的维持机制十分相似，从而表明以上等压面准地转位涡分析可以近似用来代表等熵Ertel位涡分析。

关键词：阻塞高压 位涡 北半球

Liu Hui et al. 1995. On maintenance of blocking anticyclones of the Northern Hemisphere Part 1: Quasi-geostrophic and Ertel Potential Vorticity analysis. Acta Meteorologica Sinica 53(2):177-185.

The maintenance of blocking anticyclones is invested with four observed blocking anticyclones in different regions of Northern Hemisphere. The difference of potential vorticity (PV) transform causes the regional difference in the maintenance of blocking highs in the low PV regions of 300 hPa. Very similar results are obtained with respect to maintenance of the time-mean Ertel PV in 330K surface. Therefore, in the blocking cases, the quasi-geostrophic PV analysis can be used to represent the Ertel PV analysis.

Keywords: blocking anticyclone, potential vorticity (PV), Northern Hemisphere

丁裕国，江志红，1995，非均匀站网EOFs展开的失真性及其修正，气象学报，53(2):247-253

本文针对非均匀站网EOFs展开的失真性，提出了一种附加面积权重的修正方案用以弥补非均匀站网EOFs展开的失真现象。中国气温场（160站）经修正后，其气温变化主分量趋势与特征能更加客观地揭示中国地区增暖效应的局地差异。

关键词：经验正交函数（EOFs） 非均匀站网 面积权重

Ding Yuguo and Jiang Zhihong. 1995. The lack of fidelity of empirical orthogonal functions' (EFOs') expansion over heterogeneous network and its revised scheme. Acta Meteorologica Sinica 53(2):247-253.

A revised scheme using area weighting is developed in connection with the finding that current empirical orthogonal functions' (EOFs') expansion results are not true to some extent over a heterogeneous network. Practically, the regional differences of the recent warming effect are more objectively revealed by using the revised EOFs technique and surface temperature field records (from the network of 160 stations) in response to the trends and features of China's regions.

Keywords: empirical orthogonal functions (EOFs), heterogeneous network, area weighting

吕克利，徐亚梅，1995，不同季节实际气流上斜压波的发展和锋生过程，气象学报，53(3):328-336

本文利用三维半地转模式研究了四季基本气流上非线性斜压扰动的发展过程和锋面形成过程。结果认为，在四季基本气流上，斜压扰动的发展以冬季为最强，秋夏季最弱。扰动的发展能产生冷暖锋，所以，相应地形成的锋也以冬季最强，秋夏季最弱。

关键词：斜压波 锋生 季节变化

Lu Keli and Xu Yamei. 1995. Development of baroclinic waves on actual flows and frontogenesis. Acta Meteorologica Sinica 53(3):328-336.

The development process of nonlinear baroclinic waves and frontogenesis on the mean flows of the four seasons are studied using a three-dimensional semigeostrophic model. The results indicate that the disturbance development is the most intense in winter and is the weakest in summer and fall. They also indicate that the development of baroclinic waves on the mean zonal flows, which are functions of height and latitude, can cause cold and warm fronts. The fronts caused by baroclinic waves are strongest in winter and weakest in summer and fall correspondingly.

Keywords: baroclinic wave, frontogenesis, seasonal variation

*刘辉*等，1995，北半球阻塞高压的维持2：瞬变扰动强迫和平均流位涡平流的形成，气象学报，53(3):337-348

本文探讨了大西洋阻高和东亚阻高中瞬变扰动位涡输送强迫和太平洋阻高中平均流位涡平流的形成机制。阻高西南部西风分流产生的扰动，并不是扰动位涡输送强迫形成的必要因素。扰一流相互作用在阻高西（北）部非分流气流中十分显著，这一相互作用可能是扰动强迫作用形成的机理。青藏高原则可能是太平洋阻高中平均气流的位涡平流形成的重要因素。

关键词：阻塞高压 位涡 北半球

Liu Hui et al. 1995. On maintenance of blocking anticyclones of the Northern Hemisphere Part 2: Mechanism of eddy forcing and potential vorticity (PV) advection by mean flow. Acta Meteorologica Sinica 53(3):337-348.

The formation of the potential vorticity (PV) transfer by eddy forcing in the Atlantic and Asia blocking cases and the advection of PV by mean flow in the Pacific blocking cases are studied. It is noted that the propagation of an eddy in diffluent flow in the southwestern blocking case is not necessary for the formation of the eddy forcing. The interaction between mean flow and eddies is also strong in the non-diffluent flow of the northwestern part of the anticyclones. The interaction may be one of the formation factors of the eddy forcing. The Qinghai-Xizang Plateau may be the formation factor of the advection of mean flow in the Pacific blocking cases.

Keywords: blocking anticyclone, potential vorticity (PV), Northern Hemisphere

陈受钧，1995，厄尔尼诺与东亚暖冬的数值模拟，气象学报，53(3): 380-384

本文根据实际观测的海面温度资料，应用全球大气环流谱模式（ECHAM3）长期积分一个物理过程比较完善的大气环流模式模拟了厄尔尼诺年的东亚暖冬和弱冬季风现象。并对模拟的结果进行了初步讨论。

关键词：厄尔尼诺 暖冬 数值模拟

Chen Shoujun. 1995. Numerical simulation of El Niño and East Asia warm winter. Acta Meteorologica Sinica 53(3):380-384.

On the basis of observed sea surface temperature data, the weak winter monsoon with warmer temperature over East Asia during El Niño events is simulated. A long-term integral of the European Centre for Medium-Range Forecasts (ECMWF)-Hamburg model (ECHAM3) global model on an atmosphere cycle that has a completed physical process is used. The preliminary results are discussed.

Keywords: El Niño, warm winter, numerical simulation

*马开玉*等，1995，El Nino-La Nina循环的海一气耦合机制研究，气象学报，53(4):461-470

本文对赤道太平洋洋面上温、压、风、湿、云以及热量收支各分量进行了综合研究。在El Nino过程中，赤道太平洋洋面上气压梯度减小，中、东太平洋洋面上空中水汽和云量增加，洋面获净得的热量减少。在La Nina过程中，情况相反。作者还概括了El Nino-La Nina循环的两种海一气耦合反馈机制。

关键词：EL Nino-La Nina 循环 海一气耦合 赤道太平洋

Ma Kaiyu et al. 1995. Mechanism study of El Niño-La Niña cycle in the coupled air-sea system. Acta Meteorologica Sinica 53(4):461-470.

Data of the effects of temperature, pressure, zonal wind, special humidity, clouds, and the components of the heat budget on the equatorial Pacific surface are studied. It is believed that in the processes of El Niño, the pressure gradient and trade winds decreased in the equatorial Pacific, that vapor and clouds increased, and that the net gain of heat reduced in the central and eastern equatorial Pacific surface. In the processes of La Niña the circumstances are opposite. Lastly, the authors summarize two feedback mechanisms of the El Niño-La Niña cycle.

Keywords: El Niño-La Niña cycle, air-sea coupling, equatorial Pacific

张耀存，钱永甫，1995，陆地下垫面特征对区域能量平衡过程影响的数值试验，高原气象，14(3):325-333

本文主要进行了陆地下垫面特征变化对区域能量平衡过程影响的数值试验，利用三维地气耦合的区域气候模式模拟了我国华北部分地区的地面能量平衡过程。结果认为，不同的陆地下垫面性质的变化将会改变地气系统之间的能量平衡和转换过程，进而影响到区域气候环境。通过改变地表特征的方式可改善区域气候和生态环境。

关键词：陆地下垫面特征 区域能量平衡 数值试验

Zhang Yaocun and Qian Yongfu. 1995. Numerical experiments of the effects of land surface characteristics on regional energy balance. Plateau Meteorology 14(3):325-333.

Numerical experiments of the effects of land surface characteristics on regulation energy balance are carried out. The surface energy budget is modeled in North China using a 3-D regional climate model. The results show that the different land surface characteristics would lead to large differences in exchanges of surface energy because they exert substantial influence on regional climate. Therefore it is possible to improve the climate condition and ecological environment on a regional scale by modifying the land surface charactersistics.

Keywords: underlying surface characteristics of land, regional energy balance, numerical experiments

*王宝灵*等，1995，中国西北夏季降水的EOF分析及其与500hPa高度场的关系，高原气象，14(3):342-347

本文讨论了西北地区降水量的空间特征。对7-9
月月降水量分别进行EOF分解，并与500hPa高度场进行了对比。结果发现，7-9
月月降水量第一特征向量在青藏高原东北侧有一高值中心，该中心与有关学者计算的新噪比高值中心和准3年周期有显著的区域一致，7-8
月月降水量第一特征向量与500hPa高度场在20- 40°N，100-130°E 和55-70°N，
50-85°E 两区域有较好的同期相关。
关键词：EOF 中国西北地区
降水量 青藏高原东北侧

Wang Baoling et al. 1995. Empirical orthogonal function (EOF) analysis of summer precipitation in Northwest China and the relationship between it and 500 hPa height field. Plateau Meteorology 14(3):342-347.

The spatial characteristics of precipitation in Northwest China are discussed. The characteristics of monthly precipitation from July to September in Northwest China are analyzed using EOF method. The relationship between precipitation and the 500 hPa monthly mean height is also discussed. The results show that a strong precipitation center of monthly precipitation from July to September for the first eigenvector appears on the northeast side of Qinghai-Xizang Plateau and that simultaneous relationships between first eigenvector of precipitation in July and August and 500 hPa height field in 20-40° N, 100-130° E and 55-70° N, 50-85° E are better.

Keywords: EOF, Northwest China, precipitation, the northeast side of Qinghai-Xizang Plateau

严中伟，季劲军，1995，陆面过程模式中积雪过程的参数化及初步试验，高原气象，14(4):415-424

本文在已经发展的土壤一植被一大气模式基础上，建立了包含雪盖问题的陆面过程模式。并用实测气象和辐射资料检验了模式对大气降雨和降雪的响应。结果表明。该模式描写的各种物理过程合理，一些可观测要素的演变特征与实况相当一致。
关键词：陆面过程模式
雪盖变化参数化 HEIFE

Yan Zhongwei and Ji Jinjun. 1995. Preliminary experiments of a land-surface process model with simple parameterization of snow cover. Plateau Meteorology 14(4):415-424.

A new version of the land-surface process model in which the snow-cover process is considered is developed on the base of the existing soil-vegetation-atmosphere model. A few experiments were designed using meteorological and the surface radiation data. The results show that the modeled processes forced by atmospheric precipitation (both rainfall and snowfall) are quite reasonable. Some modeling elements, such as the surface soil temperature and the surface net radiation, coincide well with the observations.

Keywords: land-surface process model, parameterization of snow-cover variation, Heihe River Field Experiment (HEIFE)

吴池胜，王安宇，1995，青藏高原隆起对亚洲夏季风形成作用的数值试验，高原气象，14(4): 425-432

本文利用有限区域五层原始方程模式进行了青藏高原隆起过程对亚洲夏季风形成作用的数值试验。试验分为1000m、2000m、3000m、3500m和4000m 5 组。
结果表明，高原及其东南侧的热源随着高原的隆起而加强，迅速加强的热源将引起季风环流产生相应的明显变化；当高原隆起达3500m时，南亚高压出现，热带东风明显加强，同时地面低压中心迅速西移上高原；当高原隆起高于3500m后，亚洲季风更为强大；高原隆起导致了周边地区降水变化。
关键词：夏季风 青藏高原隆起

Wu Chisheng and Wang Anyu. 1995. Numerical experiments for the effects of the rising of the Tibetan Plateau on the formation of Asian summer monsoon. Plateau Meteorology 14(4):425-432.

Numerical experiments were performed using a five-layer primitive equation model that is limited in certain areas. The experiments were composed of five parts: heights of 1000 m, 2000 m, 3000 m, 3500 m and 4000 m. The results show that the atmospheric heat source over the Tibetan Plateau and its southeast neighborhood strengthened with the rising of the plateau. The Asian summer monsoon circulation was changed obviously. When the mean height of the plateau is raised to 3500 m, the South Asian high in the upper troposphere appear, and the tropical easterly to the south of the high center strengthens considerably. Meanwhile, the low-level thermal low over the Asian continent moves westward over the plateau rapidly. When the plateau rises higher than 3500 m, the monsoon strengthens considerably. The rising of the plateau also causes variation of precipitation in regions around it.

Keywords: summer monsoon, the rising of the Tibetan Plateau

杨大升，曹文忠，1995，中高纬大气30－60天低频振荡的一种动力学机制，大气科学，19(2):209-218

本文研究了中高纬低频振荡产生的动力机制。正压局地不稳定性能较好地解释中高纬大气30－60天振荡，低频振荡是大尺度大气运动和扰动相互作用的一种固有特征。本文还讨论了适于激发季节内低频振荡的基本流场。初值问题的研究发现中高纬大气30－60天振荡呈纬向三波模态发展，与初始扰动和基本气流的冬、夏差别无关。
关键词：动力机制 大气季节内振荡 热带外纬度

Yang Dasheng and Cao Wenzhong. 1995. A possible dynamic mechanism of the atmospheric 30-60 day period oscillation in the extratropical latitude. Scientia Atmospherica Sinica 19(2):209-218.

The dynamic mechanism producing the intraseasonal variability in the extratropical latitude is studied. Study indicates that the barotropic local instability rather satisfactorily accounts for the atmospheric 30-60-day periodic oscillation at the middle and high latitudes. The low-frequency oscillation is an intrinsic characteristic of the large-scale atmospheric motion's interaction with the perturbation. Moreover, the basic currents accommodations to the triggering of the intraseasonal oscillation are discussed. The investigation of the initial value

problem reveals that the atmospheric 30-60-day periodic oscillation develops in a stable fashion on the zonal 3-wave mode and is independent of the initial disturbance as well as of the discrepancy of the basic currents between winter and summer.

Keywords: dynamic mechanism, atmospheric intraseasonal oscillation, extratropical latitude

*章基嘉，徐祥德*等，1995，青藏高原地面热力异常对夏季江淮流域持续暴雨形成作用的数值试验，大气科学，19(3):270-276

本文采用OSU－AGCM大气环流模式，讨论了青藏高原下垫面热力异常与夏季江淮流域暴雨形成的关系。结果表明，1991年夏季江淮流域持续性降水是由青藏高原下垫面热力异常导致的。青藏高原热力异常还可以引起大范围云量异常区类似于二维Rossby波列沿大圆路径传播的特征。

关键词：青藏高原 热力异常 江淮暴雨 数值试验 云量异常分布

Zhang Jijia and Xu Xiangde. 1995. A numerical experiment of the effect of anomalous thermal forcing of the Tibetan Plateau ground surface on the formation of persistent heavy rain in summer over the Yangtze-Huaihe basin. Scientia Atmospherica Sinica 19(3):270-276.

The relationship between the anomalous thermal forcing of the Tibetan Plateau ground surface and the formation of heavy rain in the Yangtze-Huaihe basin is discussed by using the Oregon State University atmospheric general circulation model (OSU-AGCM). The anomalous thermal regime of the Tibetan Plateau's ground surface caused persistent rainfall in the Yangtze-Huaihe basin during the summer of 1991. Similar to the character of the two-dimension of Rossby waves along the great circle route, the anomalous thermal forcing of the Tibetan Plateau can result in the distribution of anomalous cloud amount.

Keywords: Tibetan Plateau, anomalous thermal forcing, heavy rain in Jianghuai basin, numerical experiment, distribution of anomalous cloud amount

李志锦，纪立人，1995，正压大气有利发展扰动型与遥相关型的建立，大气科学，19(3):277-288

本文讨论了夏季纬向不对称气候平均气流下通过正压大气内部动力过程建立遥相关型的问题，介绍了有利发展扰动型的概念。分析表明，最有利发展的扰动型的振幅增长率同实际大气遥相关型的增长率相一致。并且这些有利发展扰动型都将演变为同实际大气相一致的遥相关型结构。至少部分实际大气遥相关型是只依赖与大气内部的正压过程即能量转换过程而建立起来。

关键词：正压大气 遥相关型 有利发展扰动 奇异值和矢量

Li Zhijin and Ji Liren. 1995. Preferred perturbations of growth in the barotropic atmosphere and the dynamics of teleconnection. Scientia Atmospheric Sinica 19(3):277-288.

The problem whether the generation of teleconnection patterns can result solely from the internal barotropic processes of the zonally varying climatological flow in the northern summer is discussed. The conception of preferred perturbation of growth is introduced. The results of calculations show that the amplification rate of the leading preferred perturbations of growth is consistent with that of realistic teleconnection patterns. It is suggested that the formation of at least some teleconnection patterns can depend on the preferred perturbations of growth.

Keywords: barotropic atmosphere, teleconnection pattern, preferred perturbation of growth, singular value and vector

*赵鸣*等，1995，一个引入近地层的土壤—植被—大气相互作用模式，大气科学，19(4):405-414

本文建立了一个土壤—植被—大气近地层的相互作用模式。结果证明，本模式能合理模拟土壤、植被、大气的温、湿以及各种通量的变化。进一步与中尺度大气模式耦合可以用于气候研究。

关键词：土壤层 植被层 近地层 相互作用模式

Zhao Ming et al. 1995. An interactive model of the soil-vegetation-atmosphere including surface layer. Scientia Atmospherica Sinica 19(4):405-414.

An interactive model of the soil-vegetation-atmospheric surface layer has been built. It is shown that the model can obtain a reasonable simulation of the variations of temperature, moisture and different fluxes in the soil, vegetation, and atmosphere. It can be used in simulating climate in a mesoscale model.

Keywords: soil layer, vegetation layer, surface layer, interactive model

谢炯光，1995，扩展经验正交函数（EEOF）及其在月、季降水预测中的应用，大气科学，19(4):481-486

本文提出一种降水长期预测的新方案，用扩展经验正交函数（EEOF）方法展开降水场，寻找前期降水场与后期降水场分布趋势的关系，对未来降水场分布趋势和降水总量趋势作出预测。

关键词：扩展经验正交函数 月（季）降水 隔季相关

Xie Jiongguang. 1995. Extended empirical orthogomal function (EEOF) and applications to monthly (seasonal) rainfall prediction. Scientia Atmospherica Sinica 19(4):481-486.

A new scheme for long-range forecasting has been proposed. The monthly (seasonal) rainfall distribution field is expanded by EEOF to find the relationship between the earlier rainfall distribution field and later rainfall distribution and prediction of rainfall tendency.

Keywords: extended empirical orthogonal function, monthly (seasonal) rainfall, relation of ever-successive seasons

穆穆，1995，大气运动非线性不稳定性研究的若干新进展，大气科学，19（4）：494-509

本文应用并发展了Arnold方法（能量－Casimir方法），在非线性不稳定性方面研究大气运动取得了若干新进展。作者讨论了该领域理论深入发展的前景及其应用问题。

关键词：不稳定性 非线性

Mu Mu. 1995. Some advances in the study of the nonlinear instability of atmospheric motions. Scientia Atmospherica Sinica 19(4):494-509.

Arnold's method (energy-Casimir method) is used and developed by the author. The nonlinear instability of atmospheric motions are studied and some recent advances are obtained. The prospects of the further development of the theory and its applications are also discussed.

Keywords: instability, nonlinearity

杨芳林，袁重光，1995，夏季赤道东太平洋海温异常对全球及东亚短期气候变化影响的数值试验，大气科学，19(5):535-544

本文应用两层大气环流模式研究了夏季赤道东太平洋地区负的海温异常对全球及赤道东太平洋地区和东亚局地短期气候变化的影响，并对赤道东太平洋海温异常影响全球及赤道太平洋和东亚局地短期气候变化的物理机制进行了探讨。

关键词：海表温度异常 降水异常 短期气候变化

Yang Fanglin and Yuan Chongguang. 1995. Numerical experiment on the influence of sea-surface temperature anomalies in the eastern equatorial Pacific in summer upon the short-range climate changes across the globe and in East Asia. Scientia Atmospherica Sinica 19(5):535-544.

The influence of negative sea-surface temperature anomalies (SSTA) in the eastern equatorial Pacific in summer on global atmospheric circulation and regional short-range climate changes in the equatorial Pacific and East Asia is studied using the two-level atmospheric circulation model.The physical mechanism of regional short-range climatic changes that are affected by SSAT in the eastern equatorial Pacific in summer is also studied.

Keywords: sea-surface temperature anomalies, anomalous precipitation, short-range climate change

*钱维宏*等，1995，地球自转年际变化作用于全球海温异常的观测事实和数值试验，大气科学，19(6):654-662

本文根据12年144个月全球各大洋的海温距平资料进行了分析，结果认为，赤道东太平洋海温的异常仅仅是全球变化的一个部分。地球自转首先引起纬向风的异常，然后作用于洋流和海温的异常。全球各大洋海温时空分布实况的变化特征可由一个简化的海洋浅水波模式模拟出来。

关键词：地球自转 海温异常 数值试验

Qian Weihong et al. 1995. The observational study and numerical experiment on the effect of the variation of the Earth's rotation on the globe. Scientia Atmospherica Sinica 19(6):654-662.

Based on the global sea surface temperature anomalies (SSTA) of 144 months in 12 years, it is found that the East Pacific SSTA is just one part of the global temperature changes. The variation of the Earth's rotation rate causes the anomaly of zonal wind and then the abnormal stress force of zonal wind will cause the anomaly of the current and the SSTA. All of these can be simulated by coupled ocean models.

Keywords: Earth's rotation, sea surface temperature anomaly, numerical experiment

*张勤*等，1995，热带太平洋地区SSTA和风应力场的海气耦合模态，热带气象学报，11(1):43-50

本文使用EOF分析了20年热带太平洋地区风应力场资料和SSTA资料，对它们的空间分布特征模态和时间变化特征进行研究，确定了海洋和大气之间的耦合关系及其与ENSO之间的关系，揭示了大气和海洋相互作用的本质。

关键词：风应力 海温 海气耦合 相互作用

Zhang Qing et al. 1995. The air-sea coupling modes of the sea surface temperature anomaly and wind stress over the tropical Pacific. Journal of Tropical Meteorology 11(1):43-50.

Twenty years of wind stress and sea surface temperature anomaly (SSTA) data for the tropical Pacific are studied by the empirical orthogonal function (EOF) method to reveal the characteristic modes of spatial distribution and features of temporal variation. The modes of air-sea coupling and its relationship with El Niño Southern Oscillation (ENSO) are found and the essence of the interaction between air and sea is summarized.

Keywords: wind stress, sea temperature, air-sea coupling, interaction

江志红，丁裕国，1995，我国下半年降水距平与北太平洋海温异常的奇异值分解法分析，热带气象学报，11(2):133-141

本文利用奇异值分解法分析了我国下半年各月降水距平与北太平洋月平均SSTA的相互关系。作者认为，秋冬季海温影响了我国春末至盛夏的降水量；秋冬季赤道东太平洋海温对次年4－5月江南东部和7月高原东侧、黄河中下游地区的降水有显著的影响；前一年6月黄淮地区及7月长江流域降水影响了次年盛夏至冬季的赤道中东太平洋海温。

关键词：奇异值分解法 下半年降水距平 北太平洋海温

Jiang Zhihong and Ding Yuguo. 1995. The singular value decomposition analysis between the sea surface temperature anomaly (SSTA) field over the northern Pacific and the precipitation anomaly field during the summer half year in China. Journal of Tropical Meteorology 11(2):133-141.

The relationship between sea surface temperature anomaly (SSTA) field over the northern Pacific and precipitation anomaly during the summer half year in China is studied using the singular-value decomposition method. The authors believe that the SSTA fields in autumn and winter affect rainfall for each month from the end of spring to midsummer in China. The SSTA field in the equatorial eastern Pacific during autumn and winter has a stong influence on the rainfall in the following July for the eastern Plateau and the middle-and-lower reaches of the Yellow River. The rainfall for the Yellow River Valley and the Huaihe River Valley in the preceding June or the Yangtze River Valley in July can affect the SSTA field in the middle and eastern equatorial Pacific from the prime of summer to winter.

Keywords: decomposition of singular value, precipitation anomaly during summer half year, sea surface temperature in northern Pacific

王兴宝，张维桓，1995，地形激发斜压波动的数值研究，热带气象学报，11(2):150-161

本文应用准地转和半地转两维模式研究了南北向长的山脊对过山斜压气流强迫产生扰动的过程，还把准地转模式和半地转模式的结果作了对比，并讨论了上述结果在实际天气过程中的意义。
关键词：地形 斜压波动 激发

Wang Xingbao and Zhang Weihuan. 1995. A numerical study of baroclinic disturbance excited by a mountain ridge. Journal of Tropical Meteorology 11(2):150-161.

Processes of disturbance generation forced by baroclinic current overflowing a north-south mountain ridge are studied using two-dimensional quasi-geostrophic and semi-geostrophic models. The authors also discuss the comparison between the two models and the implications of the results achieved in real atmospheric processes.

Keywords: topography, baroclinic wave, excitation

吕克利，1995，大气中的位涡守恒和Rossby波的能量、波作用与拟能守恒，热带气象学报，11(2):258-268

本文推导得到普遍形式的位涡度守恒方程。对准地转位涡方程，利用WKB近似，得到了空间换变基本气流和层结可变情况下的Rossby波的能量、波作用与拟能守恒条件。还给出了地形存在情况下的Rossby波的能量、波作用与拟能守恒条件。
关键词：缓变基流 地形 守恒律

Lu Keli. 1995. Conservation conditions of potential vorticity and wave energy, action and entrophy for Rossby waves. Journal of Tropical Meteorology11(2):258-268.

A general conservation law of potential vorticity is obtained by calculation. Use of the Wentzel-Kramers-Brillouin (WKB) approximation in a slowly varying basic flow and a variable stratification parameter derives the conservation laws of wave energy, action and entrophy for Rossby waves. Finally, the effect of topography is mainly on the slope with an west-east direction and causes only the variation of wave action.

Keywords: slow-varying basic flow, topograph, law of conservation

阎敬华，薛纪善，1995，中尺度模式中p-面与σ-面扩散差异的数值分析，热带气象学报，11(4):354-364

本文对常用的四阶线性水平扩散的A、B两种方案进行了量纲分析和简化，并用有地形中尺度模式对两种方案作了详细的对比数值试验和分析。试验结果表明，在地形平缓区域，两种方案的预报差异较小，而在陡峭地形附近，则预报差异很大，这是因为方案A中出现了温度和湿度的虚假扩散，造成温度和湿度异常，进而引起不稳定层和对流发展的异常。方案A还造成环流场异常，导致周围地区的降水异常。方案B可以解决陡峭地形附近的预报异常问题，用方案B解决该问题是必要的和可行的。

关键词：两种水平扩散方案 中尺度模式 量纲分析 对比试验

Yan Jinghua and Xue Jishan. 1995. Numerical analysis of the difference between pressure-surface and sigma-surface diffusion. Journal of Tropical Meteorology 11(4):354-364.

Dimensional analysis and reduction are made to the two commonly used schemes (A and B) of 4th-order linear horizontal diffusion. In addition, detailed control experiments between the two schemes are made using a topography-included mesoscale model. Experiments show that differences are small in smooth-terrain areas and very large in steep mountain areas. The reason for that finding is that temperature and humidity are falsely diffused in Scheme A, which causes abnormal temperature and humidity and results in the abnormalities of unstable layer and convective development. In addition, Scheme A causes circulation anomalies, which cause rainfall prediction deviations in the area. Analysis indicates that Scheme B, which can minimize the diffusion scheme involved in forecasting abnormalities in steep mountain and adjacent areas, is necessary and feasible.

Keywords: two horizontal schemes, dimensional analysis, mesoscale model, control experiments

严绍瑾，彭永清，1995，给定参数条件下海温脉动随机模式的混沌行为，热带气象学报，11(4):365-369

本文根据Saltzman海气随机气候模式就建立了海温脉动θ′的Langevin方程以及对应的Fokker-plank方程。在给定参数条件下，概率密度曲线p (x, t)具有多个极大值，并在p(x, t) - p(x, t+τ)相空间中呈现Cantor集合图象，表明该随机系统在上述参数条件下出现了混沌行为。

关键词：随机系统 Cantor集合 混沌行为

Yan Shaojin and Peng Yongqing. 1995. Chaos output from a sea surface temperature (SST) fluctuation stochastic model with given parameters. Journal of Tropical Meteorology 11(4):365-369.

Using the Saltzman sea-air stochastic climate model, the Langevin equation for sea-air fluctuation θ′, and the related Fokker-Planck equation were derived. The probability density curve p (x, t) is of a number of maximum, and a Cantor set image is shown in the phase space of p (x, t) and p (x, t+τ) in terms of specified parameters, indicating that the stochastic system produces chaos output with the defined parameters.

Keywords: stochastic system, Cantor set, chaos output

Radiation and Trace-Gas Emission

赵凤生，石广玉，1995，温室气体诱导的渐变气候效应，地理学报，50(5):430-438

本文用能量平衡模式（EBM）和改进的箱式扩散（BD*）海洋模式的耦合模式（EBM/BD*）研究大气中温室气体浓度增加引起的全球地表气温变化。并对下世纪大气中CO_2浓度变化及其诱导的全球地表气温变化进行了分析。
关键词：温室效应 缓变气候效应 海洋模式

Zhao Fengsheng and Shi Guangyu. 1995. A study on the transient and time-dependent greenhouse gas-induced climate change. Acta Geographica Sinica 50(5):430-438.

The article documents the development of a coupled energy balance model and a box diffusion model (EBM/BD) to study the greenhouse-gas-induced transient and time-dependent change on global mean temperature. The variations of the ground surface temperature of the next century are estimated using the coupled model.

Keywords: greenhouse effect, time-dependent climate change, ocean model

查良松，1995，西北地区太阳辐射量变化的研究，干旱地理，18(1):8-13

本文对西北地区30年来到达地面的太阳辐射量观测资料进行分析，得出太阳散射辐射量在西北地区的变化规律。认为太阳总辐射量自1978年以来基本上普遍减少。文章用太阳辐射量倾向率的形式概括出三种太阳辐射量季节变化类型。
关键词：方差分析 太阳辐射量 季节性变化类型

Zha Liangsong. 1995. Research on the variation of solar radiation in northwest China. Arid Land Geography 18(1):8-13.

The variation of solar radiation in northwest China during the last 30 years is analyzed. The paper concludes with the regulation of the diffuse solar radiation in northwest China and the global solar radiation decreases in almost the whole area since 1978. In this research, three typical types of seasonal variation of solar radiation are obtained.

Keywords: variance analysis, solar radiation, seasonal variation type

段争虎，刘新民，屈建军，1995，中国土地沙漠化对大气CO_2含量的影响，干旱区地理，18(4):46-52

本文以我国不同地区沙漠化类型的面积、土壤有机碳的含量及沙漠化的正逆转速率为基础，研究了我国沙漠化土地中有机碳的变动。结论认为，近40年来，我国沙漠化土地净释放到大气中的CO_2量占全球温带和寒带土地每年净释放量的93.5%。

关键词：中国 土地沙漠化 CO_2含量

Duan Zhenghu, Liu Xinmin, and Qu Jianjun. 1995. Effect of land desertification on the carbon dioxide content of the atmosphere in China. Arid Land Geography 18(4):46-52.

The change in the organic carbon content of the desertified land is studied based on the area of desertified land, the organic carbon content in soil, and the rate of desertification, development, or adverse processes in China. The amount of carbon dioxide released to atmosphere is more than that assimilated from atmosphere. The net carbon dioxide released to atmosphere in China occupies 93.5% of the whole quantity of the temperate zone and the frigid zone in the last 40 years.

Keywords: China, land desertification, carbon dioxide content

*曾治权*等，1995，北京地区冠心病和脑卒中发病与太阳、地磁活动关系的探讨，地理研究，14(3):88-96

本文通过对1984－1991年北京地区自然人群中冠心病和脑卒中急性发作的发病率与某些太阳、地磁活动因子的关系的统计和单相关分析说明这两类病症与太阳、地磁活动因子存在一定的相关性。为进一步用太阳地球物理流行病学方法研究心血管病病因和变化规律提供了依据。

关键词：冠心病 脑卒中 太阳活动 地磁活动 回归分析 重叠时序法

Zeng Zhiquan et al. 1995. Research on the relationship between coronary heart disease, stroke, and solar and geomagnetic activity. Geographical Research 14(3):88-96.

The paper deals with association between the acute onset of coronary heart disease and stroke and factors of solar and geomagnetic activities. The analysis was done by statistical and simple correlation for a period of 8 years from 1984-1991. The result shows that there was certain correlation between the acute onset of coronary heart disease and stroke and some factors of solar and geomagnetic activities.

Keywords: coronary heart disease, stroke, solar activity, geomagnetic activity, correlation analysis, analysis of overlapping epoch

白建辉，王庚辰，1995，太阳辐射各因子的变化对太阳紫外辐射的影响，气象，21(9):3-6

本文根据1990年北京太阳分光辐射的观测资料计算影响太阳紫外辐射的臭气、水汽、气溶胶等因子的变化所引起的太阳紫外辐射的变化。当各因子分别减少5%时，到达地面的太阳紫外辐射将分别增加0.84%,0.27%,和1.90%。在分析太阳紫外辐射的变化趋势时，应全面考虑各个因子的影响。

关键词：太阳紫外辐射 臭气 水汽 气溶胶

Bai Jianhui and Wang Gengchen. 1995. Effects of the change in factors affecting solar radiation on solar ultraviolet radiation. Meteorological Monthly 21(9):3-6.

The change of the solar ultraviolet radiation caused by changes in ozone, water vapor, and aerosol are calculated based on the observation of solar spectral radiation in 1990 over the Beijing area. The solar ultraviolet radiation will increase 0.84%, 0.27%, and 1.90% respectively as ozone, water vapor, and aerosol decrease 5%. The influence of all the factors affecting solar ultraviolet radiation should be considered comprehensively in analyzing the variation trends of solar ultraviolet radiation.

Keywords: solar ultraviolet radiation, ozone, water vapor, aerosol

*白淑菊*等，1995，长白山常绿针叶树越冬期间光合能力的抑制，应用生态学报，6(2): 138-142

本文探讨了长白山区红松及其它针叶树在冬季也存在光合抑制以及遮荫可减轻抑制的问题。推测在长白山地区或冬季气候与之相似的地区，常绿针叶树在冬季均可能表现光合抑制，释放CO_2。

关键词：针叶树 遮荫 光合能力 光合抑制 光氧化

Bai Shuju et al. 1995. Winter inhibition in photosynthetic ability of Changbai Mountain evergreen conifers. Chinese Journal of Applied Ecology 6(2):138-142.

There exists winter inhibition in photosynthetic ability of conifers. Shading can ameliorate the photosynthetic ability. It is suggested that all the evergreen conifers on Changbai Mountain and similar mountain regions suffer from photosynthesis inhibition and photooxidation stress during winter, and a large quantity of CO_2 is released as a result.

Keywords: conifer, shading, photosynthetic ability, photosynthesis inhibition, photooxidation

*陈冠雄*等，1995，稻田CH_4和N_2O的排放及养萍和施肥的影响，应用生态学报，6(4): 378-382

本文用箱法研究了我国东北稻田CH_4和N_2O的排放情况，东北稻田的CH_4排放通量小于南方稻田，在淹水期稻田基本上不排放N_2O，非淹水期则释放大量N_2O。稻田施肥和养萍明显促进CH_4和N_2O排放。稻田CH_4和N_2O排放之间存在消长关系。

关键词：稻田 CH_4和N_2O排放 养萍 施肥

Chen Guanxiong et al. 1995. CH_4 and N_2O emission from a rice field and effect of azolla and fertilization on them. Chinese Journal of Applied Ecology 6(4):378-382.

By using chamber technique, the authors studied the characteristics of CH_4 (methane) and N_2O (nitrous oxide) emission from a rice field in northeastern China. CH_4 emission from a rice field in northeastern China is less than that in southern China. Rice fields emit almost no N_2O during the flooding period, but substantially emit it during the non-flooding period. CH_4 and N_2O emissions are greatly enhanced by azolla and fertilization. There is a trade-off relationship between CH_4 and N_2O emissions.

Keywords: rice field, CH_4 and N_2O emission, azolla, fertilization

*于克伟*等，1995，几种旱地农作物在农田N_2O释放中的作用及环境因素的影响，应用生态学报，6(4): 387-391

本文根据几种旱田N_2O的排放通量的观测结果，研究了植物在农田N_2O释放中的作用及环境因子对N_2O通量的影响。结果表明，大豆田N_2O通量每天有两个释放高峰，而菠菜田和春小麦田每天只有一个释放高峰，裸地的N_2O释放很少。光照变化对植物N_2O通量影响很大，光弱时的N_2O释放通量较高。

关键词：农田 作物 N_2O通量 N_2O的汇 光照

Yu Kewei et al. 1995. Role of several upland crops in nitrous oxide emissions from farmlands and its response to environmental factors. Chinese Journal of Applied Ecology 6(4):387-391.

Based on data of observation of emissions of nitrous oxide from farmlands of upland crops, the role of upland crops in nitrous oxide emissions and the effect of environmental factors on nitrous oxide emissions are studied in this paper. The results show that there exist two emissions of diurnal nitrous oxide flux from soybean fields, but only one peak from spinach and spring wheat fields. Bare fields are a weak nitrous source. The variation of illumination has a significant influence on nitrous flux from crops. Higher emissions of nitrous oxide from crops occur under weak illumination.

Keywords: farmland, crop, nitrous flux, nitrous sink, illumination

陈万隆，1995，农作物对紫外辐射的反射与吸收，中国农业气象，16(2):9-12

本文研究了4种农作物对紫外辐射的反射与吸收，结果表明，农作物对紫外辐射的反射要比对太阳总辐射的反射率小得多，其吸收率随叶面指数增大而增大。作物对紫外辐射反射的日变化与太阳总辐射反射率的日变化一致。

关键词：紫外辐射 反射 吸收

Chen Wanlong. 1995. Reflection and absorption for ultraviolet radiation (UV) of crops. Agricultural Meteorology 16(2):9-12.

The author investigates the reflection and absorption for ultraviolet radiation (UV) of four kinds of crops. The results indicate that the reflection of UV radiation on crops is much less than that of total solar radiation. The absorption rate increases with the increase of the index of leaf area. In addition, the daily variation in reflection of UV radiation coincides with the rate of solar radiation.

Keywords: UV, reflection, absorption

*盛业华*等，1995，工矿城市地面热场的遥感调查及其对大气污染的影响，环境科学，16(3):19-22

本文根据城市冬季清晨和中午两个时相的图像信息以及地面同步辐射温度数据，通过数字图像处理，得出城市地面热强度。研究发现，城市的热岛效应在清晨表现明显。作者还建立了低空气温和下垫面辐射温度之间的线性关系，并由此研究了地面热场对大气污染的不良影响。

关键词：红外遥感 地面热场 大气污染

Sheng Yehua et al. 1995. Remote sensing survey and effects on atmospheric pollution of ground heat field in mining city. Environmental Sciences. 16(3):19-22.

Ground heat intensity of a city is obtained through digital imagery with data of image information of morning and noon and ground synchronous radiant temperature. The result indicates that the heat effect of a city is more distinctive in the morning. The authors set up a linear relationship between low-altitude temperature and radiant temperature and studies the negative effects on the atmosphere of ground heat field.

Keywords: infrared remote sensing, ground heat field, atmospheric pollution

王可丽，钟强，1995，青藏高原地区大气顶净辐射与地表净辐射的关系，气象学报，53(1):101-107

根据1972年8月－1983年7月青藏高原地区地面辐射收支观测资料及同期NOAA－7辐射收支资料，用回归分析的方法研究了大气顶净辐射与地表净辐射之间的关系，并在此基础上分析了青藏高原地区月平均地表净辐射的时空分布特征。

关键词：青藏高原 大气顶净辐射 地表净辐射

Wang Keli and Zhong Qiang. 1995. The relationship between the planetary and surface net radiation over Qinghai-Xizang Plateau. Acta Meteorologica Sinica 53(1):101-107.

Based on analysis of data of the simultaneous surface radiation and the National Oceanic and Atmospheric Administration satellite NOAA-7 radiation budget over Qinghai-Xizang Plateau during the period from August 1982 to July 1983, the relationships between surface net radiation flux and net radiation flux at the top of the atmosphere (TOA) are discussed through regression analysis. On the basis of this analysis, the spatial distributions of the monthly mean surface net flux are analyzed.

Keywords: Qinghai-Xizang Plateau, net radiation flux at the top of the atmosphere, surface net radiation flux

王尧奇，韦志刚，1995，河西地区的太阳直接辐射和大气透明度，气象学报，53(3):375-379

本文根据河西地区民勤和敦煌两个日射站1981－1983年的资料，计算了太阳直接辐射在传输过程中的各种衰减。作者认为，该地区的环境具有干燥、荒漠和狭管地形的特点，这种特点使气溶胶衰减，影响直接辐射。

关键词：太阳直接辐射 大气透明度 云的辐射衰减 河西地区

Wang Yaoqi and Wei Zhigang. 1995. The direct solar radiation and the atmospheric transparency over the Hexi region. Acta Meteorologica Sinica 53(3):375-379.

Based on the analysis of data from 1981 to 1983 of the two solar radiation stations in Minqin and Dunhuang of the Hexi region, various kinds of attenuation of the direct solar radiation during the transmission process are calculated. The authors believe that aridity, desert, and narrow channel topography are characteristic of the Hexi region and their influence on direct solar radiation appears as an attenuation of aerosols.

Keywords: direct solar radiation, atmospheric transparency, attenuation of solar radiation of cloud, Hexi region

白建辉，王庚辰，1995，大气中的水汽对太阳紫外辐射消光的可能机制分析，大气科学，19(3):380-384

本文通过对北京地区晴天和实际天气条件下到达地面太阳紫外总辐射的计算，分析了影响到达地面太阳紫外总辐射的各主要因子的主次贡献。重点讨论了大气中的水汽，对到达地面的太阳紫外总辐射消光的可能机制。

关键词：水汽 太阳紫外辐射 光化学反应

Bai Jianhui and Wang Gengchen. 1995. A possible extinction mechanism of solar ultraviolet radiation by water vapor in the atmosphere. Scientia Atmospherica Sinica 19(3):380-384.

Based on the calculation of the ultraviolet radiation reaching the ground over the Beijing area, the primary and secondary contributions of dominant factors affecting the solar ultraviolet radiation reaching the ground surface under clear sky conditions and actual sky conditions are analyzed. The possible extinction mechanism by water vapor of the solar ultraviolet radiation reaching the Earth's surface, which operates in most atmospheric photochemical reactions, is emphasized.

Keywords: water vapor, solar ultraviolet radiation, photochemical reaction

王可丽，钟强，1995，辐射传输模式中地表参数对大气长波辐射的影响，大气科学，19(5):606-614

本文分析了下垫面温度与地表温度两者不能合二为一的问题，利用Liou-Ou一维宽带辐射传输模式，对地表热力参数取值部分作了改进。同时，还讨论了下垫面温度的日变化对大气长波辐射通量日变化的影响及地表比辐射率的变化对大气长波辐射通量计算结果的修正作用。

关键词：辐射传输模式 大气长波辐射 地表热力参数

Wang Keli and Zhong Qiang. 1995. Effect of surface thermal parameters on atmospheric long-wave radiative fluxes in a radiative transfer model. Scientia Atmospherica Sinica 19(5):606-614.

The lack of an observed relationship between underlying surface temperature and surface air temperature is analyzed. The surface thermal parameters are improved by using the Liou-Ou one-dimensional atmosphere radiative transfer model. In addition, both the effect of the underlying surface temperature on the diurnal cycle of atmospheric long-wave radiative fluxes and the effect of the modulating of surface emissivity on the atmospheric long-wave radiative fluxes are discussed.

Keywords: radioactive transfer model, atmospheric long-wave radiation, surface thermal parameters

王卫国等，1995，热带东太平洋海温与北半球大气臭氧层的遥相关结构，热带气象学报，11(2):115-122

本文统计分析了1月份、7月份热带东太平洋海温与北半球大气臭氧层之间的季节性相互联系以及海温导致的臭氧层遥相关的空间结构。结果发现，热带东太平洋海温对北半球臭氧层的分布及其季节演变都具有重要作用。不同季节海温导致的臭氧层的遥相关型也相同；不同季节海温对臭氧层的影响效果产生叠加，使臭氧层对海温的响应表现出十分明显的波列结构。

关键词：臭氧层 海温 遥相关型 基点相关图

Wang Weiguo et al. 1995. Teleconnection between sea surface temperature (SST) in the tropical eastern Pacific and the ozonosphere over the Northern Hemisphere. Journal of Tropical Meteorology 11(2):115-122.

Seasonal interaction between sea surface temperature (SST) in the tropical eastern Pacific and the ozone layer in Northern Hemisphere and the teleconnection spatial structure caused by SST effects, for January and July, are statistically analyzed. The result indicates that SST in the tropical eastern Pacific is important to the northern ozone layer distribution and its seasonal evolution. The difference in the teleconnection pattern for the ozone layer is the result of the effects of SST in different seasons. And the persistent influence of SST on the ozone layer causes well-defined wave chains in the layer responding to SST.

Keywords: ozonosphere, sea-surface temperature, teleconnection pattern, one-point correlation map

Ancient Climate

刘东生，安芷生，陈明杨，1996，最近0.6Ma南、北半球古气侯对比初探，中国科学，26（2）：97-110

本文将我国黄土高原最近0.6Ma夏季风加强以及35～25Ka BP和4～2.5Ka BP时段东亚夏季风增强的记录与澳洲干旱或沙漠化增强记录进行了对比，提出导致澳洲沙漠化的高压增强，通过穿越赤道的气流可能在过去增强东亚季风的论点；另外，
本文还提出了另一论点:全新世气候适宜期东亚与澳洲气候记录所表明的同步变化，可能反映了与蒙古高压系统有关的东亚冬季风环流穿越赤道对澳洲夏季风环流增强的影响，南、北半球季风气候通过穿越赤道的气流相互作用可能自0.6 Ma BP开始表现明显。

关键词：0.6Ma BP气候转型
澳洲高压与东亚季风
蒙古高压与澳洲夏季风

Liu Dongsheng, An Zhisheng, and Chen Mingyang. 1996. A correlation between Southern and Northern Hemispheres during the last 0.6 Ma. Science in China (Series D) 26(2):97-110.

A comparison of climate records between the Chinese Loess Plateau, which shows a strengthening of the summer monsoon in the last 0.6 Ma and a strengthening of the Asian summer monsoon during 35 to 25 and 4 to 2.5 ka BP intervals, and the Australian records, which show a strengthening of aridity or desertification, is analyzed. The results suggest that the Australian high pressure leading to desertification strengthened the Asian summer monsoon in the past through the cross-equator circulation. On the other hand, the synchronous variation in the Holocene Optimum, as indicated by Asian and Australian climate records, suggests that the cross-equator East Asian winter monsoon circulation related to the Mongolian high pressure might have influenced the Australian summer monsoon. The interaction of the monsoon climate between the Southern and Northern Hemispheres through cross-equator circulation probably started to be obvious since 0.6 Ma BP.

Keywords: change of climate type at 0.6 Ma BP, Australian high and East Asian monsoon, Mongolian high and Australian summer monsoon

王富葆，韩辉友，阎革等，1996，青藏高原东北部30 Ka以来的古植被与古气候演变序列，中国科学，26（2）：111-117

本文利用孢粉分析并结合沉积学及^{14}C测年等资料，阐明了青藏高原东北部若尔盖高原30Ka来的古植物与古气候演变系列及主要的气候事件。结果表明古植被经历了高寒荒漠、草原、草甸等七个阶段；气候与植被相应发生了多次变化，冰后期和

Wang Fubao, Han Huiyou, Yan Ge, et al. 1996. Paleovegetation and paleoclimatic evolution series on Northeastern Qinghai-Xizang Plateau in the last 30 ka. Science in China (Series D) 26(2):111-117.

Palynological study of two lacustrine suites by limnological and ^{14}C dating reveals the local evolutionary history of the paleovegetation and the paleoclimate of the Zoige Plateau, northeastern Qinghai-Xizang Plateau in the last 30 ka. The evolution of territorial paleovegetaion experienced seven stages, such as alpine desert vegetation, grassland, meadow, etc., and the inferred paleoclimate evolution shared similar corresponding variations. The major climatic

全新世期间的气候事件在这里均有明显表现。这说明青藏高原对全球气候变化具有“启动区”和“放大器”的作用；不同时期不同气流变化是产生本地区气候变化的主要动力。

关键词：若尔盖高原　古植被
古气候

events during the periods of post-glacial and the Holocene left their distinct marks in the sediment record.

Keywords: Zoige Plateau, paleovegetation, paleoclimate

吕厚远，吴乃琴，刘东生，1996，150Ka来宝鸡黄土植物硅酸体组合季节性气候变化，
中国科学，26（2）：131-136

本文深入细微地研究了黄土沉积中地质记录可以在多大空间、时间尺度上显示古季风的演化历史。通过对现代表层土壤中植物硅酸体组合变化趋势与深海氧同位素变化的比较，研究了宝鸡黄土剖面约150Ka来植被类型的演替及1月、7月、年降水和温度变化。可见，在黄土高原地区“轨道尺度”上大的气候变化确实受到全球变化的控制，也揭示了季风气候在不同时期对该区影响强度的差别。

关键词：黄土　植被硅酸体
古季风

Lu Houyuan, Wu Naiqin, and Liu Dongsheng. 1996. Seasonal climatic variation recorded by phytolith assemblages from the Baoji Loess sequence in Central China over the last 150,000 years. Science in China (Series D) 26(2):131-136.

This paper presents the results of phytolith assemblages from 153 modern surface soil samples of China and from the upper of 12-m loess layer of the Baoji loess-paleosol sequence to analyze the phytolith types and to investigate seasonal climatic variation. The results show the variations in temperature and precipitation and evolution of vegetation pattern for the past 150,000 years in the Baoji loess section. The impact of changing monsoon intensity in different periods in this area is discussed.

Keywords: loess, phytolith, paleomonsoon

李训述，程国栋，郭东信，1996，气候持续变暖条件下青藏高原多年冻土变化趋势数值模拟，
中国科学，26（4）：324-327

应用数值方法模拟了气候持续以0.04 °C/a速度变暖条件下，我国青藏高原多年来冻土热状况可能发生的

Li Shuxun, Cheng Guodong, and Guo Dongxin. 1996. The future thermal regime of the permafrost of the Qinghai-Xizang (Tibet) Plateau, China, under a climate warming from numerical simulation. Science in China 26(4):324-327.

Numerical simulation indicates that the future thermal regime of permafrost on Qinghai-Xizang Plateau will change as the air temperature (T) continuously rises at 0.04℃/year. The calculated results show that when Ts are 0, -0.5, -1.5, -2.5,

变化趋势。计算结果表明，在计算所假设条件下，当初始地面年平均温度为0.0，-1.5，-2.5，-3.5和-4.5°C时，14m深度上的年平均地温分别为-0.11，-0.59，-1.52，-2.45，-3.21和-4.32°C，多年冻土厚度为16.8, 29.0, 54.1, 79.7, 112.1和 131.0m时，经50a的环境持续升温后，14m深度上的年平均地温分别升高为0.0，0.0，-0.36，-1.23，-2.16和-3.07°C；初始年平均地温高于-1.1°C时，多年冻土由衔接型变为不衔接型；低于-1.1°C 时，多年冻土上限分别由初始的1.8, 1.6, 1.4和1.2m增大为2.2, 2.0, 1.8, 1.6m，且多年冻土厚度不发生大的变化。所以，如果未来气候以文中的速度或低于该速度变暖，50a内我国青藏高原多年冻土分布将不会发生大的变化。

关键词：青藏高原多年冻土　气候变暖　年平均地温　数值模拟

-3.5, and -4.5℃ under equilibrium between climate and permafrost thermal regime, the permafrost thicknesses respectively equal to 16.8, 29.0, 54.1, 79.4, 112.1, and 131.0 m and the mean annual temperatures at the depth of 14m correspondingly equal to -0.11, -0.59, -1.52, -2.45, -3.21, and -4.32℃. After 50 years, the temperatures at the depth of 14m will rise to 0.0, 0.0, -0.36, -1.23, -2.16, -3.06℃ under the given condition. If the temperature is higher than -1.1℃, the frozen ground will change from the attachment type of frozen ground into the detachment type of frozen ground. When the temperature is lower than -1.1℃, for example, the permafrost will respectively change from 2.0, 1.8, 1.6, and 1.4 m to 2.2, 2.0, 1.8, and 1.6 m, for Ts of -1.5, -2.5, -3.5, and -4.5. Therefore, if the future air temperature rises at 0.04℃/year or lower, the decreased area of the permafrost on Qinghai-Xizang Plateau may not be over 30%. The areas include those changing from the attachment of frozen ground into the detachment of frozen ground. If the area of detachment of frozen ground is not included, the decrease in area will only be 3% within 50 years.

Keywords: permafrost on Qinghai-Xizang Plateau, climate warming, annual mean ground temperature, numerical simulation

姚檀栋，秦大河， 1996，青藏高原2Ka温度与降水变化——古里雅冰芯记录，中国科学，26（4）：348-353

古里雅冰芯中的$\delta^{18}0$和冰川积累量高分辨地和连续地记录了青藏高原过去2Ka的温度和降水变化。在这一段时间内，曾出现了8次暖期和7次冷期。其中4次重要寒冷事件有三次出现在小冰期，1次出现在11-12世纪。降水的波动相对较小，这段

Yao Tandong and Qin Dahe. 1996. Variations in temperature and precipitation in the last 2000 years on the Xizang (Tibet) Plateau—Guliya Ice Core record. Science in China (Series D) 26(4):348-353.

Past temperature and precipitation variations are recorded precisely and continuously in $\delta^{18}O$ and glacial accumulation records in the Guliya ice core. Eight warm periods and seven cold periods can be distinguished in the past 2000 years. Of the four most intensive cold periods, three are in the Little Ice Age and one in the 11th to 12th century. The variation of precipitation is relatively small compared with that of temperature. Five humid periods and four dry periods occurred in the

时间内出现过5次相对高降水期和4次相对低降水期。古里雅冰芯所记录的温度和降水的长期变化趋势呈正相关，但降水变化滞后于温度变化。

关键词：古里雅冰芯 $\delta^{18}0$
冰川积累量

past 2000 years. The long-term variation of temperature is positively correlated with that of precipitation according to the Guliya ice core record, but the variation of precipitation lags behind the variation of temperature.

Keywords: Guliya ice core, $\delta^{18}O$, glacial accumulation

王苏民，羊向东，马燕，1996，江苏固城湖15Ka来的环境变迁与古季风关系探讨，中国科学，26(2)：137-141

固城湖的环境变化记录为探讨季风活动提供了依据。湖围垦区的钻孔表明自15 Ka BP
开始，固城湖的环境有一明显的变化。固城湖的形成、扩张和收缩与季风环流的变化及其引起的季风降雨关系密切。后者明显受轨道驱动的控制，其中11.3～11.0KaBP突变的降温，可能与新仙女木事件相当。事件在一定程度上截断了轨道驱动的气候旋回，在季风区表现为极锋在短期内发生大范围向南迁移。通过与相邻南北区域的对比，季风极峰位置存在两次北推和两次南移的过程。

关键词：高分辨　环境演化
季风降水　固城湖

Wang Sumin, Yang Xiangdong, and Ma Yan. 1996. Environmental change of Gucheng Lake of Jiangsu in the last 15 ka and its relation to palaeomonsoon. Science in China (Series D) 26(2):137-141.

The high-resolution and multi-proxy analysis of lacustrine sediments from the Gucheng Lake has revealed the palaeoclimate and palaeoenvironmental evolutionary process since 15 ka BP. The formation, expansion, and shrinkage of the lake are closely related to monsoon rain caused by strength change of monsoon circulation which is controlled by orbital forcing. An abrupt decrease of temperature occurring from 11.3 to 11.0 ka BP can be correlated to a Younger Dryas event that truncated the monsoon climate cycle. It is known through correlation with adjacent regions that there were two northern shifts and two southern migrations of the polar front of monsoon rain.

Keywords: high resolution, environmental evolution, monsoon rain, Gucheng Lake

郭正堂，N.Fedoroff，刘东生，1996，130Ka来黄土——古土壤序列的典型微形态特征与古气候事件，
中国科学，26（5）：392-398

对中国西峰、洛川、渭南晚第四纪黄土及古土壤的微形态学研究表明，不少形态特征与植被和土壤湿度状况有良好的指示意义。宜作为环境变幅研究和气候事件对比的标准。130Ka来的黄土至少记录了16个气候事件。其中部分为轨道事件。另一部分时代只与非轨道原因的Heinrich事件有关。后一类事件期间黄土高原植被稀疏，风力强盛，局部有较弱的冻融作用。而事件之间的高原中东部有可观的草原植被。

关键词：黄土　古土壤　微形态　古气候

Guo Zhengtang, N. Fedoroff, and Liu Dongsheng. 1996. Micromorphology of the loess-paleosol sequence of the last 130 ka in China and paleoclimatic events. Science in China (Series D) 26(5):392-398.

The Late Quaternary loess-soil in Xifeng, Luochuan, and Weinan are studied in order to investigate the micromorphology of both loess and paleosols. Many features have clear climatic implications and may be used as indications of morpho-stratigraphic and climatic correlation. The temporal and spatial variations of these features allow us to define 16 climatic events for the last 130 ka, which are highly consistent with the variations in paleo-weathering intensity. Part of these events are attributable to orbital forcing whereas others are more or less synchronous with the Heinrich events recorded in the North Atlantic Ocean. During the latter events, the Loess Plateau was characterized by sparse vegetation cover and strong winds whereas the climatic conditions between these events were considerably humid, resulting in a significant steppe cover.

Keywords: loess, paleosol, micromorphology, paleoclimate

韩家懋，姜文英，刘东升，1996，黄土碳酸盐中古气候变化的同位素记录，中国科学，
26（5）：399-404

本文对采自西峰、洛川和渭南黄土剖面的钙结核和全岩样品中碳酸盐的碳氧同位素组分进行分析，发现黄土钙结核的碳氧同位素可以成为有效的古气候变化的指标，记录了它们形成时期的环境状况，对不同地点的同位素数据对比有可能提供过去环境变化的空间格局。全岩样品的碳酸盐的同位素组分也记录了有用的环境信息，过去150Ka渭南剖面的碳氧同位素曲线很好地反映不

Han Jiamao, Jiang Wenying, and Liu Dongsheng. 1996. Paleoclimate changes in Chinese loess. Science in China (Series D) 26(5):399-404.

Oxygen and carbon isotopes of carbonate in concretion and bulk samples collected from the Xifeng, Luochuan, and Weinan loess sections, China, have been analyzed. The carbon and oxygen isotopic ratios of concretion in paleosol, as useful paleoclimatic indicators, recorded temperature and humidity variation during their formation. Comparison of isotopic data from different locations can offer a spatial picture of past environmental changes. Isotopic data from the carbonate of a bulk sample also include useful environmental information. Carbonate isotopic records of carbon and oxygen isotopic curves of last 150 ka in Weinan reflect the fluctuations of the paleoclimate with different stratigraphical units. The curves correlate well with those of

同地层单位代表的古气侯波动，这些曲线可以和黄土中其他的气候指标及深海沉积物的同位素记录相对比。

关键词：碳氧同位素　次生碳酸盐　黄土-古土壤　古气侯　古环境变化

other climatic proxies and of the deep-sea sediments.

Keywords: carbon and oxygen isotopes, secondary carbonate, loess-paleosol sequence, paleoclimate, paleoenvironmental change

孙东怀，安芷生，吴锡浩，1996，最近150ka黄土高原夏季风气候格局的演化，中国科学，26（5）：417-422

通过覆盖黄土高原的30个黄土古土壤剖面磁化率的测量，绘制了倒数第二冰期（约150KaBP），末次间冰期（约130-74KaBP），末次冰期间冰段（约59-24KaBP），末次间冰期极盛期（约18KaBP），及全新世气候适宜期（约9 KaBP）5个特征气候期的磁化率等值线路图。以末次冰期极盛期黄土的磁化率作为风成粉的原始磁化率，相对于这个本底值的磁化率增量可作为夏季风气候活动在相应地区的指示及其相对强度。据此，初步恢复了磁化率等值线所反映的各个时期夏季风气候的空间格局，并估计了夏季风平均锋面的活动范围及其北界的可能位置。从而粗略地再现了最近150Ka黄土高原夏季风气候格局的演化过程。

关键词：黄土　古季风　磁化率　古气候重建

Sun Donghuai, An Zhisheng, and Wu Xihao. 1996. Evolution of the summer monsoon regime over the Loess Plateau of the last 150 ka. Science in China (Series D) 26(5):417-422.

From magnetic susceptibility data for 30 sections covering the Loess Plateau, contour maps of susceptibility are given for five time intervals: the last second glaciation (150 ka BP), the last interglaciation (130-74 ka BP), the interglacial of last glaciation (59-24 ka BP), the last glacial maximum (18 ka BP), and the Holocene Optimum (9 ka BP). The susceptibility value of the last glaciation maximum loess is regarded as the base value of pedogenic loess or paleosol. The susceptibility increment to the base indicates summer monsoon activity and its strength. On this assumption and susceptibility contour maps, the variation sequence of the summer regime is reconstructed for the last 150 ka. The extent and the northern boundaries of the summer monsoon front activity are also estimated for each stage. It suggests that the evolution history of the summer monsoon regimes revealed by the susceptibility contour maps not only provides information on the position, strength, and configuration of the climate members influencing the summer monsoon, but also provides some climatic signals from the polar and Southern Hemisphere.

Keywords: loess, paleomonsoon, magnetic susceptibility, paleoclimate reconstruction.

石宁，1996，上新世一早更新世云杉属和冷杉属在华北地区的发展及其气候指示意义，第四纪研究，
(4): 319-328

本文研究了上新世一更新世云杉属和冷杉属在华北地区的发展，并讨论了其气候指示意义。结论显示：（1）华北地区的云杉属和冷杉属自4.4Ma BP
的上新世早期即开始大量发展，当时它们的生态习性与现代寒温带种类不同；（2）云杉属和冷杉属不适宜作为第四纪开始的标志；（3）云杉属，冷杉属和喜暖植物在上新世一更新世的演化和迁移导致它们今日相隔遥远的分布，这一过程反映了华北地区气候变化和季风气候发育的历程。东亚季风可能是晚上新世逐渐加强，而在2.3Ma BP
前后已形成了第四纪时期的基本特征。

关键词：上新世　云杉属　生态习性　冰期　东亚季风气候

Shi Ning. 1996. Development of spruce and fir in North China during the Pliocene and the early Pleistocene: Paleoclimatic implications. Quaternary Sciences (4):319-328.

Development of spruce and fir in North China during the Pliocene and the early Pleistocene is studied, and its paleoclimatic implications are discussed. The following conclusions can be made from the study: (1) *Picea* and *Abies* developed in North China from early Pliocene (4.4 Ma BP), and the Pliocene *Picea* and *Abies* have different ecological demands than most modern species. (2) The development of modern distribution patterns of *Picea* and *Abies* that are distantly separated from the thermophylous plant reflect formation of the monsoon climate in northern China. The monsoon climate was gradually strengthened in the late Pliocene and its Quaternary pattern may be formed around 2.3 Ma BP.

Keywords: Pliocene, *Picea*, habitat, glaciation, east Asian monsoon climate

蔺知缗，李保华，Uwe Pflaumann，1996，西太平洋晚全新世变冷事件，
中国科学，26（5）：416-466

对取自冲绳槽和南海的3个重力柱状样（255，170，17940-2
柱状样）进行浮游有孔虫分析后发现：所有属种中，Pulleniatina obliquiloculata显示出对西太平洋晚第四纪冬季表层海水温度反应灵敏，其相对丰度的变化显著，且在各柱状样间可以对比，全新世最显著的变化是约4-2KaBP前的

Jian Zhimin, Li Baohua, and Uwe Pflaumann. 1996. Late Holocene cooling event in the western Pacific. Science in China (Series D) 26(5):416-466.

Cores 255, 170, and 17940-2, raised from the Okinawa Trough and the South China Sea, have been studied for planktonic foraminifers. Among all the series, *Pulleniatina obliquiloculata* is shown to be sensitive to winter sea surface temperature in the late Quaternary in the western Pacific. The fluctuations in its relative abundance are significant and correlatable between the cores. The most conspicuous change during the Holocene is the *Pulleniatina obliquiloculata* minimum zone around 4-2 ka BP, which correlates to neoglacial cooling. The widespread occurrence of this cooling event in the western Pacific

P. Obliquiloculata 最小值带，
可能与新冰期变冷有关。这一变冷事件在西太平洋的广泛存在表示P.obliquiloculata
可以作为古海洋和气候变化的示踪器，对于海-陆气候对比亦较重要。
关键词：变冷　晚全新世
Pulleniatina obliquiloculata
西太平洋

suggests that *Pulleniatina obliquiloculata* is promising as a paleoceanographic and climatic monitor, possibly important for reconstructing sea-land correlation of climate.

Keywords: cooling, late Holocene, *Pulleniatina obliquiloculata*, the western Pacific

李志中，1996，
塔里木盆地北部全新世地层中的孢粉组合与古环境，
干旱区资源与环境，10(1)：22-29

本文通过对塔里木盆地北部全新世地层中27块样品的孢粉分析，
探讨了该地区全新世的古环境特征。
全新世以来，除了塔里木河中游隐域性植被成分随着河道改道变化频繁外，
塔里木盆地北部地区河道两侧显域性的旱生、超旱生荒漠植被成分无明显变化，
它们的生境反映了气候环境总的形势是持续干旱的。但全新世地层中孢粉种属和丰度的变化，蒿属、藜科和麻黄花粉相对数量的增减也说明了在干旱背景中本区气候有微弱的干湿波动，这表现为全新世早期和晚期气候偏凉湿，中期气候干暖，
但干暖期鼎盛阶段略湿。
关键词：塔里木盆地北部　全新世
孢粉组合　气候环境

Li Zhizhong. 1996. Pollen component in the Holocene stratum and paleoenvironment in the northern part of the Tarim Basin. Journal of Arid Land Resources and Environment 10(1):22-29.

Through pollen analysis of 27 samples collected from the Holocene stratum in the northern part of the Tarim Basin, the paleoenvironment in this region is analyzed. Because there were only obtuse changes in the composition of the dry and ultra-dry ecological desert vegetation zones in this region, except that of regional vegetation of the Tarim River Basin, it is suggested that the Holocene climate in this region was dry as a whole. But there were also small changes in the quantity of pollen family and abundance and in the quality of Artemisia, Chenopodicaceae, and Ephedra pollens etc. in the stratum, which indicates that there were small wet and dry fluctuations under the background of a dry climate. That is, the paleoclimate in this region was relatively cold and moist in the early and late stage, warm and dry in the middle stage, and during the Holocene Epoch, the period was a little wet at the Megathermal Maximum.

Keywords: northern part of the Tarim Basin, Holocene Epoch, pollen component, climate environment

赵英时，杨忆，1996,
全新世海侵痕迹遥感信息特征提取方法研究，地理研究 15(1):73-81

应用TM、MSS、NOAA等多平台、多波段、多时相遥感信息,
并结合地貌、水文地质、岩相、历史考古学等地学信息进行综合分析,研究了华北平原全新世海浸痕迹信息特征的提取方法。研究中特别注重利用与海侵有着直接成因关系的地下咸水体及水化学特征变化所传递的信息。这些信息涉及到水、热、盐、土、植被等环境因子。通过多种图象处理方法,突出古海岸线两侧环境因子的综合差异,识别和勾绘古岸线。
关键词：全新世海侵　遥感图象处理　专题特征提取

Zhao Yingshi and Yang Yi. 1996. A study of methods of extracting remote sensing information features from Holocene transgression traces. Geographical Research 15(1):73-81.

An integrated analysis of multispectral and multitemporal remote sensing image data (TM, MSS, NOAA/ AVHRR) and geoscience data (geomorphological, hydrogeological, lithofacies, archaeological) was carried out to identify paleo-coastal lines since the Holocene Epoch in the eastern part of the North-China plain. The emphasis of the study is on the utilization of information on the spatial distribution of salt groundwater and changes in the water's chemical components, which are closely related to paleo-sea transgression and reflect some information on environmental factors, such as water, heat, salt, soil, and vegetation. Some image-processing methods are used to better reflect the combined landscape features of soil salinization (vegetation, land use, geomorphy). Furthermore, integrated processing of images concentrating thematic information has effectively enhanced the difference of landscapes for two sides of the transgression boundary in the Holocene Epoch. Finally, supported by the geographic information system (GIS), a variety of thematic maps are digitized. On the basis of spatial registration, an integrated data set is generated and used for defining and verifying the paleo-coastal lines.

Keywords: Holocene transgression, remote sensing image processing, extraction of thematic features

张伟强，黄镇国，1996,
台湾晚更新世以来的环境考古,热带地理，16(4):291-298

从地形地貌、地层、孢粉、化石、古文化遗存等方面出发,
结合构造运动及海平面变化,
讨论了台湾晚更新世以来的环境变迁，并与邻区对比。台湾晚更新世的古

Zhang Weiqiang and Huang Zhenguo. 1996. Environmental archaeology of Taiwan since the late Pleistocene. Tropical Geography 16(4):291-298.

Through the study of landforms, strata, spore-pollen, fossils, ancient culture sites, tectonism, sea-level change, etc., the environmental change of Taiwan since the late Pleistocene is analyzed. In the late Pleistocene or before, the environment of Taiwan was mainly affected by tectonism and sea-level change during glacial stages, but mostly in the Holocene climate and sea-level changes affected the environment. The environment of

环境演变与台湾最重要的构造运动—蓬莱运动之后余动及冰期、间冰期气候与海平面升降密切相关。进入全新世,
构造运动对台湾环境的演变已不扮演主要角色,
而气候因素及海平面变化则起重要作用。全新世早期,
台湾岛的环境与晚更新世晚期相同,
但气温已有所回升。中晚全新世, 台湾是一个波动的热带环境。
关键词: 台湾　环境考古　晚更新世

Taiwan in the early Holocene was similar to that in the late glacial stage but much warmer. Taiwan was a tropical environment in the middle and late Holocene with some fluctuation.

Keywords: Taiwan, environmental archaeology, Late Pleistocene

张伟强, 黄镇国, 1996,
台湾沿岸全新世海平面波动,
热带地理, 16(3): 226-235

根据海相沉积物样品的^{14}C年代、高程数据,
并以华南海平面变化曲线为参照系,
分析了台湾沿岸全新世海平面变化。
结果显示: 1)在5000aBP以前, 海平面曾快速上升, 约5190aBP, 出现全新世最高海平面,
超出现今海平面3.2m; 2)
5000aBP之后, 海平面呈振荡性变化
, 出现4次高海面, 且高度逐次减小
; 3)通过对比台湾, 福建及广东东部沿海的海平面变化,
台湾海峡两岸全新世可能存在8次海侵或海平面流动变化。
关键词: 台湾　海平面　全新世

Zhang Weiqiang and Huang Zhenguo. 1996. Holocene sea level changes along the coast of Taiwan. Tropical Geography 16(3):226-235.

The change of the sea level of Taiwan in the Holocene was investigated, using data of altitude and ^{14}C dating for 99 samples from marine deposits, and data along the coast of south China as reference. The results indicate that (1) the sea level rose quickly before 5000 a BP, the highest stand of sea level occurred in 5190 a BP, with an altitude of about +3.2 m. (2) The sea level has been fluctuating around its present position since 5000 a BP. Four higher sea levels occurred in 4120 ± 120 a BP, 3250 ± 40 a BP, 1970 ± 40 a BP, and 1300 ± 120 a BP, respectively, and the altitude of sea level decreased gradually. (3) From the calibrated data from the coast of Fujian and eastern Guangdong, it is concluded that there were eight cycles of sea-level changes of transgression during the Holocene along the coasts of the Taiwan Strait.

Keywords: Taiwan, Holocene, sea level

吴敬禄，王苏民，1996,
青藏高原东部RM孔碳酸盐氧同位素揭示的末次间冰期气候特征, 科学通报，41(17)： 1601-1604.

青藏高源东部若尔盖盆地RM孔碳酸盐氧同位素的研究表明, 当时青藏高源东部的气候存在相当于深海氧同位素5a, 5b, 5c,
5d和5e亚阶段的波动特征,
5e内部又有两次明显的冷波动,
可再细分为5e1, 5e2, 5e3,
5e4和5e5段, 其中5e5气候最暖,
5e3相对较弱,
5e2降温幅度最大。这一现象与最近GRIP冰芯及欧洲湖泊记录的研究结果较为吻合,
不同于深海及GISP2记录。
关键词：末次间冰期　气候不稳定性　Eemian期　若尔盖盆地

Wu Jinglu and Wang Suming. 1996. Climatic variation during the last interglacial period recorded in the lake carbonate deposit, Eastern Qinghai-Xizang Plateau. Chinese Science Bulletin 41(17):1601-1604.

The oxygen isotope record from core RM in the Zoige Basin of the Qinghai-Xizang Plateau during the last interglacial period (the Eemian period) documents five climate fluctuations that are equivalent to substages 5a-5e. Moreover, there were five climate oscillations in the substage 5e record in the $\delta^{18}O$ of carbonate in the RM core, namely, 5e1 to 5e5, among which substage 5e5 was the warmest climate period. Substage 5e1 was an optimum episode of combined moisture and heat; 5e3 was a relatively weak warmer period, and 5e2 was colder. The results coincide with records from ice core of the Greenland Ice-core Project (GRIP) and European lake sediments. 5e1 was an optimum episode of moisture and heat, but in the whole interglacial period, 5a is an optimum substage. Moreover, the record of core RM also indicates that the cooling events lasted much longer than the warming one. This is similar to the GRIP record but different from the deep-sea and GISP2 record.

Keywords: the last interglacial period, climatic instability, the Eemian period, Zoige Basin

陈骏，仇钢，1996,
最近130Ka黄土高原夏季风变迁的Pb和Sr地球化学证据。科学通报，41(21): 1963-1966.

从地球化学角度出发, 在黄土一古土壤剖面中寻找分辨率高、指示性强、成因清楚的气候代用指标。在分析了大量元素之后, 选择了Pb和Sr进行深入探讨。结果是，黄土–古土壤序列中Pb/Sr比分布与夏季风场强变化有内在联系,
可望成为重建黄土高原夏季风变迁的又一替代性指标，同时，

Chen Jun and Qiu Gang. 1996. Variation of summer monsoon intensity on the Loess Plateau of Central China during the last 130000 years. Chinese Science Bulletin 41(21):1963-1966.

The results of Rb/Sr ratio and magnetic susceptibility obtained from the Luochuan loess-paleosol section are presented and the relationships between variation of Rb/Sr ratio and fluctuation of climate are discussed. The research found that Rb/Sr ratio in the loess-paleosol sequence is linked to and controlled by the intensity of the summer monsoon. Therefore, the Rb/Sr ratio can be used to reconstruct the variations of summer monsoon intensity in Central China during the late Quaternary. Moreover, the coincidence of Rb/Sr distribution with magnetic susceptibility distribution in the sequence might

黄土一古土壤剖面中pb/Sr比分布曲线和磁化率分布曲线的同步变化，反映了这两个参数之间某种成因联系。

关键词：古季风　黄土　古土壤　Pb和Sr地球化学

reflect some genetic relationshipsof the two parameters.

Keywords: paleomonsoon, loess， paleosol, Rb and Sr geochemistry

汪品先，卞云华，李保华，1996，西太平洋边缘的“新仙女木”事件，中国科学，26（5）：452-460

根据日本海、东海、南海等海区15个沉积柱状样，对“新仙女木”期气候突变事件（YD）的分布和性质进行了探讨。在所有这些经高分辨率地层分析的柱状样中，均发现有“新仙女木”事件，说明西太平洋边缘海广泛出现。从同位素与微体古生物分析的结果看，$\delta^{14}C$测年约11-10 KaBP的新仙女木期，是在12KaBP淡水注入海洋高峰之后，一次冬季表层降水温的短暂事件。在长江口和日本海都记录了新仙女木期“视海退”现象，符合新仙女木期是两次海面快速回升期之间一次滞缓期的解释。新仙女木期的冬季表层水降温和盐度增加，均表明冬季风而不是夏季风加强，边缘海的这一次重大气候事件应对相邻陆地有深刻影响。

关键词：新仙女木期　西太平洋边缘海　冰消期　古海洋学

Wang Pinxian, Bian Yunhua, and Li Baohua. 1996. The Younger Dryas in the West Pacific marginal seas. Science in China (Series D) 26(5):452-460.

The occurrence and nature of the Younger Dryas (YD) abrupt climatic event in the West Pacific marginal seas are discussed on the basis of 15 sediment cores. This YD event has been found in all these cores studied with high-resolution stratigraphy and has proven to be common to the West Pacific region. As shown by isotopic and micropaleontologic analysis, the YD, dated by C-14 at about 11,000 to 10,000 years BP, is a brief event of sea surface cooling in the winter season following a fresh-water pulse about 12,000 years BP. The “apparent regression” of the YD recorded in the Changjiang River delta and the Sea of Japan agrees with the interpretation that the YD is a period of slowed sea level rising between two phases of rapid rising. Both the winter surface water cooling and the increasing salinity in the YD imply a strengthening of the winter but not of the summer monsoon circulation. This major climatic event in the marginal seas must have had profound impacts on the adjacent continent.

Keywords: Younger Dryas, West Pacific, marginal sea, deglaciation, paleoceanography

孙继敏，刘东，丁仲礼，1996，五十万年来毛乌素沙漠的变迁，第四纪研究，(4)：359-367

通过对陕西榆林石峁剖面(110°00'E, 37°55'N)地层记录的研究，重建了毛乌素沙漠的环境演变。主要结论如下：(1)沙漠一黄土边界带风成沉积序列中的埋藏古风成沙层，是第四纪时期毛乌素沙漠向其东南部的黄土高原入侵的证据；(2)五十万年来石峁剖面共记录了13层古风成砂，表明这段时间内至少有13次大规模的沙漠南侵；(3)第四纪地质时期沙丘活化与固定的多次转变反映了东亚季风环流的变化；(4)石峁剖面顶部现代沙层的集积很可能是历史时期土地不合理利用的结果。

关键词：五十万年　毛乌素沙漠　环境变迁

Sun Jimin, Liu Dongsheng, and Ding Zhongli. 1995. The Mu Us Desert evolution in the last 0.5 Ma. Quaternary Science (4):359-367.

A reconstruction of the environmental evolution of the Mu Us Desert is based on a study of the aeolian sequences at Shimao, Yulin City, Shanxi Province. The results are as follows. (1) The existence of buried sand layers in the eolian sequences of the desert-loess transitional zone is geological evidence of the southeastward extension of Mu Us Desert. (2) During the last 0.5 Ma, 13 sand intercalations indicate 13 occurrences of desert expansion. (3) The activation and stabilization of sand dunes in the Mu Us Desert reflect the great change of the East Asian Monsoonal Circulation. (4) The accumulation of a modern sand layer at the top of the Shimao section is likely the result of poor land-use practice in historical time.

Keywords: 0.5 Ma, Mu Us Desert, environmental evolution

冯起，陈广庭，朱震达，1996，塔克拉玛干沙漠北部全新世环境演变（1），环境科学学报，16(2)：238-244

本文分析了塔克拉玛干沙漠北部肖塘剖面的粒度和元素，讨论了剖面地层的沉积特征、古气候和环境变化。结论是，本区全新世以来的多风、高温、干燥的气候形成是以全球气候波动为背景，叠加内陆干旱封闭盆地影响而形成的，但在干燥气候条件下曾有过几次空气湿度较大的偏湿期；本区沉积相主要包括河流冲积作用形成的粒土层和风力作用下形成的风沙层，本区全新世以来共发生三次明显的河流泛滥期，可以同全新世以来的间冰期对应。

Feng Qi, Chen Guangting, and Zhu Zhenda. 1996. Evolution of the Holocene environment in the northern Taklimakan Desert (I). Acta Scientiae Circumstantiae 16(2):238-244.

The evolution of the Holcene environment in the northern Taklimakan Desert and the characteristics of the sediment were revealed by analyzing the granular characteristics and changes in chemical composition of the Xiao Tang section and determining the layer ages. The cold-dry and warm-dry climate in the Holocene was created under the background of global climate with impact of local desert landscape. Also, the paper reveals that there were several short humid periods with high air-humidity during the period. The sediment consisted of clay and sand layers, and there were three fluvial flows in the study areas mainly affected by mountain rainfall and melting ice.

Keywords: Taklimakan, Holocene, layer, sediment, environment

关键词：塔克拉玛干 全新世 地层
沉积相 环境

王律江，1996，上新世末-更新世初西太平洋变冷事件及其古气候意义，第四纪研究，(4)：300-309

以浮游有孔虫目标转换方法，利用时间面与时间系列分析相结合，本文讨论了西太平洋上新世末2.6 Ma BP以来古温度场的变化。结果表明：上新世末至更新世初，西太平洋曾经历一次大幅度，不可逆降温过程。变冷事件集中发生于2.4~1.0 Ma BP间，亚热带水团冬、夏降温幅度达7~8℃和2~3℃，热带水团则相对稳定。西太平洋温度场巨变表明其在北半球冰川发展过程中的正负反馈作用，并由此奠定了中、晚更新世冰期旋回的全球气候模式。

关键词：西太平洋 古温度
上新世末-更新世初
古气候及古海洋学

Wang Lujiang. 1996. Major temperature decrease in the western Pacific during the late Pliocene to early Pleistocene and its paleoclimatic implications. Quaternary Sciences (4):300-309.

The distribution and changes of paleotemperature for the last 2.6 Ma are discussed using a strategy of combined time-series and time-slice analyses based on the planktonic foraminifera (PF) faunal data from eight Deep Sea Drilling Project (DSDP) cores in the western Pacific (0-32°N, 124-159°E). The estimated paleotemperature curves show a major cooling during the late Pliocene to early Pleistocene in the subtropical latitudes, with a temperature decrease reaching 7-8°C and 2-3°C stepwise and irreversible in nature. The results indicate that the feedbacks of the Northern Hemisphere glaciation both positive and negative played an important role in the cooling.

Keywords: western Pacific, paleotemperature, late Pliocene-early Pleistocene, paleoclimatology-paleoceanography

丛绍光，1996，北美东部威斯康星中、晚期古环境与气候变化的甲虫化石证据，第四纪研究，（4）：310-318

通过对北美东部威斯康星中、晚期的甲虫化石组合的描述，试图解释该区环境和气候变化。甲虫分析表

Cong Shaoguang. 1996. Fossil beetle evidence for middle and late Wisconsinan paleo-environmental and paleoclimatic change in eastern North America. Quaternary Sciences (4):310-318.

Beetle assemblages of Middle and Late Wisconsinan age are summarized with an attempt to examine possible patterns of glacial climatic change. Fossil beetle studies suggest that cold

明，北美东部中纬度地区在威斯康星中、晚期的气候以寒冷为主，中间分别在
42000a BP, 34000aBP 和28000aBP
出现3次明显的暖期。威斯康星中期气候冷暖波动的幅度和出现的时间可以与同期的格陵兰冰芯记录及北大西洋Herinrich事件对比。

关键词：甲虫化石古环境气候变化
威斯康星冰期　末次冰期

climatic conditions were dominant in eastern North American between ca.45000-15000 years BP. During the Middle Wisconsinan time, three apparently short warm intervals occurred at ca. 42000 BP, 34000 BP, and 28000 BP. Middle Wisconsinan climatic changes in this area revealed by the fossil beetle record seem to correlate well with climatic records from the Greenland ice core and North Atlantic sediments.

Keywords: fossil beetle, paleoenviroment, climatic change, Wisconsinan, last glaciation

贾容芬，赵林，
刘有梅，1996，黄土地区气候演变的有机地球化学标志，地理科学，
16(2): 97-105

对陕西渭南黄土剖面S0－L2段作了总有机碳（TOC）和Rock-Eval热解烃分析，并根据实验数据建立0.14Ma来黄土地区有机质总量变化曲线。该曲线反映的变化周期与全球气候指标变化周期相近，这表明黄土地区有机质总量变化可能受天文因素控制。在对热解烃与TOC的对比研究中发现，黄土－古土壤序列中存在着两种类型烃，它们的产生受不同因素影响，可作为气候变化标志。此外还验证了黄土剖面湿度公式的可靠性，计算出0.14Ma湿度变化范围为
47％－77％
及各层段湿度分布。预测认为当前正向湿度增大方向演变。

关键词：渭南黄土剖面　有机质
气候演变　湿度

Jia Rongfen, Zhao Lin, and Liu Youmei. 1996. Organic geochemistry markers of climatic evolution in the loess region of China. Scientia Geographia Sinica 16(2):97-105.

The total organic carbon (TOC) and Rock-Eval pyrolysis of samples from the Weinan loess section (S0-L2), Shaanxi Province were analyzed. It is believed that the TOC variation might be affected by astronomical factor, because the variation in TOC in the last 0.14 Ma parallels other indicators of global climate change. In the research, two kinds of hydrocarbon were found to be influenced by climatic change, which can be a signal of climatic change. After identifying the reliability of the formula calculating humidity, the researchers found the range of future humidity variation is 47%-77%, and the tendency of humidity is increasing now.

Keywords: Weinan loess section, organic matter, climatic evolution, humidity

奚晓霞，穆德芬，方小敏，李吉均，1996，早更新世东山古湖氯离子含量变化与季风演化，冰川冻土，18（2）：125-130

测定湖相沉积物中的氯离子含量可以反演当时流域内的古气候状况。经古地磁等多种年龄测定，东山古湖是目前所知本段最高分辨率的湖相地层，是恢复六盘山以西古季风演化的关键。东山古湖沉积物（2.2-1.66 Ma BP）中氯离子含量变化表明，早更新世早期亚洲季风已稳定建立，其变化较小。早期（2.2-1.85 Ma BP）较干；中期（1.85-1.7 Ma BP）出现大湿润期，氯离子含量最低；晚期（1.7-1.66 Ma BP）再度变干。每个阶段中，季风还存在约2×10^4a的短周期波动。早期季风的演化明显受青藏高原隆起与地球轨道参数变化的双重影响。

关键词：东山古湖　氯离子　早更新世　季风演化

Xi Xiaoxia, Mu Defen, Fang Xiaomin, and Li Jijun. 1996. Variation of Cl^- content in Paleo-Dongshan Lake during the early Pleistocene and monsoonal evolution. Journal of Glaciology and Geocryology 18(2):125-130.

The Cl^- content in lake sediments can show the paleoclimate of the valley. Variation of Cl^- content in the high-resolution Paleo-Dongshan Lake sediments (2.2-1.66 Ma BP) shows that the Asian monsoon system was stably established in the Early Pleistocene with a mild change. During this time interval, the monsoon climate showed three obvious phases, namely, relatively dry from 2.2 to 1.85 Ma BP, very humid from 1.85 to 1.7 Ma BP with the lowest content of Cl^-, and dry again from 1.7 to 1.66 Ma BP. In addition, a 20-ka cycle of Cl^- variation is also evident in each phase. These phases indicate that the evolution of the early monsoon climate may have been caused by the uplift of the Tibetan Plateau and earth orbital forcing.

Keywords: Paleo-Dongshan Lake, anion chlorine, Early Pleistocene, monsoonal evolution

郑本兴，王苏民，1996，黄河源区的古冰川与古环境探讨，冰川冻土，18（3）：210-218

黄河源区周围山地的古冰川作用与黄河源湖盆的沉积环境关系密切。黄河源区盆地北面的扎日加山、布青山、阿尼玛卿山和南面的巴颜喀拉山自中更新世以来有3次大冰期，其中以倒数第三次冰川规模最大，形成了4个大冰帽。中更新世开始，盆地沉积中心由于昆仑山的隆起由北向南迁移，从而形成了河源区下

Zheng Benxing and Wang Sumin. 1996. A study on the paleo-glaciation and paleoenvironment in the source area of the Yellow River. Journal of Glaciology and Geocryology 18(3):210-218.

The paleo-glaciation in the mountain area of the source of the Yellow River shows a relationship with the deposition environment of the lake basin area of the Yellow River. During the Cahaxili Glaciation of the middle Pleistocene, there were glaciers developing in the Bayan Har, Zarijia, Buqingshan, and Anyemaqen Mountains and four big ice caps with a diameter of about 30-50 km. Up to the late stage of the middle Pleistocene penultimate glaciation, glaciers extended downward to the valleys and Ngoring Lake was a large glaciofluvial lake. During the last glaciation of the late Pleistocene, medium valley glaciers

相沉积。晚更新世末次冰期时湖水外泄，进入若尔盖盆地，黄河水系开始成为一体。全新世黄河曲折东流，本区形成广大的高寒干旱草原丘陵盆地地貌景观。

关键词：古冰川　古环境　黄河源区

developed in the mountains and the climate was cold and dry with strong wind. The Yellow River system became connected and a large amount of water with sand from lake area of the source of the Yellow River ran into the Zoige Lake area. In the middle of the Holocene, the lake area greatly shrank and a large lake bench and valley plain with a dry grassland appeared and meanders in the Yellow River were developing.

Keywords: paleoglacier, paleoenvironment, source area of Yellow River

沈永平，刘光秀，施雅风，张平中，1996，青藏高原新仙女木事件的气候与环境，冰川冻土，18（3）：219-226

末次冰期以来极地冰芯、海洋沉积等记录中观测到的最剧烈的气候突变事件之一就是新仙女木事件。近年来的研究结果表明发生于11-10ka BP的新仙女木降温事件呈全球性变化，青藏高原在这一事件中气候与环境也发生了急剧的变化。青藏高原巨大的高度和脆弱的冰冻圈结构使新仙女木事件的敏感性和作用被放大了，这对同纬度地区和全球都产生了极大的影响。

关键词：青藏高原　新仙女木事件　气候变化　环境

Shen Yongping, Liu Guangxiu, Shi Yafeng, and Zhang Pingzhong. 1996. Climate and environment in the Tibetan Plateau during the Younger Dryas cooling event. Journal of Glaciology and Geocryology 18(3):219-226.

The Younger Dryas cooling event was a global event occurring in 11-10 ka BP. Field evidence with well-dated and high-resolution data suggests the occurrence of the event in the Tibetan Plateau. During the event an abrupt and dramatic climatic and environmental change also took place in the plateau. The main changes in the plateau were cooling, drying, dropping of lake level, extending period of river and lake ice cover, and weakening intensity of plateau monsoon. Ecological conditions became more fragile, vegetation and aquatic life vanished or decreased in species, and glaciers readvanced. Because of the high altitude and the fragility of the cryosphere, the sensitivity and scope of the event were enhanced in the plateau, and are more distinct than in other places at the same altitude or globally.

Keywords: Tibetan Plateau, Younger Dryas event, climate change, environment

陈发虎，马玉贞，李吉均, 1996,
陕西黄土高原马兰黄土划分与末次冰期气候快速变化研究, 冰川冻土，
18（2）：111-118

本文对陕西黄土高原马兰黄土划分与末次冰期气候快速变化做了研究，发现马兰黄土内存在9个弱成壤组(层)，记录了末次冰期内多达22个间冰段气候的环境状况。马兰黄土中部古土壤是末次冰期大间冰段的记录，共有上、中、下三层古土壤，含11个亚层，尤以下层古土壤发育最好，表明当时气候较温暖湿润。陕西马兰黄土记录与格陵兰GRIP冰芯记录相吻合，说明末次冰期内气候快速变化和不稳定性具有全球意义。
关键词：末次冰期　马兰黄土记录
古土壤序列间　冰段
末次冰期气候不稳定性

Chen Fahu, Ma Yuzhen, and Li Jijun. 1996. High-resolution record of Malan loess in the Longxi Loess Plateau and rapid climate changes during the Last Glaciation. Journal of Glaciology and Geocryology 18(2):111-118.

Loess deposition in the plateau is quite sensitive to environmental and/or climatic changes. Because it is relatively thick and widely distributed in the Longxi Loess Plateau, the loess climate record has high resolution. There are 22 weak pedogenic layers in the Malan loess. They are records of interstades in the last glaciation. From pedogenic structures, magnetic susceptibility index, pollen and spore composition, and others it is known that climates in the interstades were relative warm and moist. The Malan loess record is quite coincident with the Greenland Ice Core Project (GRIP) ice core record, reflecting the generally instable climate for whole globe during the Last Glaciation. In middle part of the Malan loess there is a thick interstadial pedogenic layer with three main paleosols. The climate in the period was quite moist and possibly as warm as at present in some periods especially as evident in the bottom paleosol formation. In Western China, the water level of inland lakes was higher than that of the present. The interstade in China appeared as a Mega-interstade.

Keywords: Last Glaciation, Malan loess record, paleosol sequence, Mega-interstade, climatic instability during the Last Glaciation

李宜银，吕金福, 1996,
松嫩沙地晚更新世以来的孢粉记录及古植被古气候，中国沙漠，
16(4)：338-344

松嫩沙地位于中国北方半干旱半湿润农牧交错带，研究该地区植被演替历史和古气候变迁对未来生态环境评价、农牧业发展、资源利用有重要意义。本文对松嫩沙地进行了孢粉、古脊椎动物、^{14}C、热释光年代等分析，结果表明这个地区从晚更新世以来植被曾发生过多次

Li Yiyin and Lu Jinfu. 1996. The sporo-pollen records and vegetation and climate history in Songnen Plain since Epi-pleistocene. Journal of Desert Research 16(4):338-344.

The Songnen Plain is located on the semiarid-semihumid fringe in northern China. The formation and development of this area have a long geologic and historic process. The sporo-pollen records of this region indicate that the vegetation in this area has a succession of semidesert, semidesert grassland, grassland, sparse woods grassland, and dry grassland, and the climate has been changing between cold (dry) and warm (wet), along with which the desertified land expanded or reduced since the Epi-pleistocene.

更替，经历了半荒漠-(半荒漠草原)-疏林草原-干草原的演替，
气候经过多次冷暖波动，沙漠化也经历了多次扩张和收缩。
关键词：松嫩沙地　晚更新世
孢粉记录　古环境

Keywords: Songnen Plain, Epi-pleistocene, pollen and spore record, paleoenvironment

高全洲，董光荣，邹学勇，
1996，查格勒布鲁剖面--
晚更新世以来东亚季风进退的地层记录，中国沙漠，16(2)：112-126

本文结合^{14}C测年、古冰缘现象和沉积物在化学元素SiO_2/Al_2O_3分子比值变化规律分析了查格勒布鲁剖面沉积物的粒度特征和孢粉组合特征。晚更新世以来巴丹吉林沙漠南缘地区的气候条件随全球冰期气候的波动经历了由晚更新世早期的相对温湿阶段、晚更新世晚期尤其是末次盛冰期的干冷阶段向全新世温暖期的演化过程。东亚夏季风尾闾在晚更新世早期到达甚至越过本区影响到拐子湖一带，全新世以来东亚夏季风尾闾又向本区推进，并于全新世大暖期对本区造成明显影响。
关键词：查格勒布鲁剖面　晚更新世
东亚季风　古风成砂　沉积

Gao Quanzhou, Dong Guangrong, and Zou Xueyong. 1996. The Chagelebulu Section: A strata record of the advances and retreats of monsoons in East Asia since the late pleistocene. Journal of Desert Research 16(2):112-126.

Evidence of climatic stratigraphy can divide the climatic evolution in south of the Badain Jaram Desert into three stages since late Pleistocene. There are two warmer and moist ones in the early stage of Late Pleistocene (Q1/3) and in the Holocene (Q4), and a dry and cold stage in the late stage of the Late Pleistocene (Q2/3). During the late interglacial period (Q1/3), the fringe extended its range to Guaizihu, which lies to the north 180 km away from Chagelebulu. During the last glacial period, the winter monsoon dominated the climate in this area; the summer monsoon fringe, however, retreated to the middle-lower reaches of the Changjiang drainage basin, and the landscape turned to temperate desert.

Keywords: Chagelebulu section, late pleistocene, East Asia monsoons, Eolian paleosands, deposition

*管东红，奚晓霞，郝永萍*等，1996，北塬剖面碳酸钙记录的末次间冰期气候不稳定性，
冰川冻土，18（2）：119-124

最近格陵兰冰芯深孔GRIP提示末次间冰期早期(MIS-5e)气候急剧不稳定，但邻近的另一冰芯GISP2却表明这一时期气候是稳定的。其结论对将来气候的预测至关重要。由于$CaCO_3$在黄土和古土壤中含量的差异性及北塬特殊的地理位置和气候环境，决定了北塬黄土—古土壤序列中$CaCO_3$(%)记录与格陵兰冰芯 $\delta^{18}0$(‰)记录理论上有可比性，连续$CaCO_3$记录表明，气候在MIS-5e期间曾发生3次显著的温暖时期和两次明显严寒的急剧大幅度波动。与格陵兰GRIP孔气候记录一致。证明MIS-5e
气候不稳定性是存在的，并且其影响不是早先认为的局地事件，至少是北半球的一种普遍现象。
关键词：北塬　末次间冰期
冰芯深孔　气候波动

Guan Donghong, Xi Xiaoxia, Hao Yongping, et al. 1996. Climate instability revealed in the Beiyuan $CaCO_3$ record during the Last Interglacial Age. Journal of Glaciology and Geocryology 18(2):119-124.

Recent Greenland Ice Core Project (GRIP) deep ice core records reveal that the climate experienced short shifts during the early stage of the Last Interglacial Age [Marine Isotopic Stage (MIS)-5e], but the later ice core from the Greenland Ice Sheet Project Two (GISP2) near the GRIP drill has not demonstrated such a phenomenon. The difference in calcium carbonate ($CaCO_3$) content between loess and paleosol and the special location and environment of the Beiyuan area theoretically make it possible to compare Beiyuan loess-paleosol $CaCO_3$ (%) to the Greenland ice core oxygen isotope record ($\delta^{18}O$) (‰). The continuous loess-paleosol $CaCO_3$ (%) record from the Beiyuan section shows that the climate experienced three warm periods and two serious cold periods, which was a marked fluctuation and correlated well with the Greenland GRIP climate record. This correlation demonstrates the instability of climate existence during the MIS-5e and shows that this climate fluctuation was common at least over the Northern Hemisphere rather than being local as previously recognized.

Keywords: Beiyuan, the Last Interglacial Age, deep ice core, climate fluctuation

姚檀栋, 杨志红，1996，近2Ka来高分辨率的连续气候环境变化纪录-古里雅冰芯近2Ka记录初步研究，
科学通报，41（12）：1103-1106

根据古里雅冰芯的记录、恢复了该地区近2Ka的气候和环境变化的历史。结果显示：在过去近2Ka来，气候在不断的冷暖波动中逐渐变暖，而大气中尘埃在波动中逐渐减少。气候突变事件在古里雅冰芯中的反应是很明显的，这些事件不但发生在

Yan Tandong and Yang Zhihong. 1996. The high-resolution record for climatic variation during the last 2000 years: Preliminary research on the Guliya Ice Core. Chinese Science Bulletin 41(12):1103-1106.

This paper reports the reconstruction of climatic and environmental change during the last 2000 years using the records from the Guliya ice core. The results show that the climate has been warming with continuous fluctuations of warm/cold and that dust has been decreasing. The abrupt climatic changes are notable, those events occurred not only in the fluctuation from cold to warm but also in the fluctuation from warm to cold.

气候由冷变热的时期，也发生在由热变冷的时期。

关键词：古里雅　冰芯　气候　环境

Keywords: Guliya, ice core, climate, environment

郭正堂，丁仲礼，刘东生，1996，黄土中的沉积-成壤事件与第四纪旋回，科学通报，41（1）：56-59

基于渭南剖面，用微形态学方法，结合游离铁（CBD法分离）和总铁比值、磁化率，对2.5Ma以来的成壤事件进行鉴别。2.5Ma以来的渭南黄土中至少记录了56个清晰的成壤期。如果把每个成壤期和相对干冷的粉尘堆积期作为一个气候事件，则它们代表了112个以沉积一成壤事件为代表的古气候事件。

关键词：黄土一古土壤序列
成壤事件

Guo Zhengtang, Ding Zhongli, and Liu Dongsheng. 1996. Pedosedimentary events in loess of China and Quaternary climatic cycles. Chinese Science Bulletin 41(1):56-59.

The pedosedimentary events of the last 2.5 Ma are revealed in the Weinan loess section using a micromorphological method, together with Fed/Fet and magnetic susceptiblity. At least 56 paleosols have been easily identified in the Weinan loess. If all pedogenetic stages and dust deposition stages are viewed as climatic events, 112 paleoclimatic events are expressed by those paleosols in the Weinan loess.

Keywords: loess-paleosol sequence, polycyclic soil, pedosedimentary event

杨守仁，杨松，1996，中国10Ka来海滩岩时空分布与气候变迁，科学通报，41（8）：723-727

基于海滩岩形成与热带气候条件的密切关系，中国全新世海滩岩的时空分布表明，在百年尺度上，中国全新世气候变化经历了升温期、高温期和降温期三大阶段。高温期气候基本偏暖，气温比今高1.6-3.6°C，其间出现短暂的强低温事件（冷谷为4930+185aBP），降温期气候前期（11KaBP前）尚暖，气温高于现在0.5-2.2°C，后期(11KaBP后)

Yang Shouren and Yang Song. 1996. Temporal and spatial distribution of seabeach rock and climatic change in China during the last 10000 Years. Chinese Science Bulletin 41(8):723-727.

Temporal distribution and spatial distribution of beach rock in China show that, on the scale of a century, climatic change has experienced warming periods, high temperature periods, and cooling periods during the Holocene. During warming periods, the climate was warmer and the temperature was 1.6 to 3.6°C higher than it is at present, and a cold event occurred at 4930 + 185 a BP. The cooling period has two stages: before 1.1 ka BP, temperature was 0.5 to 2.2°C higher than present; after 1.1 ka BP, the temperature had an abrupt drop. According to the data of beach rock since 6.5 ka BP, the major period of temperature fluctuation was 0.2 ka, and the rate of temperature variation is 0.5 to 1.7°C.

陡降，气温比今高0-0.19°C。
根据6.5KaBP以来海滩岩数据，冷谷变暖峰、暖峰变冷谷的时间间隔以0.2Ka为主，为次，气温变化为每百年0.5-1.7°C，
推断新暖峰将在未来0.1Ka出现，在一般情况下，那时气温将比今高约0.5-1.7°C，也可能突然升高2.8°C。
关键词：中国海滩岩　时空分布　气候变迁

Prediction shows that a peak of warmth will occur in 0.1 ka, when the temperature will be 0.5 to 1.7°C higher than at present.

Keywords: beach rock in China, temporal and spatial distribution, climatic change

汪品先，
刘志伟，1996，南沙海区盛冰期的气候问题，第四纪研究，
(3)：193-201

本文根据十几个沉积柱状样的氧同位素与微体古生物分析结果，指出南沙海区盛冰期时夏季温度与全新世差别微小，而冬季水温强烈降低，使季节性温差高达6°C，明显超过同纬度的西太平洋开放水域。推测冰期时的冬季风强化，是造成这些变化的主要原因，同时也为热带海区冰期海面温度高、岛屿山地温度低的矛盾提出了一种新的解释。
关键词：南沙海区　表层海水温度　盛冰期　冬季风

Wang Pinxian and Liu Zhiwei. 1996. The last glacial maximum climate problem in the sea area of the Nansha Islands, South China Sea. Quaternary Sciences (3):193-201.

Judging from the results of oxygen-isotope and micropaleontological analyses from more than ten cores, this paper shows that the winter sea surface temperature (SST) at the Last Glacial Maximum (LGM) in the Nansha Islands sea area was about 22°C and the summer SST was about 28°C, resulting in a seasonality as high as 6°C. Thus the glacial/postglacial difference in summer SST (0.9 to 1.8) there is within the range of standard errors for the paleo-SST estimations using transfer function, where the difference in winter SST (3.3 to 3.7) is much higher than in the open Western Pacific at the same latitudes. The strengthened seasonality in the Nansha area at the LGM can be ascribed to intensified winter monsoon circulation. This also provides a new explanation for the apparent contradiction between the warm SST and cool mountain temperature of the islands in the tropics at the LGM.

Keywords: Nansha Islands area, sea surface temperature, Last Glacial Maximum, winter monsoon

聂高众，刘嘉麒，郭正堂，1996，渭南黄土剖面十五万年以来的主要地层界线和气候事件，第四纪研究，（3）：221-231

本文在渭南黄土剖面所测得的年龄结果和时间标尺的基础上，结合粒度、磁化率等气候曲线的分析，对该剖面十五万年以来一些主要地层界线和气候事件的年龄进行了初步讨论，结果如下：1）S_1/L_2界线位于剖面1180cm处，从时间标尺上可知其年龄为128800aBP，同末次间冰期起始的年龄一致；2）L_1/S_1的地层界线年龄为74220aBP，同SPECMAP曲线中末次间冰期的结束年龄吻合；3）渭南剖面所指示的末次间冰期约在20000-18000aBP之间；4）在20000-18000aBP之间的末次间冰期，有一段不足1000a的快速堆积期，其堆积速率是中国黄土平均堆积速率的10倍以上。

关键词：渭南剖面　年代学
地层界线　气候事件

Nie Gaozhong, Liu Jiaqi, and Guo Zhengtang. 1996. The major stratigraphic boundaries and climatic events in the Weinan Loess section since 0.15 Ma BP based on chronological evidences. Quaternary Sciences (3):221-231.

The American Meteorology Society (AMS) C and TL methods were used systematically to date the samples from the Weinan loess section since 0.15 Ma BP, and to tune the preliminary high-resolution time scale of this section. (1) The S_1/L_2 boundary was located at a 1180cm depth that has an age of 128800 a BP determined by the time scale, which was very consistent with the SPECMAP curve. (2) The boundary of L_1/S_1 at a 854-cm depth may suggest an age of 74200 a BP from the time scale.This age corresponds to the age of about 73000 a BP in the SPECMAP curve. (3) The maximum of the last interglacial stage had an age from about 20000 a BP to 18000 a BP. (4) There was a rapid deposit period in the Weinan loess section from 20000 a BP to 18000 a BP. The deposit rate of this segment was more than 10 times the average deposit rate of China loess.

Keywords: Weinan section, chronology, stratigraphic boundary, climatic event

赵松龄，于洪军，1996，晚更新世末期黄、渤海陆架沙漠化环境的形成，第四纪研究，（1）：42-47

末次盛冰期气候寒冷，温度降低，冰川发育，海面下降，黄、渤海陆架全部出露，东海的大部分裸露成陆，并成为亚洲大陆的一部分。根据多年来在陆架地区获得的浅地层剖面仪测量记录，陆架发生沙漠化的证据有：统一海相地层的解体、大面积的混杂堆积、漫长的风蚀基面、休止角型沉积

Zhao Songling and Yu Hongjun. 1996. Shelf desertification environment in the Bohai and Yellow Seas during the Last Glacial Maximum. Quaternary Sciences (1):42-47.

During the Last Glacial Maximum, the global climate was characterized by very low temperatures. Enlargement of the continental glaciers brought about the lowering of the East China Sea level for about 130 m. The entire Bohai Sea, Yellow Sea, and most of the East China Sea were exposed and became a part of the Asian continent. The evidence for the shelf desertification is summarized as follows: (1) Disintegration of the integrated marine stratum; (2) mixed deposits; (3) endless erosion surface;

结构以及埋藏沙丘群的发现等。
关键词：陆架沙漠化

(4) typical "angle of repose" texture; and (5) buried dune groups.

Keywords: shelf desertification

成鑫荣, 麦文，1996，南海北部陆架WC-F
孔早、中上新世超微化石及古环境，
海洋学报，18（1）：73-79

在对南海北部陆架WC-F孔超微化石分析的基础上，对早、中上新世的古环境作了一初步探讨。490-850m井段在超微化石分带上属NN12至NN15带。以730m为界，可分为早晚两个阶段。早期气候温暖，海面较高，生物生产力较低，以星盘石Discoster和冷杉石Sphenolithusabies较高含量为特征；晚期气候较冷，海面下降，陆源物携带之营养物质增多，生物生产力增高，以星盘石和冷杉楔石含量下降为标志。根据星盘石的相对丰度变化，还可分为10个次一级的冷暖旋回。
关键词：南海　超微化石　古环境

Cheng Xinrong and Mai Wen. 1996. The microfossil and its paleoenvironment in the core WC-F from the North Continental Slope of the South China Sea. Acta Oceanologica Sinica 18(1):73-79.

Based on an analysis of nannofossils in core WC-F from the North Continental Slope of the South China Sea, the paleoenvironment during early and middle Pliocene is studied. The core from 490 m to 850 m belonging to sections NN12 to NN15 can be divided into two stages at 730 m. In the early stage, the climate is warmer, and sea level is higher; biological productivity is lower and the abundance of *Discoster* and *Sphenolithusabis* is higher. In the later stage, sea levels fall, and nutrients taken by terrigenous materials increase; biological productivity is enhanced and the abundance of *Discoster* and *Sphenolithusabis* decrease. There are ten secondary cycles of warm/cold according to the relative abundance of *Discoster.*

Keywords: South China Sea, nannofossil, paleoenvironment

李道高, 郭永盛, 姜爱霞，1996，
山东半岛南、北岸全新世海侵及古地理环境差异的初步探讨，
海洋学报，18(4): 63-71

根据山东半岛沿岸大量全新世海相沉积物的分布高程．测年数据及孢粉分析结果，分析了半岛南、

Li Daogao, Guo Yongsheng, and Jiang Aixia. 1996. A preliminary discussion on the differences of the paleoenvironment in the Holocene between the southern and northern coasts of the Shandong peninsula. Acta Oceanologica Sinica 18(4):63-71.

The differences of transgression, paleovegetation, paleoclimate, and paleoenvironment during the Holoence between the southern and northern coasts of the Shangdong peninsula are analyzed on the basis of the altitude of deep-sea sediment, dating data, and pollen analysis. Those differences

北岸全新世时期海侵，古植被与古气候及古地理环境有显著差异，其形成原因主要归 结于新构造运动背景和地理纬度差异等因素.

关键词：山东半岛　全新世海侵　古地理环境

are chiefly contributed to tectogenesis and the difference of latitude.

Keywords: Shandong peninsula, transgression in Holocene, paleoenvironment

谢传礼，
蒋知缗，1996，末次盛冰期中国海古地理轮廓及其气候效应，第四纪研究，（1）:1-10

本文用101个站位^{14}C的测年和22个站位的氧同位素资料编制了末次盛冰期（20000-15000aBP）资料图、古地理图和古海洋图等三张图件。末次盛冰期低海平面时中国海轮廓发生重大改观：陆架出露约1.55X10^{6}平方公里；表层海流改组以及表层海水温度剧降（比现代低3.5-6℃）。海区面积和表层海水温度下降使中国海蒸发量大大降低。根据海陆蒸发速率差异和表层海水温度和蒸发的关系，估算出末次盛冰期中国海年蒸发量比现代降低约12 X 10^{11}-20 X 10^{11}立方米/年，或相当现代中国年降水量的1/5-1/3。同时，末次盛冰期陆架暴露、地表反照率增高使地表对太阳辐射吸收作用减弱。

关键词：末次盛冰期　古地理　中国海　反照率

Xie Chuanli and Jian Zhimin. 1996. The paleogeographic configuration of the China Seas and its climatic influence during the Last Glacial Maximum. Quaternary Science (1):1-10.

Over one-hundred sites with ^{14}C-datings and 22 sites oxygen isotope data have been collected to compile paleogeographic maps of the China Seas during the Last Glacial Maximum (LGM) of 20000-15000 a BP. A series of 3 draft maps (data map, paleogeographic map, and paleoceano-graphic map) were made. The paleogeographic map at the Last Glacial Maximum revealed two major changes of the China Seas caused by the low sea-level stand. (1) The exposure of vast continental shelves in a total area of about 1.55 million km^2; and (2) the reorganization of surface circulations and remarkable decrease of sea surface temperature (SST). Both the reduction of sea area and decline of SST must have caused a decrease in evaporation from the sea surface. On the basis of the difference between evaporation rates from sea and land and the relationship between evaporation and SST, the authors draw the following results. It is estimated that the total annual evaporation from the China Seas at the LGM might be 12×10^{11} -20×10^{11} m^3/a less than at present, or 1/5 to 1/3 of the annual total precipitation in the whole of China now. On the other hand, the exposure of shelves at the LGM must have increased the albedo from the surface and hence decreased the absorbed solar radiation.

Keywords: the Last Glacial Maximum, paleogeography, the China Seas, albedo

Climate Variation (season and year)

宫世贤，凌升海，1996，西双版纳雾在减少，气象，22(11)：10-14.

利用西双版纳40年雾的实测资料，统计分析了西双版纳的雾日、雾时、雾量的变化情况，探讨了雾减少的原因及其对人们生产、生活带来的影响。雾减少的直接原因是相对湿度的降低，而相对湿度的降低是由于气温升高和降水量的减少。植被减少和城市热岛效应的增强是西双版纳雾迅速减少的人为原因。

关键词：雾减少　西双版纳　人类活动

Gong Shixian and Ling Shenghai. 1996. Fog is decreasing in the Xishuangbanna Region. Meteorology Monthly 22(11):10-14.

The days, hours, and amount of fog in the Xishuangbanna region are analyzed using observation data for the last 40 years. It is found that the fog of Xishuangbanna is decreasing as a result of increasing air temperature and decreasing precipitation. The paper points out that the reduced vegetation and an enhanced city heat-island effect are the artificial causes of fog decrease in the Xishuangbanna region.

Keywords: fog decreasing, Xishuangbanna, human action

胡列群，袁玉江，1996，塔克拉玛干沙漠辐射平衡研究，干旱区地理，19(3):16-23.

通过对塔克拉玛干沙漠辐射平衡实测值与计算值对比分析，本文研究了辐射平衡不同季节的日变化及年变化特征，分析了影响辐射平衡的各主要因子。结论是，塔里木盆地中心日益扩大的沙漠地区是整个盆地年辐射平衡的低值中心，也是整个新疆辐射平衡年总量的低值中心。

关键词：塔克拉玛干沙漠　辐射平衡

Hu Liequn and Yuan Yujiang. 1996. A study of the surface radiation balance in the Taklimakan Desert. Arid Land Geography 9(3):16-23.

Through comparison of simulation with observation, the daily and yearly variations of the radiation balance in different seasons in the Taklimakan Desert are studied, and major factors that affect radiation balance are discussed. The results show that the lowest center of annual radiation balance in Xinjiang is at the center of the Taklimakan Desert and its value is about 1100 $MJ \cdot m^{-2} \cdot a^{-1}$.

Keywords: Taklimakan Desert, radiation balance

蒋全荣，王春红，徐桂玉，1996，北极1区海冰面积变化及其与大气遥相关型的联系，气象学报，54（2）：240-247

EOF和功率谱分析表明，北极1区海冰面积的第2、第3特征向量的年际变化具有40个月左右的振荡周期。在这一频带上，海冰面积变化的热力强迫作用可分别激发出EU和EA大气遥相关型。经对比，进一步发现，北极海冰和赤道中、东太平洋海温对北半球冬半年中纬度大气环流的影响有一定的相似性，它们都是引起短期气候变化的重要因子。

关键词：北极1区海冰面积
EU和EA大气遥相关型　短期气候变化

Jiang Quanrong, Wang Chunhong, and Xu Guiyu. 1996. Variation of the Arctic sea ice cover in Region 1 and its relationship to atmospheric teleconnection patterns. Acta Meteorologica Sinica 54(2):240-247.

Empirical orthogonal function (EOF) and power spectral analysis show that the interannual variability of the time coefficients of the second and the third eigenvectors of the Arctic sea ice cover in Region 1 has a period of approximately 40 months. At this frequency band, EU and EA teleconnection patterns can be excited by the thermal forcing of the variation of the sea ice cover. By comparison it is confirmed that the influence of the Arctic sea ice cover on the mid-latitude general circulation in the Northern winter parallels sea surface temperature (SST) over the central-eastern equatoral Pacific. Sea ice cover and SST are the important factors in the short-term climatic change.

Keywords: Arctic sea ice cover in Region 1, EU and EA atmospheric teleconnection patterns, short-term climatic change

林振耀，赵昕奕，1996，青藏高原气温降水变化的空间特征，中国科学，26（4）：354-358

利用青藏高原50个台站历年各月的气温和降水资料，分析该区50年代至90年代初气温降水变化趋势。指出西藏、青海气温普遍呈上升趋势，具有较强的空间一致性。西藏东南部暖期开始最早。可将全区划为5个气温和9个降水变化特征相异的小区。全区温湿组合以增温减湿为主。

关键词：气温降水变化的空间特征
青藏高原地区　50年代至90年代初期

Lin Zhenyao and Zhao Xinyi. 1996. Spatial characteristics of changes in temperature and precipitation of the Qinghai-Xizang (Tibetan) Plateau. Science in China (Series D) 26(4):354-358.

The changing processes and tendencies of temperature and precipitation in Qinghai-Xizang Plateau from the 1950s to the early 1990s are analyzed on the basis of monthly mean temperature and precipitation. The change of temperature in the last 40 years is almost unanimous on the spatial scale. The first area to become warmer is the southeastern Tibetan Plateau. The Plateau is divided into five parts according to the change of temperature and nine parts according to the change of precipitation. During the 40 years some areas have been warmer and drier, others warmer and wetter.

Keywords: spatial characteristics of temperature and precipitation change, Qinghai-Xizang Plateau, 1950s to early 1990s

刘爱民，刘玉平，慈龙骏，1996，毛乌素沙区的气候变化及人为活动特征分析，干旱区资源与环境，10(4):8-18

利用毛乌素沙区10个气象站近30年的气象资料和国民经济统计资料,分析了该区的气候变化特征和人为活动特点,并提出了适应该种变化的对策。结果表明,该30多年来气温抬升,降水量下降,但降水稳定性增强,平均风速减少;实现农牧业生产由粗放经营向集约化经营转变,提高该区综合生产能力,是防止农业生态环境进一步退化的重要措施。

关键词：气候变化　人为活动　生态环境

Liu Aimin, Liu Yuping, and Ci Longjun. 1996. Analysis of characteristics of climatic variation and anthropogenic actions in the Mu Us Desert. Journal of Arid Land Resources and Environment 10(4):8-18.

Characteristics of climatic variation and anthropogenic actions in the Mu Us Desert are analyzed by using statistical data of climate and the national economy for about 30 years from ten climatological stations. Research results show that over these years, temperature has gone up and precipitation has gone down, but the stability of precipitation has strengthened and average wind speed has decreased. Countermeasures for these changes are proposed. Changing agriculture and animal husbandry from extensive farming into intensive farming and increasing the production capacity are the main measures to prevent the agricultural ecological environment from degeneration.

Keywords: climatic variation, artificial action, ecological environment

刘禹，吴祥定，S. W. Leavitt，1996，黄陵树木年轮稳定C同位素与全球变化，中国科学，26（2）：125-130

本文在树轮稳定C同位素与气候变化的研究方面做了新的尝试。本文采用不同的数据分析方法，研究了消除大气CO_2影响后的陕西黄陵境内的油松树轮中 $\delta^{13}C$ 与气候因子之间的关系及其稳定程度。结果标明：黄陵地区的$\delta^{13}C$曲线表现出与全球其他地区一致的下降趋势。黄陵地区高频$\delta^{13}C$的震荡与6月平均气温及5月、6月和7月3个月的降水总和密切相关。在一定程度上反映了东亚夏季风这一地区的某些特点。

关键词：陕西黄陵　树轮$\delta^{13}C$　东亚夏季风　温度距平重建

Liu Yu, Wu Xiangding, and S. W. Leavitt. 1996. Stable carbon isotope in tree rings from Huangling, China, and climatic variation. Science in China (Series D) 26(2):125-130.

The carbon isotope $\delta^{13}C$ in the tree rings of conifers correlates with nearby temperature. The $\delta^{13}C$ climatic response is analyzed using a single-year discrimination chronology detrended from a $\delta^{13}C$ chronology from Chinese pine (*Pinus tabulaeformis*) tree rings and meteorological data. The results show that high-frequency $\delta^{13}C$ is significantly related to both the average temperature of June (with r = -0.65) and the total precipitation of May, June, and July (r = -0.46).

Keywords: Shanxi Huangling, $\delta^{13}C$ of tree rings, East Asia summer monsoon, temperature departure reconstruction

刘晓东, 马柱国, 1996,
中国短期气候变化的一个重要原因—青藏高原地表反射率的变化, 热带气象学报, 12(3): 240-245

通过数值试验, 对高原地表反射率变化的气候效应进行了敏感性研究, 同时与观测的近40年中国区域气候变化趋势作了对比分析。结果表明, 高原主体地表反射率增加是我国短期气候变化的重要控制因子之一, 它能造成东亚夏季风和高原夏季风的显著减弱, 使夏季我国东部季风区北方变暖, 南方变冷, 季风降水普遍减少。
关键词：青藏高原　地表反射率　气候变化

Liu Xiaodong and Ma Zhuguo. 1996. An important cause leading to short-term climatic variation in China: The change of the surface albedo in the Tibetan Plateau. Journal of Tropical Meteorology 12(3):240-245.

A sensitivity study on the climatic effect of surface albedo change is completed with a two-level General Circulation Model, and the results are compared with the data from observation in the last 40 years. The results show that the increase of the surface albedo in the main part of the Tibetan Plateau is one of the important factors in controlling China's short-term climatic variation. When the surface albedo increases in the Tibetan Plateau, the summer monsoon becomes remarkably weak, and the temperature rises in the northern part and falls in the southern part of eastern China, and monsoonal rainfall also decreases generally.

Keywords: Tibetan Plateau, surface albedo, climatic variation

施能, 1996, 北半球冬季大气环流遥相关的长期变化及其与我国气候变化的关系, 气象学报, 54（6）：675-683

研究北半球冬季大气环流遥相关型的长期变化发现：WA、PNA型有明显趋势变化及年代际变化（WA型有明显负趋势，PNA型有正趋势）。这种年代际变化是中国冬季气候变化的一个重要原因。
关键词：冬季遥相关型　年代际变化　突变　气候变化

Shi Ning. 1996. Secular variation of winter atmospheric teleconnection pattern in the Northern Hemisphere and its relationship with China's climate change. Acta Meteorologica Sinica 54(6):675-683.

The secular variation of the winter atmospheric circulation teleconnection pattern is studied. The Western Atlantic (WA) and Pacific/North American (PNA) patterns showed yearly trends and interdecadal change, that were a significant negative trend for the WA intensity index and a positive trend for the PNA intensity index. This interdecadal change of the intensity indices of the atmospheric teleconnection pattern may be an important sign of climatic warming over China in winter.

Keywords: winter teleconnection, interdecadal change, abrupt change, climate change

谭友邦, 谢利娟, 1996，内江市近40年日照变化的统计特征，
气象，22（10）：27-30

利用1960-
1995年内江市各测站的逐月日照时数资料，分析了内江近40年来日照的变化特征。发现，区域平均年总日照时数正以 -46.98
小时/10年的倾向率减少，四季均有减少的趋势，但主要表现在冬、夏两季；区域平均年日照数在1980年附近存在突变现象。
关键词：日照　气候变化　减少　突变

Tan Youbang and Xie Lijuan. 1996. The statistical characteristics for sunshine in the recent 40 years in Neijiang, Sichuan Province. Meteorological Monthly 22(10):27-30.

The changing characteristics of sunshine from 1960 to 1995 in Neijiang are analyzed using the data of the monthly sunshine in Neijiang. The average hours of sunshine in the area is decreasing at the trend rate of –46.98 hours/10 years, and this tendency appears mainly in winter and summer. There were abrupt changes of amount of sunshine hours in the area around 1980.

Keywords: sunshine, climatic change, decrease, sudden change

谢庄, 曹鸿兴, 1996，北京最高和最低气温的非对称变化，
气象学报，54（4）：501-507

运用1940年以来北京历年各个月平均气温资料，对最高、最低气温的非对称特性进行了研究，结论是：1940年以来，北京最低气温呈明显上升趋势，而最高气温反而下降，
40年代北京的增温主要在白天，而80年代则在夜间。
关键词：北京　增温　非对称性

Xie Zhuang and Cao Hongxing. 1996. The asymmetric trend of change in maximum and minimum temperature in Beijing. Acta Meteorologica Sinica 54(4):501-507.

The asymmetric characteristic of the maximum and minimum temperature is studied using the data of mean temperature in Beijing since 1940. (1) Since the 1940s, the minimum temperature increases but the maximum temperature decreases in Beijing; and (2) the temperature increases mainly in the day time in the 1940s but in night time in the 1980s.

Keywords: Beijing, temperature increase, asymmetric character

章名立，曾昭美，季劲钧, 1996，全球增暖过程中亚洲东部区域气候的特点，
地理学报，51（6）：518－526

采用Jones等人的100年全球陆地气温格点资料集，分析亚洲东部（70－

Zhang Mingli, Zeng Zhaomei, and Ji Jingjun. 1996. Characteristics of regional temperature in East Asia during global warming period. Acta Geographica Sinica 51(6):518-526.

The gridded temperature data from 1891-1990 over East Asia (70-140°E, 20-55°N) from Jones et al. was been analyzed. It found that the temperature variations within the region were

140˚E, 20－55˚N）的气温时空变化。发现100年来在全球增暖的过程中，该区的气温变化有明显的区域特色。主要特点为冬季变暖、夏季略变冷。高纬度增温明显，中国的东部和中亚细亚到新疆一带降温，导致这种变化的原因可能与控制因子不同有关，高纬度的变化与温室气体的增加有较大的关系，而副热带纬度的变化可能与副热带大型的环流有关。

关键词：区域气候
全球增暖与东亚气候 温室效应
季风区 温度距平

quite different from global average characteristics. Distinguishing regional features and seasonal variations are as follows: (1) The main warming appeared in winter, and there was no evidence of temperature increasing in summer. (2) There were significant differences between different latitude zones. Temperature increased both in winter and summer seasons at lower latitudes and slightly decreased in the subtropical areas. In higher latitude areas, temperature increased in winter and decreased in summer.

Keywords: regional climate, global warming and climate in East Asia, greenhouse effect, monsoon region, temperature anomaly

曾昭美,
章名立，1996，本世纪海洋云量变化与全球增暖问题，
大气科学，20（2）：149-158

本文分析了1890-1990年间全球海洋总云量。为消除资料中非气候因素的影响，序列被分为3个时段进行讨论。发现本世纪内与气候增暖的同时全球海洋云量有明显的增加，但云量变化落后于全球平均气温变化1-4年，落后于全球平均海温1-2年，且云与温度变化的关系在不同气候带不同，这可能是不同气候带上主要云型不同，以致产生的辐射强迫效应不同。

关键词：全球增暖 海洋云量
海面温度

Zeng Zhaomei and Zhang Mingli. 1996. Variation of ocean cloud amount in the 20th century and global warming. Scientia Atmosphere Sinica 20(2):149-158.

Historical data of total cloud amounts over the global oceans during 1890-1990 are analyzed. The amount of cloud over the global oceans has increased in company with global warming since the end of the 19th century. The growing warming of the climate and the general circulation systems has influenced the variation of cloudiness. The variation of cloud amounts lagged behind global mean air temperature about 1 to 4 years, but lagged behind the sea surface temperature about 1 to 2 years. The correlation between cloud and temperature has opposite signs in different climate zones, mainly as a result of the difference of dominant cloud types in different climate zones.

Keywords: global warming, ocean cloud amounts, sea surface temperature

张光智，张先恭，魏凤英，1996，近百年西北太平洋热带气旋年频数的变化特征，热带气象学报，11(4): 317-323

利用1884-1988 年西北太平洋热带气旋年频数资料，分析了热带气旋年频数的多年变化及其与海面温度、南方涛动指数、太阳黑子数和环流型日数等的统计关系。初步结果表明，热带气旋年频数的变化具有明显的21年、31年、15年和6年左右的周期和持续期平均为12年左右的阶段变化；近百年来有三次较明显的转折，分别出现在1931、1959和1977年。热带气旋年频数在厄尔尼诺年有冬春季偏少、夏秋季偏多的趋势，但在统计上不够显著。在平流层西风位相时，北半球纬向环流的异常发展及太阳活动的增强有助于热带气旋的生成和发展。

关键词：热带气旋　厄尔尼诺　环境变化

Zhang Guangzhi, Zhang Xiangong, and Wei Fengying. 1996. A study on the variations of annual frequency for tropical cyclones in the Northwest Pacific during the last hundred years. Journal of Tropical Meteorology 11(4):317-323.

A study on the variation of annual frequency of tropical cyclone (TC) and its relation with sea surface temperature (SST), Southern Oscillation Index, sunspot relative number, and number of days for specific circulation patterns was made using 1884-1988 data of annual frequency for Northwest Pacific TC occurrence. Preliminary results indicate that there are obvious variations in annual TC frequency for periods of 21, 31, 15, and 6 years and sustaining periods of 12 years on average. Three well-defined processes of inflexion were observed in 1931, 1959 and 1977 over the past hundred years. Results also suggest an insignificant statistical tendency of annual TC frequency decreasing (increasing) in winter/spring (summer/autumn) in the El Niño years. When the stratosphere was in a zonally westerly phase, the Northern zonal circulation would abnormally develop and solar activity would enhance the generation and development of TC.

Keywords: tropical cyclone, El Niño, environmental change

张培忠，杨素兰，1996，阻塞高压活动的气候变化及其中国某些地区旱涝的影响，气象学报，54(5)：633-640

本文利用1965年到1990年逐日500hPa天气图，分析了北半球阻塞高压的活动特征。结果表明，北半球有两大范围阻塞高压活动区；从1965年至1990 年阻高总次数有减少趋势；暖年阻高次数比平均偏少，冷年偏多，且在地理分布上有

Zhang Peizhong and Yang Sulan. 1996. The climate change impact of blocking highs and their effects on drought and flood of some regions of China. Acta Meteorologica Sinica 54(5):633-640.

The climate change impact of blocking highs is investigated using the daily 500 hPa historical synoptic charts from 1965 to 1990. It found that there were two active regions of blocking highs in the Northern Hemisphere. The number of blocking highs had a decreasing trend from 1965 to 1990. The frequency of blocking highs decreased when the temperature was higher than normal and increased in the cold year. The regional distribution of blocking highs for the two typical years has an obviously inverse

很好的相关性；厄尔尼诺年乌拉尔山地区阻高较常年显著偏少。此外，本文还分析了阻高对中国某些地区旱涝的影响，发现内蒙古地区和江淮流域的旱年和多雨年，东半球阻塞高压和数量分布都呈反趋势。

关键词：阻塞高压　气候变化
旱涝

relationship. At the Ural Mountains, there was a large negative anomaly center for the El Niño Southern Oscillation (ENSO) year. Additionally, the effects of blocking highs on drought and flood of some regions of China are analyzed. An inverse distribution of blocking highs was found in the drought years and flood years of the Inner Mongolia Autonomous Region. The same relationship was discovered for the Changjiang River and Huaihe Valley.

Keywords: blocking high, climate change, drought and flood

周亚军，朱正义，1996，
近百年全球海温演变特征，热带气象学报，12(1):85-90

通过对全球各大洋季海温距平的分析，
发现全球近百年海温变化有4大特点。(1)从1860年至1930年，
全球各大洋海温为负距平，
其最大降温出现在1900年至1910年之间，其值约为-
0.4℃。(2)本世纪10年代到60年代温度开始回升，且40年代升温普遍强于60年代。(3)70年代内本世纪第二次明显降温，但其强度不如本世纪初那次大，且持续时间也短，直到目前，海温仍在不断持续上升。(4)各大洋海温在数十年时间尺度中表明出了非常好的同步性。

关键词：全球　近百年海温
演变特征

Zhou Yajun and Zhu Zhengyi. 1996. Evolving features of global SST over the past hundred years. Journal of Tropical Meteorology 12(1):85-90.

Analyses of seasonal anomalies of sea surface temperatures (SST) for the oceans across the globe revealed four major features of variation over the past hundred years. First, the period from 1860 to 1930 was marked by almost monotonous negative anomalies of SST, with the maximum temperature drop (-0.4℃) taking place in 1900-1910. Second, SST rose during the period from the 1910s to the 1960s, and the amplitude of the temperature rise was generally larger in the 1940s than that in the 1960s. Third, the second significant SST falling in this century occurred in the 1970s with weaker intensity and shorter duration than that in the first. Up to now, the global SST has been generally in a stage of persistent rise. Fourth, in a global range, the SST for all of the oceans performed perfect simultaneity at the scales of dozens of years.

Keywords: globe, past hundred years SST, evolving features

周陆生，汪青春，1996，青海湖水位年际变化规律的分析和预测，高原气象，15(4):478-484

利用青海湖沙陀寺水文站1959-1992年的水位资料，分析了前期气候类型、北太平洋海温、厄尔尼诺事件以及北极海冰对湖水位年际变化的影响，得到了一些有预报价值的因子，并采用贝叶斯逐步判别法对次年水位变化的3种状态进行了预测。

关键词：水位年际变化　气候类型　北太平洋海温　北极海冰

Zhou Lusheng and Wang Qingchun. 1996. Analysis and forecast for interannual variation of the Qinghai Lake's water level. Plateau Meteorology 15(4):478-484.

The influence of antecedent climatic type, sea surface temperature (SST) of the North Pacific Ocean, Arctic sea ice, and El Niño on the interannual variation of the Qinghai Lake's water level are analyzed on the basis of Shatuosi hydrologic station's data from 1959 to 1992. The results are to be used to forecast the three states for next year's water level variation using Bayers successive discrimination method.

Keywords: water level interannual variation, climatic type, SST of North Pacific Ocean, Arctic sea ice

张寅生，姚檀栋，蒲健辰，1996，唐古拉山冬克玛底冰川平衡线高度附近的能量平衡，冰川冻土，18（1）：10-19

本文以连续的、至少一年的观测资料对青藏高原唐古拉山冬克玛底冰川平衡线高度附近的辐射平衡及能量交换特征进行了计算分析。冰川表面独特的下垫面性质使其净辐射值全年有5个月左右为负；潜热交换量基本与净辐射成反向的季节变化；感热交换全年均为正值而成为该冰川表面主要热源之一；传导热交换量对能量平衡的贡献很小。该冰川表面的能量交换水平季节变化明显，冰川表面气温季节变化与净辐射关系密切。冰川表面气温对总辐射通量变化的敏感性系数与其反射率及吸收辐射通量关系密切。

关键词：冬克玛底冰川　辐射平衡　能量交换

Zhang Yinsheng, Yao Tandong, and Pu Jianchen. 1996. Energy budget at the equilibrium line altitude (ELA) of Dongkemadi Glacier in the Tonggula Mountains, Tibetan Plateau. Journal of Glaciology and Geocryology 18(1):10-19.

The solar radiation budget and energy balance were analyzed based on a long time series observation in an automatic station set on the equilibrium line altitude (ELA) of Dongkemadi Glacier. At the observation point, the annual mean air temperature is -9.8℃, the annual mean air vapor pressure is 2.6 hpa, and the annual wind speed is 4.3 m/s. The annual amount of global radiation that reaches the surface of the glacier is about 7300 MJ/m^2, only 1/4 of which is absorbed by the glacier. The net radiation is positive from April to October but negative for the rest of the year. The latent heat flux has a seasonal variation in the opposite direction from net radiation. The conductive heat flux is insignificant in the energy budget on the glacier surface. Both the energy-exchanging level and the energy-exchanging coefficient are large in summer and winter. The sensitivity coefficient of air temperature above the glacier to variation of global radiation correlates well with albedo and absorbed radiation.

Keywords: Dongkemadi Glacier, radiation budget, energy exchange

叶佰生，赖祖铭，施雅风，1996，气候变化对天山伊犁河上游河川径流的影响，冰川冻土，18（1）：29-36

本文用水量平衡模型研究了气候变化对天山降雪比较丰富的伊犁河上游河川径流的影响。研究表明，作为西北干旱区水资源主要形成区的山区，由于气温较低和降水丰富，未来气候变化对水资源量的影响将主要取决于降水量的变化，气温升高的影响相对较小。气候的变暖，一方面使径流的年内分配发生变化，月径流峰值减小，时间提前，春季径流增加，而其余季节径流减少，其中夏季减少最多；另一方面将使年径流量的变率增大，这对水资源的利用极为不便。

关键词：气候变化　高寒山区　径流

Ye Baisheng, Lai Zuming, and Shi Yafeng. 1996. The effect of climate change in the Yili River in the Tianshan Mountains. Journal of Glaciology and Geocryology 18(1):29-36.

The river runoff changes in the Yili River basin are estimated under various future climatic scenarios using the river runoff model based on water balance. The impact of future climatic warming on water resources will depend on changes in precipitation rather than on a rise in air temperature because of the low air temperature and rich precipitation in the mountains. The future climatic warming would change the distribution and lower the peak of runoff. The runoff peak would occur earlier. Spring runoff would increase with a corresponding decrease of runoff in other seasons, particularly in the summer. Considerable change in runoff would occur with climatic warming and variational differences of runoff would increase with the shrinking of glacier area, and this would be unfavorable for the utilization of water resources.

Keywords: climate change, cold mountain region, runoff

李培基，1996，北极海冰与全球气候变化，冰川冻土，18(1)：72-80

海冰仅占大洋面积的7%，然而它所引起的海气之间热量、动量和物质交换的改变却十分显著。最近有关北极海冰在全球气候系统中作用的研究发现，北冰洋边缘海域大洋深水的形成与海冰发育有关。海冰冻融过程对盐度层结具有重要影响，海冰变化可引起盐度突变层的再变和热盐环流的突然停止。热盐环流的变化与北大西洋海冰10年际变化相联系，北大西洋气候的不稳定性与热盐环流变化密切相关。北极海冰-海洋-大气间耦合作用，使北极海冰构成了北大西洋和全球气候反馈循环中的重要环节。

Li Peiji. 1996. The Arctic sea ice and climate change. Journal of Glaciology and Geocryology 18(1):72-80.

Sea ice in the Arctic ocean, which covers large areas, and its transport into the North Atlantic represents a freshwater flux comparable to that of continental runoff and affects salinity stratification through brine rejection during freezing, transport, and melting. Salinity stratification is critical to the vertical circulation of the high-latitude ocean. Variation in sea ice may cause a great salinity anomaly or halocline catastrophe that can alter or stop convection. Evidence suggests that climate variations from decadal to millenial time scales are linked to the sea ice interaction with the thermohaline. This strong coupling between the Arctic sea ice, ocean, and atmosphere implies that variations in sea ice are involved in high-latitude and global climate feedback processes.

Keywords: Arctic sea ice, North Atlantic Deep Water (NADW), thermohaline circulation, climate variability

关键词：北极海冰　北大西洋深水
热盐环流　气候变化性

丁永建, 1996,
1980年以来冰冻圈对气候变暖响应的若干证据,
冰川冻土，18（2）：131-139

在最近几十年内，全球气候在波动中趋于变暖，冰冻圈作为气候的直接产物对气候变化具有非常敏感的反应。山岳冰川物质平衡80年代较 60-70年代平均减少近173mm，相当于冰川敏感值升高约0.38℃，对气候变化反映敏感的小冰川（长度小于2Km）退缩比例增加了15％－20％；冻土层中温度亦显示出强劲增势，冻土融深、冻土界限的变化已有所表现。半球年平均雪盖面积80年代比70年代减小约4％。种种迹象表明这种变化进入80年代以来更为明显，冰冻圈内正发生着显著的变化。
关键词：冰川物质平衡　冰川变化
冻土温度　雪盖面积　冰冻圈
全球变暖

Ding Yongjian. 1996. Response of the cryosphere to climatic warming since 1980 in the Northern Hemisphere. Journal of Glaciology and Geocryology 18(2):131-139.

In the recent decades, especially after 1980, global warming has become more and more obvious. The cryospherical system of glaciers, snow cover, and permafrost is clearly reacting to the warming climate. Glacier mass balance shows an accelerating negative tendency within the main glacier regions of the Northern Hemisphere. The average mass balance in the 1980s in the Northern Hemisphere was reduced by 1.3 times compared with that in the 1960s and 1970s corresponding to a rise of 0.38°C in air temperature. The retreating number of small glaciers (less than 2 km in length), which appears to be very sensitive to climate change, has increased 15% to 20% in the 1980s compared with the numbers in the 1960s and 1970s. Permafrost temperature also shows a significant increase. The permafrost table and the altitude of the permafrost lower limit in the northeast region of China are changing with climate warming. Average area of snow cover in the Northern Hemisphere was reduced by approximately 1 million km^2 for the 1980s compared with the 1970s which equals a decrease of 4% in area of snow cover. Various indications show that the cryospherical system has changed with global warming.

Keywords: glacier mass balance, glacier variation, permafrost temperature, snow cover, cryosphere, global warming

杨新元,
韩添丁，1996，乌鲁木齐河源气温和降水的变化趋势及其对冰川影响，冰川冻土，18（2）：189-193

乌鲁木齐河径流来源主要为降水、高山积雪、冰川融水及地下水。近30年来由于夏季气温的回升及降水量减少导致了冰川减薄。本文以大西沟气象站的气温、降水资料及1号冰川物质平衡观测值为主进行趋势计算，从中了解60年代初至90年代初的变化规律及气温、降水对冰川的影响。乌鲁木齐河上游冰川区域夏季（6-8月）平均气温回升了0.14℃；而6-8月降水总量减少了24mm，7-8月降水总量减少19mm，年降水量减少17mm；近30年来1号冰川平均每年减薄140mm水层，90年代初冰川减薄厚度平均每年达181mm水层。根据趋势分析，冰川厚度减薄仍在增大。

关键词：温度　降水　径流　消融

Yang Xinyuan and Han Tianding. 1996. The variation trends of temperature and precipitation and their influence on glaciers in the headwaters of the Urumqi River. Journal of Glaciology and Geocryology 18(2):189-193.

The runoff in the Urumqi River mainly depends on precipitation and snow and ice meltwater. Because of the summer warming and precipitation reduction during the last 30 years, the glaciers are thinning. This article discusses the influence of temperature and precipitation on glaciers. Precipitation has decreased 19 mm (July-August) or 24 mm (June-August), and the mean summer (June-August) temperature has increased 0.14°C in the glaciated region in the Urumqi River from the beginning of the 1960s to the beginning of the 1990s. The annual precipitation has decreased 17 mm. Glacier No. 1 has thinned 140 mm per year in the nearly 30 years. A thinning rate of 181 mm per year was measured from 1991 to 1993. It is expected that the thinning rate will increase.

Keywords: temperature, precipitation, runoff, melting

方小敏，陈富斌，施雅风，李吉均，1996，甘孜黄土与青藏高原冰冻圈演化，冰川冻土，18（3）：193-200

青藏高原的隆起对亚洲季风乃至全球变化有着明显的影响。青藏高原何时进入冰冻圈和高原上最大冰期发生于何时是冰川学和全球变化研究中两个非常关键的问题。逐样系统交变退磁磁性测量表明：86m的甘孜黄土剖面形成于约81.84×10^4a BP 前。

Fang Xiaomin, Chen Fubin, Shi Yafeng, and Li Jijun. 1996. Garze loess and the evolution of the cryosphere on the Tibetan Plateau. Journal of Glaciology and Geocryology 18(3):193-200.

The uplift of the Tibetan Plateau has great influence on the Asian monsoon and global change. The loess section in the Tibetan Plateau is the result of the uplift of the plateau. Magnetic polarity dating of an 86-m loess section at Garze on the southeastern Tibetan Plateau demonstrates that the bottom of the section was formed 818.4 ka BP. Analysis of various quartz sands in the section indicates that the plateau uplifted above the snow line and began to develop glaciers at least 818.4 a BP ago. Soon afterward (ca. 760 ka BP), glaciers reached their maximum, and may have

剖面中黄土石英砂类型分析揭示出至少约81.84×10^4a BP前冰川规模达到最大，并持续至约53×10^4a BP前。倒数第二次冰期时冰川规模次之，然后冰川规模明显减少。同时揭示出大气环流和环境在约81.84×10^4，60×10^4和17.8×10^4a BP前发生过较明显的改变或调整与增强，它们是青藏高原隆起阶段性环境突变效应的产物。

关键词：甘孜黄土　青藏高原　形成年代　最大冰期

persisted to about 530 ka BP. The second largest glaciation developed during the penultimate. Since the penultimate, the scale of glaciers has decreased greatly. The analysis also suggests that air circulation and the environment experienced sharp changes or adjustments and enhancement at about 818.4 ka BP, 655 ka BP, and 175 ka BP. These changes in air circulation and environment might be the results of accompanying environmental abrupt changes at some critical heights of the plateau with the sudden uplift.

Keywords: Garze loess, Tibetan Plateau, dating, Quaternary maximum glaciation

陈建明，刘潮海，金明燮，1996，重复航空摄影测量方法在乌鲁木齐河流域冰川变化监测中的应用，冰川冻土，18（4）：331-336

本文介绍了重复航空摄影测量对比成图方法在监测乌鲁木齐河流域冰川规模和形态要素变化中的应用，以及成图过程中对控制加密和精度等问题的处理。检验表明，重复航空摄影测量对比成图方法能较准确地测量冰川长度、面积和储量等形态要素的变化量，可以用于区域冰川变化的监测研究。测量资料表明，1964-1992年间，乌鲁木齐河流域155条冰川的规模均在缩小，冰川末端平均后退率为12.4%，面积平均缩小率为13.8%，冰储量减少15.5%。

关键词：航空摄影测量　对比成图　冰川变化

Chen Jianming, Liu Chaohai, and Jin Mingxie. 1996. Application of repeated aerial photogrammetry to monitoring glacier variation in the drainage area of the Urumqi River. Journal of Glaciology and Geocryology 18(4):331-336.

This article introduces the application of a comparative method that uses repeated aerial photogrammetric mapping to monitor the variation of glacier size and morphologic factors in the drainage area of the Urumqi River. The article also discusses the management control and accuracy of the method. The detection shows that the method with higher accuracy can be used to determine the variation of morphologic factors of glacier variation. The measurement data show that 155 glaciers in the drainage area of the Urumqi River all retreated from 1964 to 1992, with an average retreating rate of the glacier terminus of 12.4% and an average reducing rate of the glacier area of 13.8% as well as a loss of 15.5% of ice storage.

Keywords: aerial photogrammetry, comparative mapping, glacier variation

章新平,
姚檀栋，1996，青藏高原东北地区现代降水中δD与$\delta^{18}O$的关系研究，冰川冻土，18（4）：360-365

本文通过对取自青藏高原东北地区部分降水样中的氢氧稳定同位素比率的分析得到以下结论：沱沱河站的大气水线（MWL）为：$\delta D=8.25\delta^{18}O+9.22‰$，与全球平均MWL的差别较小；德令哈、西宁站的MWL分别为：$\delta D=5.86\delta^{18}O-27.28‰$和$\delta D=6.96\delta^{18}O-30.19‰$，均与全球平均MWL差别较大。这主要归因于水汽源地的非平衡蒸发和凝结物在非饱和大气中降落时的非平衡蒸发。上述地区的过量氘Ex d（$=\delta D-8\delta^{18}O$）具有较大的波动范围，并且与δD存在显著的正相关关系。这说明过量的氘在很大程度上受非平衡蒸发过程中氘分流速度率的制约。分析表明，青藏高原东北地区的暖季，来自海洋的水汽具有较低的稳定同位素比率和过量氘；来自本地区蒸发的水汽具有较高的稳定同位素比率和过量氘。

关键词：青藏高原
稳定同位素比率
过量氘　大气水线

Zhang Xinping and Yao Tandong. 1996. Relationship between δD and $\delta^{18}O$ in precipitation at present in the northeast Tibetan Plateau. Journal of Glaciology and Geocryology 18(4):360-365.

The application and understanding of stable isotopic ratio in ice core has become very important today. The meteoric water line (MWL) of Tuotuohe Station is obtained as $\delta D = 8.25\delta^{18}O + 9.22‰$ according to the analysis of the samples from some regions of the northeast Tibetan Plateau. This result is similar to that of the globe. But the results of MWL of Delingha and Xining Stations, which are $\delta D = 5.86\delta^{18}O–27.28‰$ and $\delta D = 6.96\delta^{18}O–30.19‰$, respectively, are different from that of the globe. Excess deuterium (Ex d) in the regions mentioned above has great fluctuation, and there is a positive relationship between Ex d and δD. Analyses show that in the northeast Tibetan Plateau the vapor from oceans has a low stable isotopic ratio and Ex d and the vapor from the evaporation in the Plateau has a high ratio and Ex d.

Keywords: Tibetan Plateau, stable isotopic ratio, excess deuterium, meteoric water line

*靳鹤龄，董光荣，李森*等，1996，800Ka BP 来西藏“一江两河”中游地区的气候与西南季风变化，中国沙漠，16(1)：9-12

位于青藏高原温带半干旱季风气候区的“一江两河”中游地区发现了较 多含古土壤的黄土地层，

Jin Heling, Dong Guangrong, Li Sen, et al. 1996. The climate and southwest monsoon change in the middle “One River Two Tributaries” Basin, Tibet, since 0.8 ma BP. Journal of Desert Research 16(1): 9-12.

This paper discusses the climate and southwest monsoon change in the temperate and semi-arid monsoon areas in the middle Yarlung Zangbo River Basin in Tibet which is usually called “One River Two Tributaries.” The study indicates that

记录着丰富的气候和西南季风演变信息。该地区风成地层沉积时代、沉积相和磁化率等研究结果表明，早在 800Ka BP
前西南季风就已存在，受全球气候波动和青藏高原隆起的影响，其盛行衰变与东南季具有较好的一致性，主要表现为本区地层所记录的气候变化信息不如东南季风区详细，而且西南季风因高原屏障作用给本区带来的降水愈来愈少，气候明显向干冷发展。

关键词：青藏高原　风成堆积
季风变化

the southwest monsoon circulation had existed since before 0.80 ma BP, and that climate change in this area coincides with that in eastern China, but with differences between them. It shows mainly that the climate had been becoming cold-dry in this area since 518 ka BP as a result of glacial/interglacial climatic fluctuations and Qinghai-Xizang Plateau uplift.

Keywords: Qinghai-Xizang Plateau, aeolian deposition, monsoon change

马继瑞，田素珍，郑文振，1996，太平洋水位站相对海平面升降趋势分析，海洋学报，18(5):14-21

根据太平洋236个站月平均水位周期成分的分析结果，用周期成分加线性趋势拟合月平均水位序列。结果表明，若不计海平面的异常升降值，太平洋相对海平面平均上升率为1.16mm/a。由于陆地沉降不一致等影响，使太平洋相对海平面的升降区域性变化较大。按线性趋势项的正负及海区的地理位置，对包括中国近海、东南亚近海在内的太平洋海平面的升降进行了区划，求出各海区的平均升降率，得到整个太平洋、北美西海岸、南美北部和中部近海、热带太平洋大部及日本群岛近海相对海平面的升降趋势与有关文献的结果基本一致。

关键词：太平洋　海平面　非线性
二阶谱　谱分析　周期成分
线性趋势

Ma Jirui, Tian Suzhen, and Zheng Wenzhen. 1996. The analysis of sea level variations in the Pacific Ocean. Acta Oceanologica Sinica 18(5):14-21.

According to the analysis of period components in the monthly mean sea level variation from 236 tide gauge stations in the Pacific, a monthly mean sea level series is fit by using significant period components plus the linear trend. The results of the linear trend show that if the abnormal rise of sea level isn't considered, the rate of relative sea level rise in the Pacific is 1.16 mm/year. Because of inconsistent earth subsidence, the regional difference of sea level variations in the Pacific is notable. Sea level variation of various oceans in the Pacific is assigned zones according value of linear trend and geographical position. The average rates of sea level variations in various oceans are obtained, and the results are consistent with historical records.

Keywords: Pacific Ocean, sea level, nonlinear, bispectrum, spectral analysis, period components, linear trend

East Asia Monsoon

施能，朱乾根，吴彬贵，1996，近40年东亚夏季风及我国大尺度天气气候异常，大气科学，20（5）：575-583

用近40年资料研究了东亚夏季风与我国夏季大尺度天气的关系。指出，强夏季风时，我国夏季大范围高温。东亚夏季风与我国夏季降水的关系则表现在夏季雨带的南北位置上。强夏季风时，雨带偏北。夏季雨带偏南均与弱季风有关。长江中下游的涝年与弱季风有关，而强夏季风时，长江中下游经常是旱年。最后，研究了强、弱夏季风年时的北半球500hPa环流异常特征，结果表明，东亚夏季风强度是造成我国夏季气温、降水异常的主要原因。

关键词：东亚夏季风　强度指数　雨带　长江中下游

Shi Ning, Zhu Qiangen, and Wu Bingui. 1996. The East Asian summer monsoon in relation to summer large-scale weather climate anomaly in China for the last 40 years. Scientia Atmospherica Sinica 20(5):575-583.

The relation of the East Asian summer monsoon (EASM) to the rainfall and temperature over China is investigated using data from the past 40 years. The investigation shows that when a strong monsoon occurs, China experiences an extensive high temperature in summer. The EASM effect on summer rainfall in the mainland is displayed in the meridional position of the rainbelt. The position of the summer belt moves northward (southward) from its mean position when the summer monsoon is strong (weak). Flooding (drought) years over the middle and lower reaches of the Changjiang River are related to the weak (strong) monsoon. Finally, the northern 500-hPa summer circulation feature for the years of the strong and weak EASM are examined and the results indicate that the EASM intensity represents a main factor for the temperature and rainfall anomalies over China in summer.

Keywords: East Asian summer monsoon, intensity index, rain belt, middle and lower reaches of the Changjiang River

庞奖励，黄春长，1996，黄土高原晚更新世黄土与古季风研究进展，干旱区地理，19(2)：1-8

作者综合评述了近十年来中外学术界在黄土高原晚新世黄土与古东亚季风演变规律相互联系上的研究进展。

关键词：黄土　晚更新世　东亚季风　黄土高原

Pang Jiangli and Huang Cunchang. 1996. Progress in the studies of the loess and the evolution of the East Asian Monsoon on the Loess Plateau during the late Pleistocene. Arid Land Geography 19(2):1-8.

Loess stratigraphy has been shown to bear a variety of information on past global change. The loess-paleosol sequence is a well-preserved materialized record of the glacial-interglacial cycles, which is now confirmed by various proxy climatic indices obtained from many loess profiles on the Loess Plateau of China. In this paper, progress in the studies of loess and the evolution of the East Asian Monsoon on the Loess Plateau during the late Pleistocene are reviewed.

Keywords: loess, late Pleistocene, the East Asian Monsoon, loess plateau

熊尚发，刘东生，丁仲礼，1996，东亚冬、夏古季风变化的相位差及热带太平洋在季风变化中的驱动作用，第四纪研究，（3）：202-210

对北京斋堂黄土剖面进行高分辨率古气候研究。结果显示：1）冬、夏季风在千年尺度上的变化存在相位差；2）冬夏季风记录在变化趋势上具有互为消长的关系，而在变化幅度和频率方面则有明显的差异。这表明，冬、夏季风在千年尺度的变化是分别由不同的因素和过程所控制。

关键词：黄土　古季风　相位
热带太平洋

Xiong Shangfa, Liu Dongsheng, and Ding Zhongli. 1996. Phase difference between summer and winter paleomonsoon variations over East Asia and the tropical Pacific forcing of monsoon evolution. Quarternary Sciences (3):202-210.

Results from analysis of a high-resolution paleoclimatic record of the Zhaitang loess sequence in Beijing reveal: (1) An apparent phase difference of the summer and winter monsoon change and (2) that differences of the summer and winter monsoon change are distinguishable in some aspects, and summer and winter monsoon variations are not always matched to each other. These scenarios indicate that summer and winter monsoons over East Asia are not dominated by the same factors and mechanisms.

Keywords: loess, paleomonsoon, phase, tropical Pacific

Historical Climate Change

刘洪滨，吴祥定，邵雪梅，1996，采用树轮图象分析方法以研究历史时期气候变化的可行性，地理研究，15(2)：44-51

采用图象分析方法，对中国四川省西部采集到的川西云杉进行气候变化研究的可行性分析，同时与其它方法得到的结果进行对比。对比分析表明，图象分析得到的年轮宽度序列与宽度仪的测量结果基本相同；而年轮宽度 与年轮灰度序列之间不存在明显关系，其差异可能是不同环境因子作用的结果。图象分析得到的川西云杉年轮灰度年表在反映某些气候要素变化上优于年轮宽度年表，并以年轮最小灰度，年轮平均灰度和晚材平均灰度尤为突出。川西云杉年轮灰度主要受初春月平均最高气温的影响，且两者为负相关关系。

Liu Hongbin, Wu Xiangding, and Shao Xuemei. 1996. A preliminary study on climate change research during historical time using image analysis of tree rings in the Kangding area, Sichuan Province. Geographica Research 15(2):44-51.

The possibile use of tree-ring image analysis with *pinus balfouriana* sampled from West Sichuan Province in climate change research for historical time in the Kangding area is studied. There is almost no difference between the ring-width series derived from image analysis and from instrumental ring-width measurement, but the relationship between the series of gray value parameters is not as close as that of the series of ring-width parameters. Gray value chronologies from image analysis are superior to ring-width chronologies in indicating some climate factors, especially the minimum gray value, average gray value, and later wood gray value.

Keywords: climate change, tree ring, image analysis

关键词：气候变化　川西
树木年轮　图象分析

莫多闻, 李非,
李水城，1996，甘肃葫芦河流域中全新世环境演化及其对人类的影响，地理学报，51（1）：59-69

利用甘肃葫芦河流域第一阶地剖面的地层观察资料，对秦安大地湾附近第一阶地沉积剖面的沉积相、粘土矿物、碳酸钙、孢粉等古环境指标进行了分析，恢复了该地区大约距今8000年至3000左右的环境演变过程。并对该地区古环境变化与人类活动规模及古文化特征变化之间的关系进行了讨论。
关键词：葫芦河流域　中全新世
古环境演变　人类活动

Mo Duowen, Li Fei, and Li Shuicheng. 1996. A preliminary study of the Paleoenvironment of the Middle Holocene in the Hulu River area in Gansu Province and its effects on human activity. Acta Geographica Sinica 51(1):59-69.

The paleoenviroment is reconstructed by the analysis of proxy data from sedimentary characteristics, clay minerals, carbonates, and pollens in the deposits on the terrace near Dadiwan, Qinan. Also, the relationships of paleoenviroment change with size of communities and the characterization of ancient civilization are discussed. The results show that climate change played a big role in the development of ancient civilization in the region. Parallel to the appearance and development of the first stage of Dadiwan, the suitable climate from 8000 to 7000 a BP was important to the stable development of Yangshao civilization. After 5000 a BP, the climate was drier, which was suggested to be a major cause of the decreasing size of communities and the recessing of ancient civilization in this area.

Keywords: Hulu River area, middle Holocene, paleoenvironment evolution, human activity

苗丰民，李淑媛，
庄振业，1996，辽东湾东部砂岸的近期变化及演变趋势，海洋学报，18(2)：75-84

根据鲅鱼圈观测站近30年(1963-1991年)的波浪资料，结合水准测量以及若干简易标致桩跟踪监视，并借助地方志及不同时期地形图对比等资料，讨论了区域沿岸泥沙演变特点。

Miao Fengmin, Li Shuyuan, and Zhuang Zhenye. 1996. Modern change and evolutionary tendency of the sand coast in the eastern area of Liaodong Gulf. Acta Oceanologica Sinica 18(2):75-84.

The present situation of the coastline and the causes of sand coastal recession and its serious consequences are analyzed using the wave data of a 27-year period (1963-1991) at the Bayyuquan Observation station in Liaodong Gulf, together with monitoring by beach leveling and some simple marking stakes and by the aid of local

同时，采用沿岸输沙模式，一线蚀淤理论及动水型理论(海平面上升)对区域岸线的今后动态进行了预测。
关键词：辽东湾东部　砂岸
岸滩演变

annals. Then the dynamic processes of alongshore sand transport are discussed. Simultaneously, a preliminary estimate of future beach processes in the area is made on the basis of an alongshore sand transport model, one-line cut-and–fill theory, and a dynamic water model (sea-level rise).

Keywords: eastern area of Liaodong Gulf, sand coast, coastline evolution

聂宝符，1996，五千年来南海海平面变化的研究，第四纪研究，（1）：80-87

礁坪面是古海面的极好标志。通过分析大量古高海面礁的资料，证实了南海出现过至少比现今高2-3米的高海面。
关键词：高海面　珊瑚礁　南海

Nie Baofu. 1996. Sea-level change of the South China Sea in the past 5000 years. Quarternary Sciences (1):80-87.

The reef flats are thought to be an indicator of sea-level change. It is proved that the high sea level that occurred in about 5000 a BP in the South China Sea was 2 to 3 m higher than the current sea level from a lot of data on the reef flats.

Keywords: high sea level, coral reef, the South China Sea

陶发祥，洪业汤，1996，贵州草海地区最近8ka的气候变化，科学通报，41(16): 1489-1492

通过对泥炭纤维素 $\delta^{13}C$和 $\delta^{18}O$的测定，本文研究了贵州草海地区最近8Ka的气候变化。过去8ka间，草海地区发生了明显的冷暖和干湿变化，该区泥炭档案记录了北半球冰后期的几次新冰期和中世纪温暖期等半球性气候事件，这说明该区对全球变化是敏感的；最近8ka，草海地区气候表现了暖湿和冷干的特点。
关键词：　泥炭纤维素　碳氧同位素
气候变化

Tao Faxiang and Hong Yetang. 1996. Climatic change over the past 8000 years in the Caohai District, Guizhou. Chinese Science Bulletin 41(16):1489-1492.

Climatic change over the past 8000 years in Caohai, Guizhou is studied using the $\delta^{13}C$ and $\delta^{18}O$ values of peat cellulose. The peat archives in the area have information that indicates the hemispheric climatic events, such as three new ice ages and the Medieval Warm Period that occurred in the Northern Hemisphere. These data indicate that the climate of Caohai might be sensitive to global environmental changes. Also, the authors believe that there was a typical variation of the warm-moist/cool-dry climate in Caohai during the past 8000 years.

Keywords: peat cellulose, carbon and oxygen isotope, climatic change

王承义，
胡扬斌，1996，新疆伊犁地区近250年冷暖变化特征分析，干旱区地理，19（3）：37-44

利用伊犁地区22个树轮年表，重建了该地区250年平均温度序列，并对其周期冷暖变化特征进行了分析，对未来趋势作了预测。该地区250年中存在3个偏冷期和4个偏暖期，温度序列具有166、83、11、2.2年较为稳定的变化周期，平均温度变化目前正处于偏暖时期，此后到2005年进入下降时期。
关键词：冷暖变化特征　伊犁地区　树木年轮

Wang Chengyi and Hu Yangbin. 1996. Analysis of the characteristics of cold-warm climatic variation in the last 250 years of Yili, Xinjiang, China. Arid Land Geography 19(3):37-44.

The annual mean series of temperature at Yili, Xinjiang, China for the last 250 years is reconstructed using tree-ring data. Characteristics of warm/cold change are analyzed from this series. The results indicate that there were three cold periods and four warm periods by 166, 83, 11, and 2.2 years respectively.

Keywords: cold-warm climatic variation, Yili region, tree-ring

吴丰昌，万国江，
黄荣贵，1996，贵州红枫湖纹理沉积物中近代气温记录，地理科学，16（4）：345-350

定量评估了红枫湖早期成岩化学作用对沉积物碳酸盐沉积记录的影响程度，通过纹理年代学校正柱芯的碳酸盐地球化学剖面和近代流域气温资料对比研究，表明碳酸盐总量和Ca/(MgO.Al2O3)比值可作为湖泊近代气温变化的敏感代用标志。
关键词：纹理沉积物　气温记录　碳酸盐　地球化学　红枫湖

Wu Fengchang, Wan Guojiang, and Huang Ronggui. 1996. Recent temperature records of annually laminated sediments in Hongfeng Lake, Guizhou. Acta Geographical Sinica 16(4):345-350.

The influence of the early diagensis process on lake sedimentary carbonate at Hongfeng Lake is analyzed through comparison of the carbonate geochemical profile in the core, calibrated to mass-depth from varve-counting dating, with recent annual temperature data. It found that carbonate concentration and the Ca/MgO.Al2O3 ratio can be used as a high-solution temperature index in recent lake sediments.

Keywords: annually laminated sediments, temperature records, carbonate, geochemistry, Hongfeng Lake

张志华，
吴祥定，1996，祁连山地区1310年以来湿润指数及其年际变幅的变化与突变分析，第四纪研究，（4）：368-378

为研究祁连山地区的气候变化与气候突变，用树木年轮资料重建了祁连山地区5~7月份1310年以来的湿润指数序列M（i）以及湿润指数年际变幅序列MV（i）。对两个序列分别进行了等级分类和干湿、强弱的时段分析，并用最大熵谱分析法对这两个序列的不同时段分别进行了周期分析，显示祁连山地区湿润指数及其年际变幅有明显的周期性。采用HK突变检验方法对这两个序列分别进行了突变分析，发现祁连山地区的湿润指数及其年际变幅存在明显的突变年份。
关键词：湿润指数
湿润指数年际变幅　气候突变

Zhang Zhihua and Wu Xiangding. 1996. The change and rapid shifts of moisture index and its annual variability since A.D.1310 in the Qilianshan area. Quaternary Sciences (4):368-378.

In order to study climate change and abrupt change of climate, the moisture index (May to July) time series M(i) since A.D. 1310, was obtained from tree-ring chronologies in the Qilianshan Mountains (38°51'N, 100°08'E, 3500 m). A time series of the annual moisture index variability MV(i) was also made. The M(i) and MV(i) were classed into five grades and were analyzed using maximum entropy spectrum. Results indicate significant periodic climatic variation. Discontinuous changes of the M(i) and MV(i) are detected by the Lepage test, and results show that there was obvious abrupt change of moisture in the Qilianshan Mountains over the last 680 years.

Keywords: moisture index, annual moisture index variability, rapid climate shift

张青松，李元芳，杨惟理，1996，北极巴罗Elson泻湖过去450年气候与环境变化记录，第四纪研究，（3）：211-220

对北极巴罗地区Elson泻湖 AB-67站孔岩芯进行了^{210}Pb测年、沉积物粒度、有机质、化学元素和微体古生物化石等分析。结果显示：巴罗地区过去450的气候、环境变化过程存在如下3个阶段：1）1540-1740 年为低海面寒冷时期；2）1740-1827年为气候转暖-海侵过渡时期；3）1827年至今为继续海侵-气候波动变暖时间。另外，

Zhang Qingsong, Li Yuanfang, and Yang Weili. 1996. Climatic and environmental change over the past 450 years recorded in Elson Lagoon at Barrow, Alaska. Quaternary Sciences (3):211-220.

An unfrozen 60-cm-deep lake deposit core (AB-67) from Elson Lagoon at Barrow, Alaska, is analyzed for ^{210}Pb, grain size, organic materials, environmental geochemical elements, micro-fossils, etc. The results show that three stages of climatic and environmental changes occurred in the Barrow area over the past 450 years: (1) From 1540 to A.D. 1740 was a relatively cold stage with a low sea level; (2) from 1740 to A.D. 1827 was a transitional stage of warming and transgression; and (3) after A.D. 1827 was a fluctuating warming stage followed by sea-level rising.

Keywords: Arctic, lagoon, climatic and environmental change

本研究还就若干海面变化事件和未来气候变化趋势进行了讨论。
关键词：北极　泻湖
气候与环境变化

Impacts

徐文铎，
邹春静，卜军，1996，全球变暖对中国东北植被的影响及对策，地理科学，16(1)：26-36

中国东北植被对全球变暖的响应如下：未来建群种的变动类型分为三个类群；气候变暖后，植物种群将向北迁移400~700km，向上迁移250~350m；栽培作物的界线有所变化；大部分植物物候发育将提前一个节律；主要森林生态系统生产力将提高7.65%，农业生态系统生产力将提高36.4%。
关键词：全球变暖　水热指标

Xu Wenduo, Zou Chunjiang, and Bu Jun. 1996. The influence of global warming on vegetation in northeast China and measures to be taken. Scientia Geographica Sinica 16(1):26-36.

According to the prediction of general circulation models (GCM) by the middle of the next century, the concentration of CO_2 in the atmosphere will be doubled and the global temperature will increase about 2°C. The vegetation response to global warming in northeast China will include the following changes: (1) The future alternative types of edificators (builders) can be divided into three types (extending population; retreat population; extinct population). (2) The edificators will move northward about 400 to 700 km and the population move upward 250 to 350 m. (3) The distribution border of cultivated crops will move. (4) The growth period of plants will extend 15 days and the phenological development of trees will roughly advance one season. (5) The productivity of the main forest ecosystem will increase 7.65% and that of main agroecosystems will increase 36.4%.

Keywords: global warming, moisture-temperature indexes

王修兰，1996，
全球农作物对大气CO_2及其倍增的吸收量估算，气象学报，
54(4)：466-473

根据农作物产量资料（FAO，1992年），计算出中国和全球各种农作物

Wang Xiulan. 1996. The estimation of crop absorbing CO_2 under current and doubling CO_2 conditions in the World. Acta Meteorologica Sinica 54(4):466-473.

The CO_2 absorption from crops has been estimated on the basis of crop production data (FAO, 1992). It is about 550 million tC/year in China and 2890 million tC/year in the world.

对CO_2的吸收量分别为5.5×10^8 t/aC和28.9×10^8t/aC。同时以不同CO_2浓度下小麦、玉米、大豆等全生育期光合速率实验数据直接计算的C吸收量为对照，与相应的中国产量资料计算结果比较，两者相差2.6%。从而进一步依据作物对CO_2倍增反应诊断实验结果，推算出大气CO_2浓度比目前倍增（700ppm）条件下，中国和全球农作物吸收CO_2总量将增长21%－26%，分别为6.6×10^8 －6.9×10^8 t/aC和34.1×10^8 －36.2×10^8 t/aC。研究还表明，单位面积作物年吸收C量全球［3.2 t/(hm^2·a)］比中国［4.2 t/(hm^2·a)］低25.4%，而且C_4作物普遍高于同类C_3作物。

关键词：作物　CO_2倍增　CO_2吸收量　估算

Photosynthetic experimental data for wheat, corn, and soybean in all growing seasons can be used to calculate absorption of C directly, with a 2.6% error between estimation and calculation. Thereby, according to experimental results of crop response to a doubling CO_2, crops absorbtion of CO_2 will increase 21 to 26% under a doubling CO_2 concentration condition (700 ppm compared with 350 ppm). That is, the total CO_2 absorption from crops will be 660 to 690 million tc/year in China and 3410 to 3620 in global world. Additionally, this study indicates that crops absorb C at a rate of 4.2 t/(hm^2 · a) in China, which is 25.4% more than the mean level of the world (3.2t/m^2 · a), and that C_4 crop species take up more C than do C_3 crops generally.

Keywords: crop, CO_2 doubling, absorbing CO_2, estimation

李新，1996，塔里木盆地西北部荒漠化气候特征，干旱区地理，19（1）：53-57

利用中国科学院阿克苏水平衡试验站30余年的气象观测资料，分析了近年来荒漠化对气候的影响及气候与沙漠化的关系。主要结论如下：1）若人类不改变沙漠边缘的水文和植被状况，气候因子不会导致沙漠化；2）春季风沙和浮尘天气多，是土地沙漠化易发生的季节；3）塔克拉玛干沙漠北部绿洲以外的广大地区近来水文条件有所变劣，植被减少，气候条件对沙漠化有促进作用。

关键词：塔里木盆地西北部　气候特征　荒漠化

Li Xin. 1996. Climate characteristics of desertification in the northwestern part of Terim Basin. Arid Land Geography 19(1):53-57.

The relationship and changing regularity between the climate and desertification in the northwestern part of Tarim Basin are discussed on the basis of climatic data collected at the Aksu Water Budget Experiment Station (AWBS) from 1962 to 1993. The conclusions are: (1) Desertification cannot be brought about by climatic factors if the hydrological and vegetation conditions are not changed by human activities. (2) Sand-drifting and dust-floating weather occurs frequently and desertification occurs easily in spring. (3) Hydrological and vegetational conditions become worse and the climate impels desertification around the oases in the northern part of Tarim Basin.

Keywords: Tarim Basin, climatic characteristic, desertification

王会昌，1996，2000年来中国北方游牧民族南迁与气候变化，地理科学，16（3）：274-279

探讨了近2000年来气候变化与北方游牧民族南迁的关系。认为，气候变化与中国历史发展有着内在联系。在气候温暖期，北方游牧民族与中原农耕王朝和平共处，气候寒冷干旱时期，北方游牧民族由于生存环境不适于生存而南迁，中原的农耕世界受到冷期影响而国势衰微，于是出现北方游牧民族统治农耕世界的王朝或二者对峙的局面。

关键词：中国北方游牧民族
气候变化　南迁

Wang Huichang. 1996. The relationship between the southern migration of the nomadic nationalities in North China and climatic change. Scientia Geographica Sinica 16(3):274-279.

The corresponding relationship between the southern migration of nomadic nationalities in North China and climatic changes is studied. It is believed that there are relationships between climatic changes and Chinese historical development. In the warm period, the nomadic nationalities that dwelt north of the Great Wall lived together in peace with the agricutural nationality that dwelt in the Central Plains. However, in the cold period, the nomadic nationalities launched an all-out offensive on the agricultural world because the forage grass withered and the water source had dried up in the prairie. At the same time in the Central Plains, the agricultural world was also hit by the cold climate. Thus either the nomadic nationalities controlled the agriculture nationalities or they confronted each other.

Keywords: nomadic nationality in North China, climatic change, migrating south

白月明，王春乙，温民，1996，不同CO_2浓度处理对冬小麦的影响，气象，22(2)：7-11

利用OTC-1型开顶式气室，进行不同的CO_2浓度处理对冬小麦发育影响的诊断试验。结果表明，不同二氧化碳浓度，冬小麦的发育期、生物量、叶面积、产量、产品质量、种子发芽率以及粘虫等有明显差异。

关键词：开顶式气室
不同CO_2浓度处理　冬小麦

Bai Yueming, Wang Chunyi, and Wenmin. 1996. Impacts of different CO_2 concentration treatments on winter wheat. Meteorological Monthly 22(2):7-11.

A diagnostic experiment on the impacts of different CO_2 concentration treatments on the growth and development of winter wheat is made using open top chambers OTC-1. Results show that the impacts of different CO_2 concentration treatments on the development stage, biomass, leaf area, grain yield, grain quality, and armyworm infestation are remarkably different.

Keywords: open top chamber (OTC-1), different CO_2 concentration treatment, winter wheat

王修兰,
徐师华, 1996，气候变暖对土壤化肥用量和肥效影响的实验研究，气象，22（7）：12-16

分析气候变暖对土壤肥料施用量和肥效的影响，并提出相应的对策。通过对土壤分期增施不同用量尿素的实验，测定土壤中速效氮含量的动态变化，研究土壤肥效对温度的反应。结果表明，温度升高，土壤中速效氮释放量增大，释放速度加快，释放周期缩短。在450－1125kg/ha施肥水平下，每增温1°C氮释放平均增加4%，释放周期缩短3.6天。同时，施肥量愈大，速效氮释放量也愈大，释放速度愈快。因此，在气候变暖的条件下，需相应增加施肥总量和施肥次数，减少每次施用量，提高肥效，减弱气候变暖对肥效的不利影响。
关键词： 气候变暖 化肥 肥效

Wang Xiulan and Xu Shihua. 1996. The experimental study on the effects of climate warming on fertilizer amount and efficiency in the soil. Meteorological Monthly 22(7):12-16.

The changes of easily available nitrogen (N) content in the soil are measured and the responses of soil fertilizer efficiency to temperature are studied using a soil fertilizer experiment under three urea levels with different release rates. Results show that the release amount of N increases in the soil when temperature goes up, and the release rate shortens. When temperature increases 1°C, the release amount of N enhances 4% on the average and the release period shortens 3.6 days. In addition, the greater the fertilizer amount, the more the release amount of N is, and the quicker the release rate will be. Therefore, in conditions of climate warming, the total of fertilizer amount and frequency should be increased relatively, but the amount each time should be decreased, thereby enhancing fertilizer efficiency, and reducing the disadvantageous impact of climate warming on fertilizer efficiency.

Keywords: climate warming, fertilizer, fertilizer efficiency

吴金栋, 太华杰, 1996，
近30年我国气候变化的不稳定性及其与农业的关系，气象，22（8):3-8

引入信息论中熵值分析方法，利用全国七大区1961-1990
年的气象和粮食生产资料，统计分析近30年平均气温和降雨量等4个要素熵值变化的时间型和空间型。在此基础上，讨论了气候变化的不稳定性与农业气象灾害的关系及其对农业产量的可能影响，并得出产量与气象要素熵值的定量关系。
关键词：气候变化 不稳定性 熵 农业

Wu Jindong and Tai Huajie. 1996. The variability of climate change and its relationship to agricultural production in China during the last 30 years. Meteorological Monthly 22(8):3-8.

Based on the data of meteorology and crop yield in seven regions of China from 1961 to 1990, the method of entropy analysis in information theory is applied to discussion of the temporal and spatial distribution patterns of entropy change of four meteorological factors (mean temperature, maximum temperature, minimum temperature, and rainfall) in the last 30 years. Regression models of yield and entropy of meteorological factors in different regions are established.

Keywords: climate change, variability, entropy, agriculture

马树庆，1996，气候变化对东北地区粮食产量的影响及适应性对策，气象学报，54（4）：484-492

采用作物生长发育和产量形成对气温、降水等资源环境条件的反映函数，建立了在气候变化条件下粮食产量变率理论推算模式，分析了在主要农作物生长季气温升降与降水增减的各种组合条件下，东北各地粮豆作物产量的变化，提出了适应气候变化的农业对策。

关键词：气候变化　粮食产量　影响模式　农业对策　东北三省

Ma Shuqing. 1996. A simulating study on the influences of climate change on grain yield and the countermeasures in Northeast China. Acta Meteortologica Sinica 54(4):484-492.

Using the response function of the growth and yield of crops to temperature and precipitation, the calculating model of the variability of yield in various parts of northeast China is analyzed in association with variable combined conditions of temperature change and precipitation change. The agricultural countermeasures to the climate change are also put forward.

Keywords: climate change, grain yield, impact model, agricultural countermeasures, northeast China

张苏平，胡桂芳，朱平盛，1996，降水长期变化对胶东地区水资源的影响，气象，22（11）：3-9

利用1960-1994年胶东地区降水和水资源资料，用变点分析方法将35年分成A、B两个气候段。分析发现从A段到B段降水，水资源明显减少。水资源总量的变化规律和降水变化规律一致，但前者的变化率明显大于后者。对2000年水资源分析表明，水的利用率要提高30%以上方能基本满足经济发展的需要。

关键词：降水长期变化　水资源　分析预测

Zhang Suping, Hu Guifang, and Zhu Pingsheng. 1996. Impacts of precipitation change on water resources in the Jiaodong Region, Shandong Province. Meteorological Monthly 22(11):3-9.

Precipitation and water resources data for 35 years (1960-1994) in the Jiaodong region are divided into two periods by means of change-point analysis. Marked shifts between the two periods are revealed for both rainfall and water resources. The variation trends of precipitation and total amount of water resources are identical, but the former variation rate is smaller than the latter's. Supply-and-demand analysis for the year 2000 indicates that the utilization efficiency of water resources must be raised at least 30% in order to meet the needs of basic economic development.

Keywords: long-range variation of precipitation, water resources, analysis and prediction

高素华，郭建平，赵四强，1996，“高温”对我国小麦生长发育及产量的影响，大气科学，20（5）：599-605

采用田间试验、人工模拟试验和历史资料分析模拟及CERES小麦模式相结合的方法研究温度变化对小麦生长发育及产量的影响。结果表明：随温度升高，小麦发育历期缩短，高温使春小麦经济产量下降，温度升高改善了冬小麦越冬条件，对穗粒数及籽粒重有利。返青后的“高温”对冬小麦经济产量不利。
关键词：小麦　生长发育　产量　“高温”影响

Gao Suhua, Guo Jianping, and Zhao Siqiang. 1991. The impacts of “higher-temperature” on wheat growth and yield in China. Scientia Atmospherica Sinica 20(5):599-605.

The impacts of “higher-temperature” on both winter wheat and spring wheat development stages, production structure, and economic yield are analysed using field experiments, artificial chamber simulation experiments, historic data, statistical analysis, and Crop Environmental Resource Synthesis (CERES) winter wheat models. The results show that the wheat development period shortens and the economic yield decreases as temperatures rise. The increase of temperature improves the overwinter condition for winter wheat which is favorable for ear grain numbers and grain yield. However, the “higher-temperature” after spring greening is unfavorable for winter wheat economic yield.

Keywords: wheat, development, production, “higher-temperature” impact

刘黎明，陈创买，1996，广东近40年来5－9月气候变化及与主要农作物关系，热带地理，16(2)：136-144

用多元逐步回归分析方法探讨了广东全省性气候变化与同期及后期(1－3 年)主要农作物单产量间的关系，并作了预报。有如下结论：5－9 月各气候要素最重要的EOF分量空间分布相似，都为全省位相相同的型式；广东主要农作物(如稻谷、花生、糖蔗)的趋势产量都是二次非线性的，而且其周期性变化特征不显著；由4种不同方案选入气候因子来考虑单个气候因子及多种因子综合对作物产量的影响，4种方案的结果有明显的差异；气候因子在预报方程和拟合方程有很

Liu Liming and Chen Chuangmai. 1996. The change of the climate from May to September for the years 1954-1990 with relationship to the main crop yields in Guangdong Province. Tropical Geography 16(2):136-144.

Climate change and its relationship with the yields of three main crops in Guangdong Province are studied with multiple regression analysis. The first eigenvector of each variable describes the same phase change pattern. The trends of yields of three main crops are all nonlinear and have no periodic signals. The climate factors in the prediction equations are very different from those of the simultaneous equations, and the multiple correlation coefficients in the prediction equations of multiple regression analysis are even better than those in the simultaneous equations.

Keywords: climate change, crop yield, prediction, Guangdong Province

大的不同，比较4种方程，
预报方程的最佳效果比同期拟合方程的效果还好。
关键词：气候变化　农作物产量　预报　广东省。

王石立，娄秀荣，1996，
气候变化对华北地区冬小麦水分亏缺状况及生长的影响，应用气象学报，7(3)：308-315

利用43个站点的多年气象资料、作物发育期资料和土壤水文资料，计算了未来气候变化情景下华北冬小麦生产区小麦不同发育阶段和全生育期内水分亏缺量的变化。结果表明，气温升高时小麦水分亏缺状况变差，亏缺量等值线南移，引起小麦气候适宜区范围缩小，减产额加大，产值降低，用于额外灌溉的生产费用增加。
关键词 气候变化影响　水分亏缺　冬小麦

Wang Shili and Lou Xiurong. 1996. Impacts of climate change on the water deficit status and growth of winter wheat in North China. Quarterly Journal of Applied Meteorology 7(3):308-315.

The water deficits at various development stages and during the whole growing season of winter wheat in North China under different climate change scenarios are calculated based on the meteorological data, crop development period, and soil hydrological data from 43 stations. The results show that when temperature rises, the water deficit status deteriorates, the isolines of deficit might shift southward, and the climate-suitable areas of wheat would contract. The yield reduction would become serious, output values would lose, and production costs resulting from additional irrigation also might increase.

Keywords: climate change impacts, water deficit, winter wheat

罗承平，薛纪渝，1996，大气中CO_2浓度增加对我国农业生产的影响，热带地理16(3)：191-195

分析了全球大气中CO_2浓度上升对我国农业生产的影响，并提出了对策。结果认为：1)由于光合作用的增强，作物第一性生产力将增加；2)作物水分利用效率增强；3)根、茎、叶、花、果实和种子的生产发育加快；4)CO_2增加引起的全球

Luo Chengping and Xue Jiyu. 1996. Effects on increase of CO_2 in the atmosphere on agricultural production in China. Tropical Geography 16(3):191-195.

The effects of an increase of CO_2 in the atmosphere on agricultural production in China are predicted. (1) The primary productivity of crops would rise because of a strengthening of photosynthesis. (2) Crops would have a higher rate of water-use under increased atmospheric CO_2. (3) Roots, stems, leaves, flowers, fruits, and seeds might experience enhanced growth. (4) Global climate change, caused partly by the increasing CO_2, would lead to a series of

气候变化将导致一系列农业生产条件如光、温度、水、土壤的改变，作物产出将受到影响。由于中国各地自然环境差异大，不同地区农业条件的变化有很大的不同。

关键词：CO_2 农业生产 对策

transformations of agricultural productive conditions, such as changes in light, temperature, water, soil, and air. Thus, the output of crops would be influenced, but be greatly different in different areas. Some countermeasures for agricultural production in China are proposed.

Keywords: CO_2, agricultural production, countermeasures

郑有飞，杨志敏，1996，
作物对太阳紫外辐射增加的生物效应及其评估，应用生态学报，
7(1)：107-109

分析UV-A和UV-B
辐射强度增加对大豆和小麦生长发育等方面的影响。结果表明，在自然条件下，UV辐射的增加抑制了被测试作物的光合作用速率及生长；
由于作物蒸腾作用及叶片的气孔传导受抑制，产量下降。另外，对UV辐射的增加对农作物的影响作了定量估算，估算值与实测值的相对误差在0.30-8.56%之间。

关键词：紫外辐射 大豆 小麦 生长 生物效应

Zheng Youfei and Yang Zhimin. 1996. Biological response of crops on enhanced solar ultraviolet radiation and its estimation. Chinese Journal of Applied Ecology 7(1):107-109.

Studies of the effects of enhanced solar ultraviolet (UV) radiation on the growth and physiology of soybean and wheat show that under natural conditions, the increase of UV radiation can inhibit the net photosynthetic rate and the growth of leaves, stems, and roots of both tested crops. The decrease of biomass and yield is caused by the decline of transpiration and stomatal conductance of leaves. Estimation of the crop response to enhanced UV radiation shows that the mean error between the fitting value and an observed one is 0.30 to 8.56%.

Keywords: ultraviolet radiation, soybean, wheat growth, biological response

王石立，赵艳霞，1996，气候变暖对小麦蒸散和产量的可能影响，中国农业气象，17(4):18-22

利用自行研制的水分循环与小麦生长关系的模拟模式，估算了气候变暖后小麦不同发育阶段农田蒸散量的可能变化及其对产量的影响，还分析了可能产生的农业投入费用的变

Wang Shili and Zhao Yanxia. 1996. Study of the possible impact of climate warming on the evapotranspiration and yield of winter wheat. Agricultural Meteorology 17(4):18-22.

The possible change of crop evapotranspiration in different development stages of winter wheat and its impact on wheat yield under a warming climate are estimated on the basis of a simulation model. The results show that the transpiration and evapotranspiration after the jointing stage of winter wheat decrease significantly under a

化。结果表明温度升高时小麦生长中后期实际蒸腾量和总蒸散量明显减少，将导致干物质下降，产量减少，产值降低，并需额外增加灌溉，从而使农业生产费用增加。

关键词：气候变暖　冬小麦　蒸散

temperature increase, which would result in the reduction of dry matter and yield and require additional irrigation, so that the cost of agricultural production might be increased.

Keywords: climate warming, winter wheat, evapotranspiration

李秀斌，1996，全球环境变化研究的核心领域——土地利用土地覆被变化的国际研究对象，地理学报，51(6)：553-558

论述了全球环境变化中的土地利用土地覆被变化的内涵，在全球环境变化中的作用，其主要内容、关键问题及研究方法，并介绍了国外有关研究项目的情况。

关键词：土地利用　土地覆被
全球环境变化

Li Xiubin. 1996. A review of international research on land use and cover change. Acta Geographica Sinica 51(6):553-558.

A general review on the basic concepts, background, and progress on the methdologies of international land use and cover change (LUCC) research is presented. Relevant programs are introduced.

Keywords: land utilization, land cover, global environmental change

李培基，1996，青藏高原积雪对全球变暖的响应，地理学报，51（3）：260-265

根据60个地面基本气象站1957-1992年逐日雪深观测记录，用统计模式检验了青藏高原积雪变化趋势。证明近36年来高原积雪变化呈普遍增加趋势，并且与北半球冬季气温呈正相关。高原积雪的增加与北半球温带低地春季积雪自80年代后期的减少形成了鲜明地对比，与两个大陆冰盖雪积累率的增加相一致。

关键词：青藏高原积雪
变化趋势检验　全球变暖

Li Peiji. 1996. Response of Tibetan snow cover to global warming. Acta Geographica Sinica 51(3):260-265.

A study of trend testing of Tibetan snow cover variation is presented using daily snow depth records at 60 primary climatic stations covering the period from 1957 to 1992. It is found that the increase of snow depth was almost omnipresent over the Tibetan Plateau, and the fluctuation of snow cover over the Tibetan Plateau revealed a positive relationship with surface air temperature in wintertime over the Northern Hemisphere. This association tends to contrast sharply with the reduced extent of snow cover in extratropical lands in the late 1980s, but coincides with the recent increases in Antarctic and Greenland snow accumulation.

Keywords: Tibetan snow cover, trend testing, global warming

王铮，张丕远，
周清波，1996，历史气候变化对中国社会发展的影响，地理学报，
51（4）：329-339

讨论了历史时期气候变化与中国人口分布、社会经济、政治疆界的关系，试图说明全球气候变化对中国可能产生的人文影响。最后讨论了人地关系。

关键词：全球变化　人文影响　中国

Wang Zheng, Zhang Peiyuan, and Zhou Qingbo. 1996. The impacts of climate on the society of China during historical times. Acta Geographica Sinica 51(4):329-339.

The relationship between demography and the social-economy of China with climate change during historical times is discussed, and the human impact of global change on society in China is investigated.

Keywords: global change, impact of human dimension, China

张定琪，
乔宗演，1996，冬季气温变化与小麦生产对策，中国农业气象，
17（3）：10-13

气象资料显示，建湖县自1980年以来冬季气温变暖，主要表现在：冬半年，小麦越冬前及越冬期间的气温均比1980年前同期偏高，>0°C积温多75.1°C，冬季负积温少24.6°C。因此，小麦生产应采取相应对策，除了优化产品结构，减少用种量，科学肥水运筹之外，适宜播期应较往年推迟3－4天，冬性小麦最适宜播期推迟到10月11日－14 日，
春性小麦在10月20日－ 22日，
才能防止冬前、越冬期间旺长拔节，躲过冬季低温和春霜冻的危害。

关键词：冬季气温变暖
小麦生产对策

Zhang Dingqi and Qiao Zongyan. 1996. Discussion of temperature variation in winter and countermeasures for wheat production. Agricultural Meteorology 17(3):10-13.

Meteorologial data show that climate is becoming warmer since 1980 in Jianhu, Fujian. Not only before but also during the period of wheat overwinter, the temperature is higher than that in the same period before 1980, accumulated temperature is 75.1°C higher, and negative accumulated temperature is 24.6°C lower. Therefore corresponding countermeasures should be taken for wheat production. To optimize structure of product, reduce the use of seed, and enhance fertilization and irrigation, the suitable sowing time should be delayed 3 to 4 days.

Keywords: warmer in winter, countermeasures for wheat production

陈丽萍，韩永翔，1996，甘肃省玉米气候产量的周期及其区域分布与降水的关系，中国沙漠，16(4)：379-382

为了解甘肃省玉米产量的年际变化及其成因，本文对全省玉米气候产量进行了功率谱分析，并研究了其气候产量周期与降水量、干燥度的关系。分析表明甘肃省玉米气候产量主要有6-7a、10a 和3a 的周期，其周期分布与 5-6月，6-8月降水量的分布，特别是玉米生育期的干燥度分布有较一致的关系。

关键词：玉米　产量　功率谱分析　分布规律

Chen Liping and Han Yongxiang. 1996. The period of climatic corn yield and its distribution related to rainfall. Journal of Desert Research 16(4):379-382.

This paper analyzes the climatic corn yield (yw) of each district in the Gansu area by means of power spectrum analysis. The result shows three major periods in the yw series, which are 6-7 years, 10 years, and 3 years. The distribution of these periods coincides with the isohyet figures of May to June and June to August, especially with the pattern of dryness during corn growing period.

Keywords: corn yield, power spectrum analysis, regularity of distribution

Modeling

封国林，曹鸿兴，1996，全球气候长期振动的方程及其求解，气象学报，54（6）：753-758

假定行星反照率为温度的平方关系，导出了零维随机动力气候模式。对相应的Fokker-Planck 方程用距阵连分法求解，得到了10万年、4万年、2万年气候周期的本征值和本征向量。数值计算表明，在随机噪声强度D=1.95时，10万年气候振动具有最大的振幅，即Milankovitch理论无法解释的10万年周期。

关键词：零维气候模式　Fokker-Planck 方程　距阵连分法

Feng Guolin and Cao Hongxing. 1996. Fokker-equation of long-term global climatic fluctuation and its solution. Acta Meteorologica Sinica 54(6):753-758.

Assuming the planetary albedo is equal to a temperature square, a zero-dimensional stochastic-dynamic climate model has been suggested. The appropriate Fokker-Planck equation is solved by use of the matrix continued-fraction method, eigen values, and eigen vectors of 100,000-, 40,000- and 20,000-year climatic periods. When a value of 1.95 is used for the intensity of random noise, the calculations indicate a maximum climatic variability at 100,000 years, which is not explained with the Milankovitch theory.

Keywords: zero-dimensional climate model, Fokker-Planck equation, matrix continued-fraction method

李雪松，A. Berger，1996，
用数值模拟方法研究第四纪古气候——以LLN二维模式为例，第四纪研究，（4）：289-299

用LLN模式对中晚第四纪大陆冰量变迁进行了模拟研究。模拟从最初的末次冰期一间冰期延伸到0.6MaBP，模拟的大陆冰量变化与地质记录对比良好，二者与地球轨道要素有关的天文频率上的波动具有很高的相关性。

关键词：LLN二维气候模式
米兰科维奇理论　大气CO_2含量
大陆冰量　深海氧同位素记录

Li Xuesong and A. Berger. 1996. Simulating quaternary paleoclimate with the Louvain-la-Neuve two-dimensional (LLN 2-D) climate model. Quaternary Sciences (4):289-299.

Studies of the Louvain-la-Neuve two-dimensional (altitude-latitude) (LLN 2-D) model of the earth's ice volume change in the late Quaternary are presented. The first periods are from 0.122 Ma BP to the present, then from 0.22 Ma BP, the last from 0.575 Ma BP. The major periods of the simulated ice-volume change correspond to the change in parameters of the earth's orbit and rotation. Cross-spectral analysis reveals that the simulated ice volume highly correlates with the SPECAMP 180 record at frequency bands associated with the above-mentioned periods.

Keywords: LLN 2-D climate model, Milankovitch theory, atmospheric CO_2 concentration, earth's ice volume, deep-sea oxygen isotope record

杨清书，吴超弱，1996，
傅氏变换在短序列确定海平面变化趋势中的应用，热带地理，16(2)：107-113

从一元线性回归分析的正则方程出发，讨论高频扰动对确定海平面变化趋势的影响。结果表明，高频扰动（周期小于4年）对确定短序列中海平面变化趋势有显著影响。此外，还探讨了用傅氏变换方法来消除高频扰动的影响，由低通序列一元线性回归分析就能从短序列中准确计算海平面的变化趋势。

关键词：海平面变化　高频扰动
短序列　傅氏变换

Yang Qingsu and Wu Chaoruo. 1996. Application of Fourier transform to the determination of secular trend of relative sea level from short times series. Tropical Geography 16(2):107-113.

The normal equation of linear regression is used to assess the effects of high-frequency components on determination of the secular trend of relative sea level (RSL). It shows that high-frequency components (with periods less than 4 years) have significant effects in determining the secular trend of the short time series, but that the linear regression can be still used to forecast the secular trend of RSL.

Keywords: sea level change, high-frequency components, short time series, Fourier transform

陈文，黄荣辉，1996，中层大气行星波在臭氧的季节和年际变化中输运作用的数值研究，大气科学，20（5）：513-523

本研究构造了一个34层球坐标原始方程波一流相互耦合模式，利用此模式从拉格朗日平均环流的观点研究了在常定流下行星波对臭氧的输运作用。研究结果表明，行星波对臭氧的输运有明显的季节变化，在北半球冬季，由于行星波上传到平流层而大大增强了中高纬地区向极地向下的O_3输运；并且还表明，热带纬向风的QBO不仅影响东、西风切变而引起热带 O_3分布的年际变化，而且通过影响行星波的传播引起了行星波对O_3输运的年际变化，这表现为当热带纬向风处于东风位相时，中高纬地区行星波对O_3的输运比西风位相时强。

关键词：臭氧　行星波输运　拉格朗日平均环流　年际变化

Chen Wen and Huang Ronghui. 1996. The numerical study of seasonal and interannual variabilities of ozone due to planetary wave transport in the middle atmosphere. Scientia Atmospherica Sinica 20(5):513-523.

A 34-level coupled planetary wave-zonal flow, mechanistic global primitive equation model is constructed, and the effects of planetary wave transport on ozone are studied with the Lagrangian mean circulation forced by planetary waves while the flows are steady. The results show that there is an obvious seasonal variation of ozone as a result of planetary wave transport and the transport is largest during the winter over the Northern Hemisphere. It also shows that the quas-biennial oscillation (QBO) of tropical winds may cause interannual variation of ozone not only in the tropical regions through the secondary meridional circulation in the westerly or easterly shear zones, but also in the middle and high latitudes areas through planetary wave transport. When tropical winds are easterly, the effects of planetary wave transport on ozone are stronger at the middle and high latitudes than that during the westerly phase.

Keywords: ozone, planetary wave transport, Lagrangian mean circulation, interannual variability

王春乙，白月明，温民，1996，模拟大气中CO_2浓度增加对玉米产量和品质影响的试验研究，环境科学学报，16（3）：331-336

利用OTC-1 型开顶式气室，研究了CO_2浓度增加对玉米的影响。结果表明，CO_2浓度增加，玉米发育期和株高几乎不受影响，而生物产量和籽粒产量呈上升趋势；CO_2浓度增加对玉米籽粒、粗蛋白、粗纤维和总糖含量的影响呈负效应，对淀粉的影响则成正效应。

关键词：CO_2浓度　产量　品质

Wang Chunyi, Bai Yueming, and Wen Min. 1996. Effect of CO_2 concentration increase on yield and quality of corn. Acta Scientiae Circumstantiae 16(3):331-336.

The effects of CO_2 concentration increase on corn were studied using open top chamber (OTC-1). The result shows that increases in CO_2 concentration have no effects on corn development stage and height but increase the biomass and grain yield. With CO_2 concentration increased, negative effects on corn seed, rough protein, rough fiber, and contents of total carbohydrate were observed, but the starch of corn was positively effected.

Keywords: CO_2 concentration, yield, quality

薛峰，曾庆存，1996，年际气候变率的数值模拟，大气科学，20（5）：524-532

利用IAP GCM 20年的模式输出结果，计算了模式大气中海平面气压、表面气温和降水的年际变率，并与相应的观测资料作了对比，以考察模式对观测年际变率的模拟能力。结果表明模式成功地再现了观测变率地理分布的基本特征，这说明大气内部动力-物理相互作用过程对年际变率有重要影响，而模拟值的偏低则显示了模式中未包括的某些外界强迫因子如海温和海冰年际变化的潜在作用。此外，还讨论了半球平均表面气温的长期演变。

关键词：年际变率　模拟　观测

Xue Feng and Zeng Qingcun. 1996. A numerical simulation of the climatic interannual variability. Scientia Atmospherica Sinica 20(5):524-532.

The simulated interannual variability of sea level pressure, surface air temperature, and precipitation is computed using the 20-year model output of the Institute of Atmospheric Physics (IAP) general circulation model (GCM). The model's ability in simulating variability is shown in that the model successfully reproduces the characteristic features of the geographical distributions of the observed variability. Therefore, the internal dynamical physical interaction processes in the atmosphere have substantial influence on interannual variability. However, the model underestimates the observed variability systematically because of the absence of some external factors, such as the interannual variations of the sea surface temperature and sea ice coverage. Additionally, the long period of change of average surface temperature in the Northern Hemisphere is discussed.

Keywords: interannual variability, simulation, observation

朱永春，黄士松，1996，包含详细水分循环和海冰物理过程的一维气候模式与气候系统内反馈机制的研究，大气科学，20(6)：691-702

设计了包含详细水分循环和海冰物理过程的一维气候模式，着重研究了存在气候内部的反馈机制，得到如下几点结论：（1）水汽反馈和冰雪反照率均为很强的正反馈，但水汽反馈的强度甚于冰雪反照率反馈。（2）降水过程无论在地表还是在大气中均表现为负反馈。（3）在大气中，蒸发过程表现为很强的正反馈；在地表，蒸发过程在中低纬度表现为很强的负反馈，而在高纬度却表现为正反馈。（4）大气中的感热输送无论在

Zhu Yongchun and Huang Shishong. 1996. A one-dimensional climate model with hydrological cycle and sea ice physics to analyze feedback mechanisms of the climate system. Scientia Atmospherica Sinica 20(6):691-702.

A one-dimensional climate model that includes an explicit hydrological cycle and sea ice physics is devised. The model is used to mainly study the feedback mechanisms in the climate system. Results show that (1) water vapor feedback and ice-albedo feedback are positive with the former stronger than the latter; (2) precipitation is proved to be a negative feedback both at the surface and in the atmosphere; (3) evaporation is a strong positive feedback in the atmosphere and at the surface, whereas evaporation is a strong negative feedback in middle-low latitude and a positive feedback in high latitudes; (4) the atmospheric sensible heat flux represents a negative feedback as it dampens the ice-albedo feedback; (5) the atmospheric latent heat flux proved to be a positive feedback by strengthening greenhouse

大气中还是在地表均表现为较弱的负反馈，其负反馈作用通过抑制冰雪反照率而表现出来。（5）大气中的潜热输送无论在大气中还是在地表均表现为正反馈，其正反馈效应通过放大水汽的温室效应体现出来。（6）不同反馈的合成是以一种非线性方式，而不是简单的线性相加。

关键词：反馈机制　水分循环　海冰物理过程

warming; and (6) different feedbacks interact in a nonlinear way, and the resultant feedback can be much stronger than the additive effect of the individual feedbacks.

Keywords: feedback mechanism, hydrological cycle, sea ice physics

石广玉，郭建东，1996，近百年全球平均气温变化的物理模式研究，科学通报，41(18)：1681-1684

用物理模式分析了近百年全球平均气温变化的因子。结果表明：大气GHGs浓度的增加支配了过去一个多世纪以来的全球增暖，并很可能将继续支配未来几十年的全球增暖；平流层火山气溶胶的变化是造成年际和10年间平均地面气温变化的主要原因；无论是对全球的气温变化趋势，还是对其10年间和10年际的变化，太阳活动看来都不大可能具有重要的贡献。

关键词：全球平均气温　温室气体　自然变化因子

Shi Guangyu and Guo Jiandong. 1996. A physical model for global mean surface air temperature anomalies over the past century. Chinese Science Bulletin 41(18):1681-1684.

A recently developed physically based model and available data are used to examine the important roles that solar variability, greenhouse gases (GHG), and volcanic aerosols play in present climatic variation. The results indicate that (1) GHGs have been dominant over the past century and most likely will continue to dominate global warming in the next decades; (2) stratospheric aerosols could be mainly responsible for the decadal variation of the surface air temperature; and (3) solar variability is unlikely to be a remarkable contributor to global temperature trends which show decadal and interdecadal variations.

Keywords: global-mean temperature, greenhouse gases, sources of natural climate variability

胡桂芳，张苏平，1996，近40年山东省各水资源分区降水变化特征及多步预测时序模型，气象，22（8）：16-19

利用近40年山东省41站降水资料，分析了各水资源分区降水演变特征，以均生函数为基函数，用主成分分析进行筛选，建立了山东省各水资源分区降水时序多步预测模型。通过计算，试验，拟合，预报效果均较好。
关键词：降水变化特征 水资源分区 多步降水预报

Hu Guifang and Zhang Suping. 1996. The characteristics of rainfall variation in water resource divisions in Shangdong Province in the last 40 years and a multistep time series predictive model. Meteorological Monthly 22(8):16-19.

The characteristics of rainfall variation in the water resource divisions in Shangdong Province are analyzed using precipitation data from 41 weather stations in the last 40 years. Mean generation function is used as the basic function, which is screened through principal component analysis. Multistep predictive models are set up in the water resource divisions in terms of the mean generation function. The forecasting results achieved through testing and fitting are rather good.

Keywords: characteristics of rainfall variation, water resource divisions, multistep precipitation prediction

陈晓光，徐祥德，朱乾根，1996，河套华北地区旱涝的前期环流异常与大西洋海温的关系及其数值模拟，气象学报，54（1）：102-107

首先采用了河套华北地区旱涝的前期异常环流，然后探讨了这种环流形成的机制，最后采用了OSU-AGCM作了大西洋地区热源异常强迫的数值实验。结果表明，大西洋地区海温异常强迫激发的定常波向上、下游的能量传播，造成的前期秋冬季环流异常与河套华北地区的夏季旱涝有较好的对应关系。
关键词：河套华北地区 夏季旱涝 大西洋海温异常

Chen Xiaoguang, Xu Xiangde, and Zhu Qiangen. 1996. A numerical experiment on the effect of Atlantic heating and the relationship between the abnormal circulation of the preceding stage on drought and flood in the Hetao Huabei region and Atlantic sea surface temperature anomaly (SSTA). Acta Meteorologica Sinica 54(1):102-107.

In this paper, we analyze the abnormal circulation of the preceding stage on drought and flood in summer over the Hetao Huabei region, present an attempt to explore the forming mechanism of this abnormal circulation, and perform a numerical experiment on the effect of Atlantic heating with the Oregon State University atmospheric general circulation model (OSU-AGCM). The results show that the abnormal circulation of the preceding stage in autumn and winter agree roughly with the drought and flood over the area in summer. The abnormal circulation is formed by the energy propagation upstream and downstream of the stationary waves that are forced by the action of Atlantic SST anomaly.

Keywords: Hetao Huabei region, drought and flood in summer, Atlantic SST anomaly

刘树华，黄子琛，刘立超，1996，半干旱区植被覆盖度对边界层气候热力影响的数值模拟，气象学报，54(3)：303-312

在陆-气相互作用的中小尺度系统研究中，水平非均匀下垫面的强迫作用是主要的物理过程。本文利用能量闭合二维陆面过程与大气边界层耦合模式，研究了我国西北半干旱地区（38°N，105°E）夏季下垫面物理特征的变化对区域边界层气候的影响。结果表明：土壤湿度、植被覆盖度对局地环流和区域边界层气候的形成起着决定性的作用。模拟结果揭示了在半干旱地区大面积植树造林、提高植被覆盖度，可涵养土壤水分，改善局地生态环境，是人工持续改造干旱、半干旱荒漠地区局地气候的重要途径。

关键词：植被覆盖度　边界层气候　数值模拟

Liu Shuhua, Huang Zichen, and Liu Lichao. 1996. Numerical simulation of the influence of vegetation cover on boundary layer climate in semiarid region. Acta Meteorologica Sinica 54(3):303-312.

A two-dimensional mesoscale land-surface process and atmospheric boundary layer coupled model, including a detailed representation of the planetary boundary layer, the soil, and the vegetation, are presented for studying the influence of the variation of vegetation cover on the soil physical properties and boundary layer climate in the semiarid region of northwest China (around 38°N, 105°E). Through heat balance equations the soil surface and vegetation surface were merged in a coupled system in which vegetation was considered as a horizontally uniform layer, soil was divided into 13 layers, and the horizontal differences of vegetation cover were a decisive factor to boundary layer climate. The model can be used to forecast the radiation, heat, and water fluxes in the atmosphere.

Keywords: vegetation cover factor, boundary layer climate, numerical simulation

朱乾根，兰红平，沈桐立，1996，土壤湿度和地表反射率变化对中国北方气候影响的数值研究，气象学报，54(4)：493-500

本文利用OSU两层大气环流模式来考察土壤湿度和地表反射率变化对中国北方气候的影响。在(30-46°N, 90-120°E）的区域上进行了3个实验，结果表明干土壤对我国东部季风区和西部非季风区有不同的影响特征。高反射率造成降水减少。并指出地表过程的作用可能是经常发生在华北地区春夏连旱现象的重要原因之一。

Zhu Qiangen, Lan Hongping, and Shen Tongli. 1996. Numerical study of the influence of soil moisture and surface albedo on climate of the northern part of China. Acta Meteorologica Sinica 54(4):493-500.

Three numerical simulations by the Oregon State University atmospheric general circulation model (OSU AGCM) that integrated more than 50 days are carried out to show the effects of changes in soil moisture and surface albedo on the climate of the northern part of China (30-46°N, 90-120°E). Results of the simulations indicate that dry soil moisture has different effects on the non-monsoonal area in the west of China and the monsoonal area in the east of China. High albedo produces a decrease in rainfall. The article points out that the effect of surface processs is one of the possible major reasons for spring-to-summer

关键词：土壤湿度　地表反射率
华北春夏连旱

continuous drought that happens frequently in the northern part of China.

Keywords: soil moisture, surface albedo, North China, spring-to-summer continuous drought

王晓春，吴国雄，1996，
利用空间均匀网格对中国夏季降水异常区域特性的初步分析，气象学报，54（3）：324-332

用方差极大正交转动EOF（Varimax EOF）及点相关图法分析了夏季总降水（6、7、8月降水之和）及逐月降水的区域特性。使用的资料为全国范围47个5°×5° 经纬度网格上的降水资料，分析时段为1959－1994年。分析结果表明，由于采用了空间均匀的格网资料，本分析除进一步证实了中国东部地区降水异常的区域特性外，也揭示了西部地区降水异常的区域特性及沿长江流域东西方向上降水异常的相互关系。夏季总降水异常最显著的区域特性是江淮流域与河套及华南反相关。另外沿长江流域，四川盆地的降水异常与青藏高原东部及江淮流域的降水异常也存在着反相关联系。西部地区的区域特性为青藏高原中东部南北两侧为负相关，并且青藏高原中东部南侧的降水异常与华北东部及东北南部为正相关。上述的空间模式都有准 2－3a 及10a左右的 周期。逐月降水的分析表明，6月份，江淮流域、华北东部及东北大部分地区为正相关。7月，河套地区与江淮流域的降水异常呈现一定的负相关联系，8月份降水异常的区域特性与夏季总降水异常的区域特性极其

Wang Xiaochun and Wu Guoxiong. 1996. Regional characteristics of summer precipitation anomalies over China identified in a spatially uniform network. Acta Meteorologica Sinica 54(3):324-332.

The regional characteristics of precipitation anomalies of total summer precipitation (total precipitation of June, July, and August) and monthly precipitation are analyzed using the results of Varimax empirical orthogonal function (EOF) and correlation analysis. The data set used is the grid point precipitation over a (5° lat × 5° lon) network in China in the period of 1959 to 1994. The analysis of total precipitation shows that the most significant regional characteristic is the existence of negative correlation in precipitation anomalies between the low-reaches of the Yangtze River and Huaihe River Valley (LRYH) and the middle-reaches of the Yellow River Valley (MRY region), and between the LRYH region and South China. The precipitation anomaly over the Sichuan Basin is negatively correlated with that over the eastern part of the Qinghai Xizang Plateau and that over the LRYH region. The regional characteristic of summer precipitation anomalies in western China is that there exists a negative correlation between the summer precipitation anomalies over the southern part of the central and eastern Qinghai Xizang Plateau and that over the northern part. There also exists positive correlation between the southern part of eastern Qinghai Xizang Plateau and the eastern part of North China and southern part of Northeast China. The noted spatial correlation models have significant periods of about 3 years and 10 years. The analyses of monthly precipitation show that in June, there exists a positive correlation among the precipitation anomalies over the LRYH region, the eastern part of North China, and Northeast China. In July, the precipitation in the MRY region and the LRYH regions are negatively correlated. The regional characteristic of precipitation anomalies in August

一致。关键词：方差极大正交转动EOF（Varimax EOF） 分析 夏季降水异常区域特性 夏季降水 逐月降水

is very similar to that of the total summer precipitation anomalies.

Keywords: Varimax EOF analysis, regional characteristic of summer precipitation anomalies, total summer precipitation, monthly precipitation

Radiation and Trace-Gas Emission

卞林根，陆龙骅，贾朋群，1996，南极中山站紫外辐射的初步研究，科学通报，41（9）：805-807

本文分析了1993年2月~1994年12月南极紫外辐射和总辐射的变化特征，初步讨论了南极春季臭氧减少与紫外辐射和总辐射的关系。南极中山站紫外辐射与总辐射的比例年平均为5.7%，春季（9－11月）该比例明显高于其它季节。臭氧与UVB关系是十分显著的，两者呈对数关系变化，同时臭氧的变化对UV也有一定的影响，基本上也是呈对数关系，UV与臭氧的相关系数达到或超过0.01的信度水平。
关键词：南极中山站 紫外辐射

Bian Lingen, Lu Longhua, and Jia Pengqun. 1996. A preliminary study of the ultraviolet radiation in Zhongshan Station, Antarctica. Chinese Science Bulletin 41(9):805-807.

The characteristics of the ultraviolet and global radiation (UV/Q) during the period from February 1993 to December 1994 are analyzed, and the relationship between the decrease of Antarctic ozone in spring with the ultraviolet and global radiation is discussed. The annual mean ratio of UV/Q in Zhongshan is 5.7%. In spring (September-November) it is larger than that in other seasons. The ozone and UVB have a close relationship basically met by logarithmic line. The relationship between UV and ozone was almost similar to that of UVB and ozone and has a confidence level of less than 0.01. It can be concluded that the decrease of ozone in spring in Zhongshan Station not only obviously enhances UBV but also has effects on UV and global radiation.

Keywords: Antarctic Zhongshan Station, ultraviolet radiation

段争虎，刘新明，屈建军，1996，中国土地沙漠化对大气CO_2含量的影响，干旱区资源与环境，10(2)：89-94

利用沙漠化土地面积、土壤有机碳的含量及沙漠化的正逆转速率等资

Duan Zhenghu, Liu Xinming, and Qu Jianjun. 1996. Atmospheric CO_2 content affected by desertification in China. Journal of Arid Land Resources and Environment 10(2):89-94.

This paper calculates the change of organic carbon in desertified lands of China using data of areas and conversion rates (positive and negative) of desertified lands and contents of organic carbon in

料，分地区分类型统计了我国沙漠化土地中有机碳的变土地沙漠化而释放到大气中的CO_2，总量达173.286Mt，而逆转过程中固定的CO_2量为59.124Mt碳，所以，近40年来我国沙漠化土地净释放到大气中的CO_2量为124.475Mt碳占全球温带和寒带土地每年释放CO_2量133Mt碳的93.5%。

关键词：沙漠化　CO_2　大气环境　全球变化

soils. The results show that the organic carbon is 753.143 Mt in 50-cm soil layers, 173.286 Mt of CO_2 are released from desertified lands, and 59.124 Mt of CO_2 have been fixed in the processes to reverse desertification in the last 40 years.

Keywords: desertification, CO_2, atmospheric environment, global change

郭世昌，杨秀洪，邱金桓，1996，昆明地面生物有效紫外辐照度的初步计算，大气科学，20（4）：414-421

近年来，大气平流层臭氧含量普遍呈下降趋势。这将对人类的生存环境构成极大威胁，应当引起人们的高度重视。其中，太阳紫外辐射是一大因素。太阳紫外光（UVB和UVA，尤其是波长为280－320nm）对动植物生长及人类健康具有重要的生物学效应。但太阳光在大气中的传输过程极其复杂，涉及到大气臭氧吸收、空气分子散射、气溶胶颗粒以及云滴的散射等作用。针对昆明地处低纬高原、季风云系影响显著等特点，本文在同时考虑上述几种情况下，用二流(two-stream model)模式方法对太阳紫外辐射传输问题进行了研究，得出了一些有意义的计算结果，并对其作了讨论。

关键词：UV辐照度　二流近似　臭氧垂直分布

Guo Shichang, Yang Xiuhong, and Qin Jinhuan. 1996. A preliminary calculation on the surface biologically active ultraviolet (UV) irradiance for Kunming by two-stream approximation. Scientia Atmospherica Sinica 20(4):414-421.

Recent reports of stratospheric ozone depletion have caused concern about the levels of solar ultraviolet radiation at the earth's surface. A preliminary calculation using a two-stream model of surface biologically active ultraviolet (UV) irradiance (UVB and UVA) in the Kunming area is described in this paper. In the model, the influences of ozone absorption, Rayleigh scattering, cloud droplet scattering, aerosol scattering, and their seasonal variations are considered. Finally, the calculated results including spectral and integral surface irradiances are discussed.

Keywords: UV irradiance, two-stream approximation, O_3 vertical distribution

康惠宁，1996，中国森林C汇功能基本估计，应用生态学报，7(3)：230-234

根据森林资源波长状况和未来变化趋势，估计和预测了中国森林固C的现状和潜力。结果表明，中国森林目前C积累高于C释放，年平均净固C为0.8627×10^8t/a，在未来20年内中国森林净固C能力约每年增加773×10^4t，到2000年，中国森林固C能力将达到1.4697×10^8t/a。

关键词：森林　CO_2积累　C汇

Kang Huining. 1996. Estimation of carbon sink function of forests in China. Chinese Journal of Applied Ecology 7(3):230-234.

An estimation of the amount of carbon accumulated by forests are made using the data of changing trends of the forests in China. It shows that the accumulation is higher than the release at the present time, and that the net absorption is about 86.27 million tons per year, which will increase by 7.73 million tons per year in the future 20 years and reach to 146.97 million tons by the year A.D. 2000.

Keywords: forests, carbon accumulation, carbon sink

孔琴心，刘广仁，王庚辰，1996，1993年春季南极中山站上空大气臭氧的观测分析，大气科学，20（4）：393-407

利用球载电化学O_3探空仪于1993年南半球春季在南极中山站测量了O_3和温度垂直廓线，三次观测到O_3柱总量<220Du的低值，O_3浓度减少从9月开始，9月中旬-10月中旬达到最大。典型O_3垂直廓线表明，O_3量损失最大区域在高度13-23km之间，此高度与PSCs和火山气溶胶的存在高度有很好的对应关系。本文给出观测结果及初步分析。

关键词：臭氧柱总量　臭氧分压垂直廓线　大气温度　南极臭氧洞

Kong Qinxin, Liu Guangren, and Wang Gengchen. 1996. Observations and analyses of atmospheric ozone over the Antarctic Zhongshan Station in the spring of 1993. Scientia Atmospherica Sinica 20(4):393-407.

Using an electrochemical ozonesonde, we measured the vertical profile of ozone and temperature over the Antarctic Zhongshan Station in the spring of 1993. We observed a total ozone less than 220 Dobson units (Du) three times. The reduction of ozone concentration begins in September and reaches a maximum from mid September to mid October. The vertical distribution of the typical ozone indicates that the altitude from 13 to 23 km is the range of the largest ozone losses. This height has a good corresponding relationship with the existing height of the polar stratospheric clouds (PSCs) and volcanic aerosol. The paper presents observation results and fundamental analyses.

Keywords: total ozone, vertical profile of ozone partial pressure, atmospheric temperature, Antarctic ozone hole

吕达仁,
李卫, 1996，长春地区紫外光谱(UV-A，UV-B)
辐射观测和初步分析，大气科学，20（3）：343-351

利用自己研制的太阳-大气紫外光谱辐射计，从1992年5月在长春开始实验了野外观测，监视到达地表的太阳直射和大气散射紫外光谱辐射，主要给出长春地区地面紫外辐射，特别是紫外（UV）B段（280-320）光谱辐射的一些基本特点和初步统计特征。由于地表UV-B辐射对生态系统和人类健康有危害作用，其强度随着臭氧减少而增加。该项观测分析将有助于监测和研究臭氧层变薄的实际效应。
关键词：紫外光谱辐射
紫外B段辐射　紫外光谱辐射计

Lu Daren and Li Wei. 1996. Observation and analysis of surface ultraviolet (UV-A, UV-B) spectral radiances in Changchun. Scientia Atmospherica Sinica 20(3):343-351.

As one part of global research, surface ultraviolet (UV) spectral radiance observation began in Changchun, China, in May 1992, and later in Beijing. UV spectral radiance was measured with an absolute-calibrated UV spectroradiometer developed by the Changchun Institute of Optics and Fine Mechanics, Chinese Academy of Science. This paper describes the instrument and the observation, analyzes the statistics of UV-B and UV-A radiances, and the ratio spectra of diffused global radiances as well as ratio spectra for different solar zenith angles. Observations are compared with calculations by radiative transfer models.

Keywords: UV spectral radiance, UV-B radiance, UV spectroradiometer

刘嘉麒, 钟华, 刘东生, 1996, 渭南黄土中温室气体组分的初步研究，科学通报，41（24）：2257-2259

本文对黄土沉积物深部气体组分的含量与分布作了初步探讨。从CO_2的含量来看，渭南黄土与现代土壤相似，其CO_2含量均较高，一般为大气CO_2含量的数倍至数十倍，而且随着深度的增大，CO_2气体含量也相应增加。但渭南黄土中CO_2的碳同位素组成与现代土壤相差较大，前者$\delta^{13}C$值要比后者重16%以上，甚至黄土中CO_2的$\delta^{13}C$值比当地大气CO_2的$\delta^{13}C$值都要重很多，可以认为，黄土吸收大气CO_2是大气CO_2的汇。

Liu Jiaqi, Zhong Hua, and Liu Dongsheng. 1996. Preliminary study of greenhouse gases in loess in Weinan Shaanxi Province. Chinese Science Bulletin 41(24):2257-2259.

A preliminary discussion on the concentration and distribution of greenhouse gases in deeper loess sediments is made. The carbon dioxide (CO_2) concentration in loess and modern soil is similar; that is, CO_2 concentration in loess and modern soil is higher and generally several times to several ten times as high as that in the atmosphere. Furthermore, CO_2 concentration in loess and modern soil increases with depth. However, carbon isotope compositions of CO_2 in loess and modern soil are greatly different. The isotope $\delta^{13}C$ of CO_2 in loess is 16% higher than that in modern soil and much higher than that in the atmosphere.

Keywords: CO_2, CH_4, N_2O, loess sediments, Weinan

关键词： CO_2 CH_4 N_2O
黄土沉积物 渭南

单正军，蔡道基，任阵海，1996，土壤有机质矿化与温室气体释放初探，环境科学学报，16（2）：150-154

本文从土壤中有机质的积累和矿化的角度模拟估算了温室气体在中国土壤中的释放量。结果表明，CO_2从土壤中的释放量为37.5亿t/a，CH_4从稻田中的释放量为0.20亿t/a，N_2O从稻田中的释放量为34.5万t/a。本文提供了一种估算温室气体释放量的简便方法，并对进一步开展该项研究提出了意见。

关键词：土壤有机质 矿化
温室气体 释放

Shan Zhenjun, Cai Daoji, and Ren Zhenhai. 1996. A preliminary assessment of CO_2, CH_4, and N_2O emission from soils in China. Acta Scientiae Circumstantiae 16(2):150-154.

Greenhouse gas emissions from soils in China were assessed based on the mineralization rate of soil organic matter. It was estimated that 3.75 billion tonnes of CO_2 from soil and 20 million tonnes of methane and 345,000 tonnes of N_2O from paddy soils in China are emitted into the atmosphere every year. The paper provides a simple method for assessing greenhouse gas emissions from soils, and proposes further studies in the next step.

Keywords: soil organic matter, mineralization, greenhouse gas, emission

汪宏七，赵高祥，孙金辉，1996，强火山喷发对地面紫外辐射照度的影响，环境科学学报，16（1）：103-110

本文利用辐射传输理论，探讨了各种火山气溶胶及O_3变化对到达地面的不同波长紫外直射、漫射和总的辐射照度以及 UV-B 辐射照度的影响。并利用了菲律宾皮纳托博火山喷发前后北京地区O_3资料、激光雷达探测的平流层气溶胶增加的资料进行了模拟计算，将结果与 UV-B 观测资料作了粗略的比较，讨论了引起差别的可能原因。

Wang Hongqi, Zhao Gaoxiang, and Sun Jinhui. 1996. Effect of strong volcanic eruption on ultraviolet irradiancies at the Earth's surface. Acta Scientiae Circumstantiae 16(1):103-110.

The effects of variations in volcanic aerosols on direct, diffuse, and total ultraviolet spectral irradiances and UV-B irradiances arriving at the surface have been simulated with the applied theory of transfer calculations. The simulation results and observed UV-B irradiance change in the northwest suburb of Beijing before and after eruptions of Mt. Pinatubo are compared, and some causes related to the difference between them are discussed.

Keywords: ultraviolet irradiances, UV-B, volcanic aerosol, ozone

关键词：紫外辐射度　UV-B
火山气溶胶　臭氧

杨永辉，P. Ineson，1996，
草原土壤N_2O释放及全球变暖影响下土壤养分变化的反馈效应，应用生态学报，7(4): 386-390

用实验的方法研究了寒温带草原生态系统中不同土壤N_2O释放规律，以及全球变暖时土壤有机质分解加速情景下土壤养分(N、P)浓度升高对N_2O释放的影响。结果表明，以沼泽泥炭土N_2O释放量最大，生长季节为1.3~12.2kg $N\cdot hm^{-2}\cdot a^{-1}$，其次为灰壤土，1.5~2.4kg$N\cdot hm^{-2}\cdot a^{-1}$；酸性棕壤最小，为0~3.2kg$N\cdot hm^{-2}\cdot a^{-1}$；$N_2O$的释放层灰壤土在0~5cm，其它2种土壤为0~10cm。施肥试验表明，N、P肥在生长季节对土壤N_2O释放量影响不显著，但在生长季末期，N肥对酸性棕壤及灰壤土N_2O影响显著，施肥后第3天酸性棕壤由1.3提高到44.2kg$N\cdot hm^{-2}\cdot a^{-1}$，灰壤土则由1.9提高到31.1kg$N\cdot hm^{-2}\cdot a^{-1}$。这说明全球变暖对土壤有机质分解的影响不会诱发$N_2O$释放量的大幅度增加。

关键词：N_2O　全球变暖　山地草原　施肥

Yang Yonghui and P. Ineson. 1996. N_2O emission from grassland soils and the feedback effect of nutrient changes resulting from global warming. Chinese Journal of Applied Ecology 7(4):386-390.

Nitrous oxide (N_2O) emissions from grassland soils and the influence of nutrient changes resulting from global warming are studied. The study shows that in growing season peaty gley soil has a maximum N_2O emission that varies from 1.3 to 12.2 kg nitrogen $hm^{-2}\cdot yr^{-1}$. This N_2O emission mainly comes from the top 5 cm in the micropodzol soil and from the top 10 cm in the other two soils. Fertilizer application in growing season doesn't make any difference in different soils. However, nitrogen application greatly stimulates the N_2O emission at the end of the growing season in acid brown earth and micropodzol soil, and it reached 44.2 from 1.3 kg nitrogen $hm^{-2}\cdot yr^{-1}$ and 31.1 from 1.9 kg nitrogen $hm^{-2}\cdot yr^{-1}$ respectively. This implies that the influence of global warming on the decomposition of organic matters may not play a significant role in an increase of N_2O emission.

Keywords: N_2O, global warming, mountainous grassland, fertilizer application

喻本德，唐孝炎，李金龙，1996，大气中CH_4和N_2O浓度变化对氟氯碳化合物损耗O_3及ODP的影响，中国环境科学，16（3）：186-190

在大气中CH_4和N_2O增长的条件下，采用计数物种法，对氟氯碳化合物的分解、氯原子的储库分子的浓度的空间变化，及其损耗O_3的量和臭氧消耗潜势（ODP）进行了定量研究。结果表明，在0~20km大气范围内，NO_x增幅最大，引起这一区域的O_3有较大的增长，HO_x浓度有所降低；在平流层中上层，由于CH_4，HO_x和NO_x的增加，使得对氯原子条件储库分子有较大幅度的增加，氟氯碳化合物对臭氧的消耗能力因此有所减少。微量成分对臭氧消耗潜势（ODP）值的影响幅度不大，方向也不确定。

关键词： 臭氧 臭氧消耗潜势 氟氯碳化合物 平流层化学 模式计算

Yu Bende, Tang Xiaoyan, and Li Jinlong. 1996. A study of the impact of increasing concentrations of CH_4 and N_2O in the atmosphere on O_3 destruction by halocarbons and ODP. China Environmental Science 16(3):186-190.

The impact of increasing concentrations of methane (CH_4) and nitrogen dioxide (N_2O) in the atmosphere on ozone (O_3) destruction by halocarbons and ozone depletion potential (ODP) has been studied with counter species method. In the atmosphere from 0 to 20 km, O_3 increases quickly with NO_X rapid growth and HO_X decrease, and the latter distinctly reduces the decomposition of HCFC-22. The CFC-11 decomposition is only slightly affected by the increasing of CH_4 and N_2O. The increasing of CH_4, HO_X, and N_2O in the upper middle stratosphere considerably increases the reservoir molecules of Cl, and thus the ability of O_3 destruction of halocarbons decreases. The impact of these trace components on ODP is not distinct according to the paper.

Keywords: ozone, ozone depletion potential, halocarbons, stratosphere chemistry, model calculation

郑循华，王明星，1996，稻麦轮作生态系统中土壤湿度对N_2O产生与排放的影响，应用生态学报，7(3)：273-279

通过对太湖地区稻麦轮作生态系统的N_2O排放及土壤湿度进行系统观测和模拟实验，研究了降雨和土壤湿度对N_2O排放和产生过程的 影响。结果表明，春季和秋季麦田N_2O排放与降雨量呈明显正相关，但水稻田和冬季麦田的N_2O排放不受降雨影响。稻麦轮作周期内的N_2O排放较强烈地受土壤湿度制约，土壤

Zheng Xunhua and Wang Mingxing. 1996. Impact of soil moisture on N_2O production and emission from a rice-wheat rotation ecosystem. Chinese Journal of Applied Ecology 7(3):273-279.

The impact of precipitation and soil moisture on N_2O production and emission is studied on the basis of in situ measurement of soil humidity and N_2O emission from a rice-wheat rotation ecosystem and on a simulated experiment in the laboratory. The results show that the N_2O emission from the wheat field is positively correlated with precipitation in spring and autumn but not in winter, and that N_2O emission from a rice field is not influenced by precipitation. Within the rice-wheat rotation, N_2O emission is intensively affected by soil moisture. A 97 to 100% of soil water-holding capacity (i.e., 84 to 86

湿度为田间持水量的97-100% 或84-86% WFPS（土壤体积含水量与总孔隙度的百分比）时，N_2O排放最强，低于此湿度范围时，N_2O排放通量与土壤湿度呈正相关，反之，则呈负相关。田间N_2O排放随土壤湿度的变化形式与模拟条件下培养土壤样品的N_2O产生率变化非常相似，
但前者的最佳湿度范围比后者窄，而且偏小。

关键词：N_2O排放通量　土壤湿度　降雨量　N_2O产生率

of water-filled pore space) leads to a maximum N_2O emission. When the soil moisture is lower than this range, there is a positive correlation between N_2O emission flux and soil humidity, and vice versa. The variation pattern of N_2O emission with soil moisture from simulation is similar in that from investigation of fields, although the optimum moisture range for N_2O emission in the fields is lower.

Keywords: N_2O emission flux, soil humidity, precipitation, N_2O production rate

张厚暄，李玉娥，1996，减缓农业生产中温室气体排放的对策及其经济可行性初探，中国农业气象，17（5）：7-11

分别探讨了减缓农业生产中CO_2和CH_4排放的各种可能途径。减少CO_2排放的途径：改进土地利用格局，减少农业系统碳分离，增加生物燃料生产等。减少CH_4排放的主要途径：提高饲料质量，开发沼气生产，加强稻田水肥管理等。最后还初步讨论了实施这些减排措施的经济可行性问题。

关键词：农业生产　温室气体排放　经济可行性

Zhang Houxuan and Li Yu'e. 1996. Strategies for retarding greenhouse gas discharge from agriculture production and their economic feasibility. Agricultural Meteorology 17(5):7-11.

Strategies for retarding carbon dioxide (CO_2) and methane (CH_4) emissions in agricultural production are discussed. The ways to reduce CO_2 emissions are to improve land use, reduce carbon decomposition in the agrosystem, and increase production of biological fuel. The ways to reduce CH_4 emissions are to improve the quality of forage, utilize methane, and enhance the management of fertilizing in rice fields. Finally, the economic feasibility of these strategies is discussed.

Keywords: agricultural production, greenhouse gas emission, economic feasibility

Adaptation

李有利，杨景春，1997，河西走廊平原区全新世河流阶地对气候变化的响应，中国沙漠，
17(3)：248-252

对河西走廊盆地内河流阶地的发育情况与古气候变化情况进行分析，发现河流下切和加积过程与气候变化之间有密切关系。下切作用发生在气候稳定湿润期，加积作用发生在气候明显转化期。第一级阶地形成于5.57-3.15ka
BP，处于气候由暖湿向干冷转变时期，并且气候波动剧烈。第二级阶地形成于11-8ka BP，
位于气候由干冷向暖湿转变时期，气候波动也比较剧烈。在气候稳定湿润的8-6ka
BP，河西走廊的河流普遍发生下切
。
关键词：河流阶地 气候变化
河西走廊

Li Youli and Yang Jingchun. 1997. Response of alluvial terraces to Holocene climatic changes in the Hexi Corridor Basin, Gansu, China. Journal of Desert Research 17(3):248-252.

The relationship between alluvial terraces and the climatic changes in the Holocene is discussed. It is found that the downcutting period was coincident with a stable warmer and wetter climate, and that aggradation took place when the climate was changing either from drier to wetter or from wetter to drier. The lower terraces were formed between 5.57 ka BP and 3.15 ka BP, when climate was changing from wetter to drier. The higher terraces were formed between 11 ka BP and 8 ka BP when the climate was changing from drier to wetter. There was a downcutting period of the rivers from 8 ka BP to 6 ka BP.

Keywords: alluvial terraces, climatic change, Hexi Corridor Basin

王志禄，
祁治林，1997，北亚热带边缘引种油橄榄气候适应性及开发价值的研究，中国农业气象，18(6)：38-40

根据实验研究，分析了油橄榄在甘肃武都白龙江河谷地带引种的气候适应性程度，
评价了其开发价值及其开发前景。
关键词：油橄榄 气候生态 开发利用

Wang Zhilu and Qi Zhilin. 1997. Studies on the adaptability of climate for growing olive trees and the onset of spring in the marginal area of north subtropics. Agricultural Meteorology 18(6):38-40.

This paper presents the experimental research used to analyze the degree of the adaptability of climate for growing olive trees in the Bailong River Valley of Wu Du, Gansu Province, and also examined the use and exploitation of changes in climate.

Keywords: olive tree, climatic ecology, exploitation and utilization

吴景云, 杜志贵, 华云峰，1997，浙中地区菜豌豆翻秋栽培的气候适宜性，中国农业气象，18(1)：30-33

通过菜豌豆翻秋栽培试验，分析出秋播期气候对豌豆生长的相宜性与相悖性，并发现如采用相应的农艺措施，趋利弊害，豌豆翻秋是可行的。并且证实菜豌豆翻秋栽培具有生产周期短，工本投资少，经济效益高的优势。

关键词：菜豌豆 翻秋栽培 气候适宜性

Wu Jingyun, Du Zhigui, and Hua Yunfeng. 1997. Climatic sustability for autumn-grown vegetable peas in Central Zhengjiang Province. Agricultural Meteorology 18(1):30-33.

Based on field experiments on the cultivation of peas for off-season consumption, the adaptation and the conventions were found. Results showed that it is feasible to grow peas in autumn if appropriate cultural practices are used, leading to a shorter production cycle, less labor input, and higher economic return.

Keywords: *Pisum salivum var.hortense Poir*, autumn cultivation, climatic suitability

姜逢清, 马虹, 胡汝骥, 袁玉江，1997，新疆地表水资源对亚洲中部未来气候变化的响应，干旱区地理，20(4)：40-46

采用经验正交函数展开了分析新疆北部地表水资源的时空分布特征，并将实测资料与历史资料相结合，对南疆地表水资源进行分析。结果表明：新疆地表水资源的未来变化趋势受亚洲中部未来气候变化的影响，亚洲中部气候变冷的效应对新疆来说总体上是有利的。

关键词：新疆 地表水资源 亚洲中部 气候变化

Jiang Fengqing, Ma Hong, Hu Ruji, and Yuan Yujiang. 1997. Response of water resources in Xinjiang to future climate changes in Central Asia. Arid Land Geography 20(4):40-46.

The spatial and temporal distribution of surface water resources in north Xinjiang are analyzed using an empirical orthogonal function expansion. Based on research done previously, the sequence of surface water resources in north Xinjiang is extended from 250 to 412 years, by combining two different sequences of tree-ring chronologies into one sequence. The water resources in the south Xinjiang are analyzed using historical data with the regional characteristics of water resource circulation taken into account. The results show that the cooling trend of the climate in Central Asia will produce some good effects on water resources in Xinjiang.

Keywords: Xinjiang, surface water resources, Central Asia, climate change

Ancient

朱诚, 于世永,
卢春成, 1997, 长江三峡及江汉平原地区全新世环境考古与异常洪涝灾害研究, 地理学报,
52(3): 268-278

根据对长江三峡及江汉平原地区新石器文化遗址的分布、文化层、自然地层和埋藏古树的研究，并结合历史资料分析，探讨了本区全新世异常洪水频率的变化，共划分出4个洪水频发期：第I个洪水期（8000 a BP-5500 a BP），共发生特大洪水9次；第II洪水期（4700 a BP-3500 a BP），至少发生特大洪水9次；第III洪水期（2200 a BP-700 a BP），共发生特大洪水91次；第IV洪水期（500 a BP-100 a BP），共发生特大洪水52次，其中在小冰期最冷期（300 a BP-100 a BP）就有40次。前3个洪水期均与高温、高海面期强盛的夏季风活动有关，其中第III洪水期还与江汉平原地区围
、筑堤等不合理的土地利用有关，第IV洪水期与强盛的冬季风活动和环太平洋表层海温异常事件有关。
关键词：长江三峡 江汉平原 全新世 环境考古 异常洪涝灾害

Zhu Cheng, Yu Shiyong, and Lu Chuncheng. 1997. The study on Holocene environmental archaeology and extreme flood disaster in the Three Gorges of the ChangJiang River and the JiangHan Plain. Acta Geographica Sinica 52(3):268-278.

Based on a cultural site of Neolithic age, cultural layers, natural layers, fossil trees, and material history in the Three Gorges Changjiang River and the Jianghan Plain, the frequency (times per 100 years) changes of large floods in this region could be clustered into 4 distinct time intervals: (1) Deluge I from 8 ka BP to 5.5 ka BP, had 9 times of extreme floods; (2) Deluge II, from 4.7 ka BP to 3.5 ka BP, had 9 times of extreme floods at least; (3) Deluge III, from 2.2 ka BP to 0.7 ka BP, had 91 times of extreme floods; and (4) Deluge IV, from 0.5 ka BP to 0.1 a BP, had 52 times of extreme floods totally. In the coldest phase of the Little Ice Age (0.3 ka BP to 0.1 ka BP), floods took place 40 times. The first three deluges are all correlated with powerful activity of the East Asia monsoon during periods of high temperature and high sea level. In addition, Deluge III also resulted from unreasonable land use, such as dike-building and reclaiming land from marshes etc. in the Jianghan Plain. Deluge IV is related to the powerful activity of the winter monsoon and the anomalous sea surface temperature (SST) of the equator east of Pacific Ocean.

Keywords: the Three Gorges of Changjiang River, Jianghan Plain, extreme flood disasters, environmental archaeology, Holocene period

*薛滨, 王苏民, 夏威岚*等, 1997,
若尔盖RM孔揭示的青藏高原900 ka BP 以来的隆升与环境变化,
中国科学, 27(6): 543-547

通过对青藏高原迄今为止最深的全取芯井,
即若尔盖盆地RM孔湖泊沉积物环境多代用指标的综合判识, 重建了900 ka BP
以来盆地的古气候古环境演化序列。根据该孔的沉积特征、沉积旋回的结构，以及沉积速率的变化，结合环境冷暖、干湿的组合特点，分辨出900 ka BP
以来高原东部3次明显的隆升加速时期，也即800, 300及160 ka BP。
同时对青藏高原3次构造加速抬升在全球变化背景下的环境效应作了初步探讨。
关键词：若尔盖盆地 900 ka BP 隆升过程 环境演化

Xue Bin, Wang Sumin, Xia Weilan et al. 1997. The uplifting and environmental change of Qinghai-Xizang (Tibetan) Plateau in the past 0.9 Ma inferred from core RM of Zoige Basin. Science in China (Series D) 27(6):543-547.

According to a multidisciplinary study on the lake sediments from core RM of the Zoige Basin (i.e., the deepest wholly collected core in Tibetan Plateau), the paleoclimate and paleoenvironment for the basin in the past 0.9 Ma are reconstructed. The analytical results suggest that there were 3 distinct accelerated uplifting periods for the east Plateau in the past 0.9 Ma (i.e., 800, 300, and 160 ka BP). Sedimentary characteristics, the texture of sedimentary cycles, and variations of depositional rates, in conjunction with the environmental features of cold/warm to dry/wet combinations, are presented. The paper also probes into the environmental effects under the three accelerated tectonic upliftings on the background of global change.

Keywords: Zoige Basin, 0.9 Ma BP, uplifting process, environmental change

*刘禹, 吴祥定, 邵雪梅*等, 1997,
树轮密度、稳定C同位素对过去近100a陕西黄陵季节气温与降水的恢复, 中国科学, 27(30): 271-276

通过相关函数分析,
表明黄陵地区树轮早林最小密度与6月份气温及4～6月份降水显著相关,
相关系数分别为0.616 和-0.662。在此基础上,将早林最小密度指标与稳定C同位素指标采用第一主分量法合并,较精确地重建了黄陵地区6月气温, 重建值的解释方差达45%。同时以早林最小密度重建了该区4～6月降水,
解释方差达49%。6月份气温实质

Liu Yu, Wu Xiangding, Shao Xuemei et al. 1997. The restoration of seasonal temperature and precipitation using annual ring density and stable carbon isotope in Huangling of Shaanxi Province in the past 100 years. Science in China 27(30):271-276.

Relative function analysis indicates that there is significant correlation between the minimum tree-ring density of early woods and the temperature of June and precipitation from April to June. The correlation coefficients were 0.616 and -0.662, respectively. Based on these, the index of minimum density of early woods coincided with the index of stable C isotope using the first principle factor analysis, the temperature of June was reconstructed precisely, with an interpretive variance of 45%. At the same time, the precipitation from April to June was also reconstructed based on the minimum density of early woods and its interpretive variance was

上指示了东亚夏季风前锋到达此地时间上的早晚。
关键词：陕西黄陵 树轮密度 稳定C同位素 气温 降水 东亚夏季风

49%. The temperature of June actually indicated the early and late coming of the front of East Asian monsoon.

Keywords: Huangling Shaanxi Province, tree-ring density, stable C isotope, temperature, precipitation, East Asian monsoon

*陈骏, 季峻峰*等，1997,
陕西洛川黄土中Mn^{2+}
电子顺磁共振特征与古季风变迁,
科学通报, 42(22): 2419-2421

通过分析陕西洛川黄土和古土壤中Mn^{2+}电子顺磁共振谱,
发现黄土中的EPR（电子顺磁共振）信号是一种对东亚夏季风响应比较敏感的气候代用指标。
关键词：古季风 黄土 古土壤 Mn^{2+}的EPR谱

Chen Jun, Ji Junfeng et al. 1997. Electron paramagnetic resonance studies of Mn^{2+} in the Loess Plateau of Central China: Implication for variation of East Asia summer monsoon. Chinese Science Bulletin 42(22):2419-2421.

The Mn^{2+} electron paramagnetic resonance (EPR) intensity recorded in the Chinese loess-paleosol sequence shows a close correlation with magnetic susceptibility and strontium content as well as the oscillation of the paleoclimate. Thus the Mn^{2+} EPR signal can serve as an indicator of the East Asia summer monsoon intensity fluctuations.

Keywords: paleomonsoon, loess, paleosol, EPR signal of Mn^{2+}

汪永进, 陈琪, 刘泽纯等，1997,
南京汤山溶洞石笋连续200ka古气候记录, 科学通报,
42(19): 2093-2097

对南京东郊汤山喀斯特溶洞内的一支石笋进行了年代学、同位素地球化学和岩相学研究,
获得了距今381～166ka高分辨率古气候演变信息。
关键词：稳定同位素、气候变化、石笋、南京

Wang Yongjin, Chen Qi, Liu Zechun et al. 1997. A continuous 200-Ka paleoclimatic record from stalagmite in Tangshan Cave, Nanjing. Chinese Science Bulletin 42(19):2093-2097.

An oxygen isotope temperature record from 381 to 166 ka BP has been obtained by combining data on the isotopic composition of calcites with that of fluid inclusions trapped in a stalagmite from a limestone cave in which a fossil cranium was deposited. Several laminae in the microsequence of the stalagmite represent climatic events or shifts.

Keywords: stable isotope, climatic change, stalagmite, Nanjing

盛文坤, 姚檀栋, 邓友生，1997，用冰芯中的硫酸根离子探讨古里雅冰川作用区的干湿变化, 冰川冻土, 19(1): 90-94

根据古里雅冰帽中的SO_4^{2-}离子主要来源于陆地地表矿物以及干旱少雨的内陆地区可溶性硫酸盐分布广泛的事实，在地表矿物中含量的变化主要受气候条件，特别是干湿程度所控制的自然现象，提出了用古里雅冰芯中的 SO_4^{2-} 离子推断该冰川作用区的干湿变化。

关键词：古里雅冰帽 SO_4^{2-} 干湿变化

Sheng Wenkun, Yao Tandong, and Deng Yousheng. 1997. Dryness variation in the Guliya Ice Cap Region inferred from SO_4^{2-} within ice core. Journal of Glaciology and Geocryology 19(1):90-94.

The dryness variation in the glaciated region is inferred from the SO_4^{2-} within the Guliya ice core, based on the facts that SO_4^{2-} in the core mainly originates from terrestrial surface minerals, soluble sulfate is widespread in the dry inland regions, and the changes in concentrations of surface minerals are governed by climate conditions, particularly dryness. The dryness variation since the Little Ice Age can be inferred in accordance with the SO_4^{2-} within the Guliya ice core.

Keywords: Guliya Ice Cap, SO_4^{2-}, dryness variation

刘光秀, 施雅风, 沈永平，1997，青藏高原全新世大暖期环境特征之初步研究, 冰川冻土, 19(2): 114-123

发生在9.0-3.5 ka BP的高原全新世大暖期，早于我国大陆其它地区，并且在高原内部存在区域差异，东北部、西部及南部地区较早，其它地区稍晚。大暖期时，高原植被景观表现在分布高度的上移及森林的扩大。在大暖期鼎盛期，高原年均温度高于现代 3-5℃左右，夏季风增强，年降水量增加100-400 mm。湖泊水面扩张并升高，湖水变淡，高地泥炭发育，冰川退缩，多年冻土退化。

关键词：青藏高原 全新世大暖期 环境特征

Liu Guangxiu, Shi Yafeng, and Shen Yongping. 1997. Holocence megathermal environment in the Tibetan Plateau. Journal of Glaciology and Geocryology 19(2):114-123.

The Holocence megathermal event took place about 9.0-3.5 ka BP in the Tibetan Plateau, earlier than in other places in China. The starting and ending dates of the megathermal had regional differences inland of the plateau, in general, early in northeastern, western, and southern parts and late in the other parts. During the megathermal, vegetation on the plateau was very different from vegetation at the present time. The altitude zonation of vegetation moved forward and that of forests extended. In the maximum megathermal stage, the mean annual air temperature was 3 to 5°C higher than that of the present, annual precipitation increased by 100-400 mm with strengthened summer monsoon, and lakes extended and their level rose with freshened water in them. In addition, highland peat formed, glaciers retreated, and permafrost degraded during the Holocence Megathermal in the plateau.

Keywords: Tibetan Plateau, Holocence Megathermal, environment features

*姚檀栋, L. G. Thompson, 施雅风*等，1997，古里雅冰芯中末次间冰期以来气候变化记录研究, 中国科学, 27(5): 447-452

通过对古里雅309 m冰芯上部268 m的研究，重建了末次间冰期以来的气候环境变化。根据对古里雅冰芯的研究，清楚地划分出阶段1(冰后期)、2(末次冰期冰盛期)、3(末次冰期间冰阶)、4(末次冰期早冰阶)和5(末次间冰期)。阶段5又可分出 a, b, c, d, e 5
个亚阶段。古里雅冰芯 $\delta^{18}O$记录明确地显示了青藏高原温度变化和太阳辐射的密切关系。研究表明，太阳辐射是驱动青藏高原气候变化的主要因子。古里雅冰芯记录与北极格陵兰冰芯和南极Vostok冰芯的对比研究表明，青藏高原地区气候变化幅度大于北极地区和南极地区。
关键词：古里雅冰芯 末次间冰期 气候变化 三极对比

Yao Tandong, L. G. Thompson, and Shi Yafeng et al. 1997. Climate variation since the last interglaciation recorded in the Guliya Ice Core. Science in China (Series D) 27(5):447-452.

The climatic and environmental variations since the Last Interglaciation are reconstructed based on a study of the upper 268 m of the 309-m-long Guliya ice core. Five stages can be distinguished since the Last Interglaciation from the $\delta^{18}O$ record in the Guliya ice core: Stage 1 (Deglaciation), Stage 2 (the Last Glacial Maximum), Stage 3 (interstadial), Stage 4 (interstadial in the early glacial maximum), and Stage 5 (the Last Interglaciation). Stage 5 can be divided further into 5 substages. The $\delta^{18}O$ record in the Guliya ice core indicates clearly the close correlation between temperature variation on the Tibetan Plateau and solar activities. The study indicates that solar activity is a main forcing factor on the climate on the Tibetan Plateau. Through a comparison of the ice record in Guliya with that in Greenland and the Antarctic, it can be found that the variation amplitude of temperature is different.

Keywords: climate variation, Last Interglaciation, Guliya ice core, comparison of three poles

周卫建, 安芷生, S. C. Porter 等，1997，末次冰消期东亚和挪威海气候事件的对比, 中国科学, 27(3): 260-264

通过黄土－古土壤和泥炭剖面的高分辨率^{14}C 年代学以及有机质的 $\delta^{13}C$
值和有机碳百分含量的研究，揭示了末次冰消期百年尺度温暖－寒冷的东亚季风气候颤动事件及其反映的有意义的降水变率。它们由波令(Bolling 13-12.5 ka BP),
老仙女木(Older Dryas 12.5-11.75 ka BP)，阿勒鲁德(Allerod 11.75-11.2

Zhou Weijian, An Zhisheng, S. C. Porter et al. 1997. Correlation of climatic events between East Asia and Norwegian Sea during Last Deglaciation. Science in China (Series D) 27(3):260-264.

Using a high-resolution ^{14}C chronology, $\delta^{13}C$ values, and organic content from loess/paleosol and peat profiles in China, we can demonstrate century-scale warm-cold East Asia monsoon palaeoclimatic fluctuation events and significant precipitation variability within the Last Deglaciation. The major climatic events recognized are the Bolling (13-12.5 ka BP), Older Dryas (12.5-11.750 ka BP), Allerod (11.75-11.2 ka BP), and Younger Dryas (11.2-10 ka BP). The stratigraphic structure of the last deglaciation sediments is characterized by frequent changes in sedimentation phases

ka BP) 和新仙女木 (Younger Dryas 11.2-10 ka BP.) 事件构成。
其地层结构表现出多种沉积相的变化，反映了气候的不稳定性。这些高频、快速的气候事件可与挪威海海面温度记录的气候事件一一对比。反映了东亚季风气候通过西风带及其相关的气压系统与极地、高纬度地区古气候的遥相关。
关键词：末次冰消期
东亚季风气候的不稳定性
黄土－古土壤 古气候遥相关

reflecting climatic instability. These high-frequency, rapid climatic events can be correlated with fluctuations recorded by sea surface temperature in the Norwegian Sea. This indicates a palaeoclimate teleconnection between polar, high-latitude areas and East Asian monsoon areas through westerlies and the related atmospheric pressure system.

Keywords: Last Deglaciation, East Asian monsoon climatic instability, palaeoclimatic teleconnection, loess-paleosol

吴敬禄, 王苏民, 潘红玺, 夏威岚，1997，青藏高原东部RM孔140 ka
以来湖泊碳酸盐同位素记录的古气候特征,中国科学, 27(3): 255-259

通过若尔盖盆地RM孔湖泊化学沉积碳酸盐氧、碳同位素代用指标，重建了该区近140 ka
以来的古气候演化历史，其中末次冰期至少存在有7次暖波动及5次冷事件，其波动特征可与冰芯及深海记录相比较；而末次间冰期内部的次级波动与格陵兰冰芯GRIP氧同位素记录相一致，早期的Eemian暖期也存在两次冷波动。演化结果表明了末次间冰期和冰期气候的不稳定性。色素和碳酸盐含量指标也具有与氧同位素记录相似的结果。
关键词：若尔盖盆地 氧同位素
气候波动

Wu Jinglu, Wang Sumin, Pan Hongxi, and Xia Weilan. 1997. Climatic variations in the past 140 ka recorded in core RM, East Qinghai-Xizang Plateau. Science in China (Series D) 27(3):255-259.

The sequences of climatic evolution are reconstructed by the analyses of $\delta^{13}C$ and $\delta^{18}O$ of carbonate from core RM in the Zoige Basin since 140 ka BP. During the Last Glaciation at least seven warm climatic fluctuations and five cold events correlated with the ice core and deep sea records and during the preceding last interglacial period there were two cold climatic variations coinciding with the record of ice core of the Greenland Ice Core Project (GRIP). These results depict climatic instability in east Qinghai-Xizang Plateau over the last interglacial period. In addition, the environmental proxies of the carbonate content and pigments indicate similar results for the stable isotope record from core RM.

Keywords: Zoige Basin, oxygen isotope, climatic fluctuation

陆龙骅, 卞林根, 贾朋群, 1997，南极和邻近地区温度的时空变化特征, 中国科学, 27(3): 284-288

对南极和邻近地区1957-1993年气温的空间分布特征、时间变化趋势及多年振荡特征的研究表明，南极地区的短期气候变化在时间、空间上都是多样的，南极不是对全球温室效应响应最强烈的地区，其温度变化趋势与全球平均变化有较大差异。这种变化和差异很难简单地用全球温室效应来解释。

关键词： 南极 温度 温室效应 变化趋势 振荡特征

Lu Longhua, Bian Lingen, and Jia Pengqun. 1997. The temporal and spatial characteristics of the surface air temperature variation over the Antarctic and its surrounding area. Science in China (Series D) 27(3):284-288.

The characteristics of the spatial distribution, temporal variations trend, and oscillation for the surface air temperature variations during 1957-1993 in the Antarctic and its surrounding area were analyzed. The results show that the short-time climate change in the Antarctic is complex both temporally and spatially. The Antarctic is by no means the strongest responding region to the global greenhouse effect. There is a distinct difference in the trends of the temperature changes for the Antarctic and the global mean that cannot be explained simply by the global greenhouse effect.

Keywords: the Antarctic, temperature, greenhouse effect, variation trend, oscillation features

罗育建, 陈镇东, 1997，台湾高山湖泊沉积记录指示的近4000年气候与环境变化, 中国科学，27(4): 366-372

海拔3310 m嘉明湖的沉积物，记录了台湾高山近4ka来的古气候变动，即2.2ka BP之前的湿暖期，相当于全新世大暖期的后半段，以及2.2ka BP以来的降温期；在大暖期结束前，出现了一段特别湿暖的时期(2.2-2.4ka BP)。鸳鸯湖及七彩湖的沉积物，也显示大暖期似乎结束于2-2.3ka BP。另外，在降温期中出现了一短暂暖期(820-1320AD)，似乎对应于中世纪暖期；而自1320 AD开始，气候又转变为干冷，意味着小冰期来临。这些气候变动也可与大鬼湖所记录的相对应。

关键词：古气候 小冰期 中世纪大暖期 全新世大暖期 台湾 嘉明湖 鸳鸯湖 七彩湖

Luo Jiann-Yuh and Chen Tung Arthur. 1997. Paleoclimatological and paleoenvironmental records since 4000 a BP in sediments of alpine lakes in Taiwan. Science in China. (Series D) 27(4):366-372.

The 3310-m-high Chia-min Lake records the climatic history since 4 ka BP in Taiwan. The warm/wet period before 2.2 ka BP seemed to correspond to the later part of the Holocene Megathermal, and the cold/dry period during 0-2.2 ka BP correspond to the Katathermal. Before the termination of the Megathermal, an especially warm and humid segment (2.2-2.4 ka BP) emerged. The palaeoclimatic records from Yuen-yang and Chi-tsai Lakes support the notion that the Megathermal in Taiwan terminated during 2-2.3 ka BP. A warm segment (820-1320 AD) in the Katathermal could be considered the Medieval Warm Period. The climate turned cold and dry after 1320 AD and this indicated the onset of the Little Ice Age. These palaeoclimatic variations are also in good agreement with those recorded in Great Ghost Lake.

Keywords: palaeoclimate, Little Ice Age, Medieval Warm Period, Holocene, Megathermal, Taiwan, Chia-min Lake, Yuen-yang Lake, Chi-tsai Lake

董光荣, 靳鹤龄, 陈惠忠，1997，末次间冰期以来沙漠－黄土边界带移动与气候变化，第四纪研究，(2): 158-167

位于现代季风区边缘的沙漠－黄土边界带在末次间冰期以来经历了多次北进南退移动和暖湿、冷干变化。其中，盛冰期时移动幅度最大，南界可能达30°N左右；末次冰期和全新世气候鼎盛期最靠西北，南界在古长城以北。全球冰期－间冰期波动导致的气候变化以及东亚冬夏季风强弱变化是控制边界移动和气候变化的根本因素。

关键词：末次间冰期
沙漠－黄土边界带 气候变化

Dong Guangrong, Jin Heling, and Chen Huizhong. 1997. Desert-loess boundary belt shift and climatic change since the Last Interglacial Period. Quaternary Sciences (2):158-167.

Desert-loess boundary belt, which is located in the fringe of the contemporary monsoon climate region, has undergone a multiple northward-shift, southward-retreat, and the change of warm and cold, wet and dry since the Last Interglacial Period. During the Last Interglacial stage, its southern border reached about 30° N, and during the Last Glacial Period, the northern border was close to the 400 mm isohyet of today, its middle part being at the zone of the ancient Great Wall ruins. The shift of the desert-loess boundary belt is an inevitable outcome of global glacial-interglacial climatic variation and is related to the variations of the East-Asia monsoon.

Keywords: Last Interglacial period, desert-loess boundary belt, climatic change

*曾永年, 马海洲, 李玲琴*等，1997，1.2 Ma BP以来西宁盆地沙漠化问题初探，中国沙漠，17(3): 226-229

西宁盆地大墩岭黄土剖面L_1、L_2、L_{15}中存在3层古风成砂。沉积年代及各种环境记录的分析表明，这3层古风成砂分别代表了1.2 Ma BP以来西宁盆地在中更新世初、中更新世末和晚更新世晚期发生的3次较大规模的流沙活动，均受制于冰期时干冷严酷的气候条件控制。进一步分析得出西宁盆地的沙漠化正逆过程受到第四纪全球波动变化以及青藏高原隆升的影响。第四纪青藏高原冰川的冰缘作用为其边缘的沙漠、黄土沉积提供了丰富的物质来源。

关键词：西宁盆地 古风成砂
气候变化

Zeng Yongnian, Ma Haizhou, Li Lingqin et al. 1997. First discussion on problems of desertification in the Xining Basin since 1.2 Ma BP. Journal of Desert Research 17(3):226-229.

There are three eolian paleosand layers in the loess profile of Dadunling, Xining Basin. The age and environmental records of loess stratigraphy proved that these three eolian paleosand layers, which represent three extensive desert expansion periods in the Xining Basin since 1.2 Ma BP, were formed in the early part and the latter part of the Middle Pleistocence and the latter part of the Last Pleistocence, respectively. Furthermore, the Quaternary climatic changes and the uplift of Qinghai-Xizang Plateau controlled the advance and the retreat processes of desertification in the studied area. In detail, the periglacial action of the plateau glacier in the Quaternary produced a lot of detritus for desert and loess deposition in adjacent areas.

Keywords: Xining Basin, Eolian paleosand, climatic changes

张虎才，1997，撒哈拉沙漠东北部全新世气候与人类活动，
中国沙漠，17(3): 291-294

在12000 a BP
前，现代极端干旱的撒哈拉沙漠东北部就出现了代表湿润气候记录的湖相沉积；全新世以来，在9900－2400 a BP形成了众多的淡水湖泊，9800－6450 a
BP达到鼎盛时期。在6000 a
BP－3600 a
BP前，湖泊演化进入波动期，反映了该时期气候环境周期性的变化并具600年的准周期。撒哈拉沙漠东北全新世湿润时期是该区古人类发展与进步、繁衍与分化的时期；也是自然演变史上一个十分重要的时期，其中强烈的风化作用和碎屑物质积累为今日撒哈拉沙漠的形成奠定了物质基础。
关键词：撒哈拉沙漠 全新世 古气候

Zhang Hucai. 1997. Holocene climatic environment and human activities in the northeastern Sahara Desert. Journal of Desert Research 17(3):291-294.

The data for age determination from lake facies sedimentation in the northeastern Sahara Desert showed that there were a lot of large lakes in 9900-2400 a BP. Moreover, the time 9800-6450 years BP is a period of significant growth in the processes of lake forming. From 6000 years BP to 3600 years BP, the evolution of lakes arrived at its fluctuating period which corresponded to the changing climatic environment. This changing period lasted about 600 years. The humid period, represented by lake facies sedimentation in the Holocene in the northeastern area of the Sahara Desert, was also a period of development, progress, evolution, and differentiation of ancient human beings in this area, as well as the key period in natural evolutionary history. The heavy erosion and detrital accumulation in this period had laid a foundation of material source for forming the Sahara Desert.

Keywords: Sahara Desert, Holocene, paleoclimate

叶佰生, 李世杰, 施雅风，1997，从末次冰盛期冰川规模探讨当时的气候环境，
冰川冻土，19(1): 1-9

根据乌鲁木齐河源区末次冰盛期形成的古冰川遗址和现代气候条件下冰川物质平衡与气候的关系，结合冰川动力学模型估算出冰川到达末次冰盛期规模时的气候条件。依据末次冰盛期冰川面积，结合冰川体积综合分析，乌鲁木齐河源区末次冰盛期的夏季气温低于现代气温4.8℃左右，降水约只有现代的30%。但目前其它古气候方法的研究结果

Ye Baisheng, Li Shijie, and Shi Yafeng. 1997. Investigation of climatic condition by the glacier extension in the Last Glacier Maximum. Journal of Glaciology and Geocryology 19(1):1-9.

Based on glacial investigation well preserved in the headwater of the Urumqi River and relationship between glacier mass balance and climate in the contemporary climatic scenarios, this paper presents the estimated climatic scenarios in the Last Glacial Maximum (LGM) using glacier dynamics method. By combining the equilibrium line altitude (ELA) and glacier volume in the LGM, it is determined that summer air temperature in the headwater of the Urumqi River in the LGM was 4.8°C lower than the contemporary temperature and the precipitation in that time accounted for approximately 30% of the contemporary one.

表明，末次冰盛期的夏季气温比现代低5.6℃左右，两者相差约0.8℃，造成差异的原因可能主要是冰川动力学方法没有考虑构造抬升对气温的影响。

关键词：末次冰盛期 冰川 气候

However, other paleoclimatic studies demonstrate that the temperature in the LGM was 5.6°C lower than that at present. The difference of 0.8°C is attributed to the fact that ground surface uplift was not figured by the glacier dynamics method.

Keywords: Last Glacier Maximum, glacier, climate

施雅风, 郑本兴, 姚檀栋，1997，青藏高原末次冰期最盛时的冰川与环境，冰川冻土，19(2): 97-113

在16－32 ka BP的末次冰期最盛(LGM)时，青藏高原环境有重大改变，较现代降温7℃左右，降水为现代的30%－70%。极地型冰川广泛分布，高原内部平衡线较现代下降值减至500－300m以内，高原东部、南缘及西缘可能以亚极地型冰川为主，平衡线下降800m以至1000－1200m。据统计，包括周围高山在内的青藏高原冰川面积在35×10^4 km^2左右，为现代冰川的7.5倍，总冰量相当于全球海平面变化24.2cm。多年冻土在LGM时广泛发展，面积达220×10^4 km^2，比现在扩大40%。海拔较低处受季风降水影响强烈的湖泊出现低水位或接近干枯，海拔较高处受季风影响微弱的高原中西部湖泊呈现低于间冰期、高于冰后期的次高水位，湖水含盐量增加，柴达木出现多层石盐沉积。

关键词：末次冰期最盛时 冰川平衡线 湖泊 多年冻土

Shi Yafeng, Zheng Benxing, and Yao Tandong. 1997. Glacier and environments during the Last Glacial Maximum (LGM) on the Tibetan Plateau. Journal of Glaciology and Geocryology 19(2):97-113.

During the Last Glacial Maximum (LGM) at about 16-32 ka BP, it was 7°C colder than at the present and precipitation was 30% to 70% that of the present on the Tibetan Plateau. Polar-type glaciers developed extensively. The equilibrium line in the LGM was 300 to 500 m lower than at present and subpolar type glaciers might exist in the eastern, southern, and western edges of the plateau, with an equilibrium line altitude (ELA) decrease of 800 m or even up to 1,000-1,200 m. According to preliminary statistics, the glaciated area on the plateau in the LGM is about 350,000 km^2, 7.5 times larger than at present, and the ice volume on the plateau at that time was estimated to be about 87,500 km^3 and equivalent to a decrease of 24.2 cm of the global sea level. Permafrost developed extensively to its maximum, about 2,200,000 km^2. Lakes in the eastern part of the plateau, which depended significantly on monsoon precipitation, shrank or even disappeared during the LGM. Those located in the northwestern part of the plateau had lower levels than in former interglacial stadial and higher than that during the post glacial period because of the effect of the westerlies. Almost all lakes on the plateau became saltier.

Keywords: Last Glacial Maximum (LGM), glacier, equilibrium line altitude (ELA), lakes, permafrost

Climate Variation

秦大河,
李培基, 1997，气候不稳定性的重要发现——对国外冰芯研究进展的综述, 地理学报，52(5): 470-476

冰芯分析促进了气候环境变化研究的发展。通过对格陵兰冰盖顶部的一对冰芯的测定，证实了末次冰期出现过多次冰段和间冰段的快速转换，二者气温相差达5~8°C。GRIP冰芯还发现末次冰期盛期也被冷期所打断。安第斯山冰芯揭示了末次冰期热带气候变化之谜。这些发现动摇了曾被普遍接受的气候稳定的间冰期和气候多变的冰期的结论，恒温式热带冰期气候运转模式也受到挑战。对GISP2冰芯钻孔温度的测量，解释了近4万年来地表气温的变化，证实了极地对气候变化的放大作用。这同时也意味着未来温室效应导致的极地大陆冰盖不稳定性加剧和海面突变的灾难性结局是不容忽视的。
关键词：冰芯 气候不稳定 冰段和间冰段 热带气候敏感性

Qin Dahe and Li Peiji. 1997. Climate instability recorded in ice cores: An overview of recent findings by ice-core studies. Acta Geographica Sinica 52(5):470-476.

Analysis of ice cores drilled through Greenland and Antarctic ice sheets and high glaciers has made great progress in our study of the evolution of Earth's climate. One of the principal advances made by the Greenland Ice Core Project (GRIP) and Greenland Ice Sheet Project (GISP2) ice cores has demonstrated that the last glacial period was punctuated by a series of abrupt warm interstadials during which temperature increased by about 5°C to 8°C for a few hundred years. Another significant new finding documents that the Eemian interglacial was interrupted by a series of severe cold periods. In a third advance, two ice cores from the Andes open a view of the ice age tropics. And the last advance, analysis of the borehole temperature at GISP2 proves that polar amplification of climate change is a central characteristic of Earth's climate. With these new discoveries, the widely accepted concepts of a noisy glacial climate and a quiet interglacial climate as well as thermostatic tropic came under challenge. These discoveries also bring out questions about the consequences of future global warming. The greenhouse effect will end the recent climate stability and bring rapid climate change to our doorstep. We can not ignore all of these!

Keywords: ice core, climate instability, stadial and interstadial, tropic climate sensitivity

许国昌, 姚辉, 李珊, 1997, 中国干旱-半干旱区当代气候变化,
第四纪研究，(2):105-114

作者在最近几年有关研究的基础上，结合最新资料和成果，对我国干旱-
半干旱地区当代气候变化的基本趋势做了比较系统的分析,
并与全国及北半球气候变化相结合。研究结果表明：中国干旱-
半干旱地区气候变化与全国以及北半球气候变化相比有一定的特点。
冬夏气温变化不同，干旱-
半干旱地区降水变化趋势不同。
关键词：干旱-半干旱地区
气候变化

Xu Guochang, Yao Hui, and Li Shan. 1997. The present climate change in arid and semiarid region of China. Quaternarnary Sciences (2):105-114

On the basis of a recent investigation together with up-to-date information, the authors made a comparative study on the present climate changes in arid and semiarid regions of China. It revealed that the general trend of climate change in arid and semiarid regions of China was characteristic compared to that of all China and the entire Northern Hemisphere. Temperature variation is different between summer and winter in arid and semiarid regions. The trend of precipitation variation is also different in arid and semiarid regions.

Keywords: arid and semiarid regions, climate change

林志强，1997，全球平均海温演变的奇异谱分析, 气象，23(9):31-34

应用奇异谱分析法（SSA）对1856－1991年全球平均海温季距平演变特征进行了研究，并对各分量做了最大熵谱分析。研究结果表明，海温演变除了具有81年的周期外，另两个明显周期是准10年和2.6－6年。从各主分量的方差贡献来看，前15个主分量的方差贡献之和是总方差的78%。从特征向量的分布函数来看，第1、2特征向量的方差之和占总方差的48%,
其合成曲线基本描述了海温年距平在数年或数十年时间内的总体平均特性；前四个分量的合成曲线能够很好的地拟合海温年变化特征。
关键词：海温 奇异谱分析 主分量

Lin Zhiqiang. 1997. The singular spectrum analysis for global sea surface temperature anomaly. Meteorological Monthly 23(9):31-34.

The global sea surface temperature anomaly (SSTA) for the past 136 years (1856-1991) was studied with singular spectrum analysis, then a maximum entropy spectrum analysis for several principal components was conducted. The result shows that SSTA has several very evident periods of quasidecade and 2.6 to 6 years in addition to 81 years. The first fifteen principal components have a variance contribution of 78%. Eigenvector 1,2 stand for linear characteristic of SSTA, their variance contribution is 48%, and their resultant curve basically describes average trends during several years and several decades. Eigenvector 3 and later eigenvectors stand for wave characteristics of SSTA. The first four principal components can better fit SSTA yearly change characteristics.

Keywords: SSTA, singular spectrum, principal component

解思梅, 邹斌, 王毅, 包澄澜, 1997，南极海冰异常变化与全球海平面变化, 海洋学报, 19(1): 27-37

通过分析1973-1994年南极海冰的长期变化趋势和全球海平面的年际变化规律，发现南极海冰80年代明显比70年代的海冰面积偏小，海平面高度80年代平均值也明显比70年代偏高。这种变化标志着全球气候增暖。海水温度和大气温度的明显增高，导致海冰长期累积的大量减少，南极大陆冰盖向海洋输送冰川的数量也增多，这一切造成了海平面的明显上升，特别是太平洋尤为明显。南大洋水温偏高，南大洋环流在南美大陆向北分支的秘鲁寒流水温也相对偏暖，这就容易发生EI Nino 事件。
关键词：南极海冰 全球海平面 大洋环流 长期变化 EI Nino 事件

Xie Simei, Zou Bin, Wang Yi, and Bao Chenglan. 1997. The abnormal change of the Antarctic Sea ice and global sea level variation. Acta Oceanologica Sinica 19(1):27-37.

The long-term changing trend of the Antarctic sea ice and the annual variation of global sea level were analyzed. It was found that the area of the Antarctic sea ice was much smaller and that the global sea level was much higher in 1980s than in the 1970s. This indicates that the global temperature has been increasing. Because of the higher air and water temperatures, the long-term accumulation of sea ice has been decreasing greatly and more and more of the glacier has been flowing to the ocean from the Antarctic ice sheet. All these influences caused the distinct increases in the global sea level, especially in the Pacific. Corresponding to the high water temperature in the South Ocean, the temperature of the Cold Wave has been increasing. So, an El Niño event is likely to occur.

Keywords: the Antarctic sea ice, global sea level, ocean circulation, long-term variation, El Niño event

王绍令，1997，若尔盖高原及其周围山地的冻土和环境, 冰川冻土，19(1)：39-46

若尔盖高原内部年平均气温0.6-3.3℃，气温年较差19.1-21.2℃,已不具备多年冻土形成和保存的气候条件。据1972年7月间试坑和钻孔测温，在1.0-2.2 m深处地温为5-8.4℃，浅层地下水温为6.0-7.8℃，由此判断不存在多年冻土，季节冻结深度为1.0-2.0 m。区内沼泽演化表明，部分沼泽已疏干或向疏干趋势发展

Wang Shaoling. 1997. Frozen ground and environment in the Zoige Plateau and its surrounding mountains. Journal of Glaciology and Geocryology 19(1):39-46.

Field investigation shows no permafrost in the interior of the Zoige Plateau. The mean annual air temperature is 0.6 to 3.3°C, and the annual range of air temperature is from 19.1 to 21.2°C. This is not cold enough to form permafrost. According to the temperature measurement from pits and boreholes (in July 1992), the groundwater temperature is 5.0 to 8.4°C at a depth of 1.0 to 2.2 m, and the shallow ground temperature is 6.0 to 7.8°C. The seasonal frozen depth is 1.0 to 2.0 m. The swamp evolution reveals that a part of swamp has been drained and another part will be drained. The degeneration and desertification of grasslands

，草场退化和草原沙化已成为本区生态环境的重要问题，已影响到畜牧业的发展。

关键词：若尔盖高原 冻土 环境演化

becomes an important problem to the ecological environment and impacts livestock.

Keywords: Zoige Plateau, frozen ground, environment evolution

孙东怀, 刘东生, 陈明扬, 安芷生，1997，中国黄土高原红粘土序列的磁性地层与气候变化，中国科学， 27(3)：265-270

对西峰和西安红粘土剖面作了磁性地层研究，表明黄土高原风成堆积和东亚古季风的发育至少自6.5 Ma BP前开始；初步重建了磁化率变化反映的晚第三纪东亚夏季风气候的时间序列，6.5-2.5 Ma红粘土磁化率值的逐步升高可能与青藏高原的隆起过程密切相关。黄土高原的风尘堆积速率在距今3.2 Ma以后显著增大，反映了冰量对东亚冬季风和风尘堆积的影响。中国黄土高原风成红粘土序列记录的晚第三纪东亚古季风变迁可视为青藏高原隆起、太阳辐射与全球尤其是北半球冰量变化等多种因素相互作用的结果。

关键词：红粘土磁性地层 风成堆积 季风变迁 青藏高原隆起

Sun Donghuai, Liu Dongsheng, Chen Mingyang, and An Zhisheng. 1997. Magnetostratigraphy and palaeoclimate of red clay sequences from Chinese Loess Plateau. Science in China (Series D) 27(3):265-270.

Two red clay profiles near Xi'an and Xifeng were investigated in an attempt to determine magnetostratigraphic and palaeoclimatic records. The results show that aeolian dust accumulation and the East Asia palaeomonsoon system had begun by 6.5 Ma. The late Tertiary palaeoclimatic history of the red clay as reflected by magnetic susceptibility is reconstructed during the period of 6.5 to 2.5 Ma. A stepwise increase in susceptibility of aeolian dust accumulation appears to have a close correlation to the uplift processes of the Tibetan Plateau. The remarkable increase of aeolian dust accumulation at 3.2 Ma appears to be a result of the influence of global ice volume on the East Asia monsoon. Palaeomonsoon variation during the late Tertiary as recorded in the red clay sequences from the Chinese Loess Plateau can be regarded as the product of a number of interacting factors, such as uplift of the Tibetan Plateau, solar radiation, global ice volume, etc.

Keywords: magnetostratigraphy of red clay, aeolian dust accumulation, monsoon variation, uplift of Tibetan Plateau

王绍令,
赵秀峰, 1997, 青藏公路南段岛状冻土区内冻土环境变化, 冰川冻土, 19(3): 231-239

将90年代的勘探、钻孔测温和地面综合调查等实测资料与70年代对比，发现青藏公路南段岛状多年冻土区内的冻土退化和生态环境变化相当明显。表现为岛状多年冻土南界北移12
km，多年冻土岛总面积减少7%。沼泽化湿地面积缩小约三分之一，沼泽化草甸向草原化草甸逐步转化，湖塘和洼地中的水生植物群落向湿、中生植物群落演替。草场退化严重，少数地段土地沙化，形成活动性沙丘，目前区内的生态环境正向劣势方面发展。
关键词：青藏公路南段 冻土退化 环境变化

Wang Shaoling and ZhaoXiufeng. 1997. Environmental change in patchy permafrost zone in the south section of the Qinghai-Tibet Highway. Journal of Glaciology and Geocryology 19(3):231-239.

Comparison of the ground temperature and other investigation data in the 1990s with that in the 1970s, showed significant permafrost degradation and eco-environmental change in the patchy permafrost zone in the south section of the Qinghai-Tibet Highway. The southern limit of permafrost moved northward about 12 km. The area of patchy permafrost decreased 7%. The area of swamp land decreased about one-third. The swamp meadow gradually changed into grassy meadow, and the aquatic plants in lakes and low wetlands were replaced by moderate hydrophilous plants. Along with serious degradation of grassland, some lands underwent desertification and a movable sand dune formed. The eco-environment became worse gradually.

Keywords: southern section of the Qinghai-Tibet Highway, permafrost degradation, environmental change

陆龙骅, 卞林根,
贾朋群, 1997, 南极臭氧的短期气候变化特征, 应用气象学报, 8(4): 402-412

本文利用1957－1992年南极地区大气臭氧总量地面观测站资料，对南极地区臭氧的时空变化特征进行了研究。结果表明：虽然近35年来南极地区大气臭氧有较明显的减少趋势，但在不同地区、时段和季节，其变化趋势也不相同。近年来南极地区大气臭氧的显著减少主要是由于南极臭氧洞的形成和发展所造成的。南极地区的大气臭氧存在明显的年振荡、准20个月和准30个月

Lu Longhua, Bian Lingen, and Jia Pengqun. 1997. Short-term climatic change of Antarctic ozone. Quarterly Journal of Applied Meteorology 8(4):402-412.

In this paper, the spatial-temporal variations of Antarctic ozone are studied using the surface-observed data of Antarctic ozone from 1957 to 1992. The results show that during the last 35 years the mean total ozone in Antarctic has an obvious decreasing trend, but in different regions, periods, and seasons, there are great differences for the ozone variable trend. In recent years, the formation and the development of the Antarctic ozone hole caused the discrepancy in ozone data in the Antarctic. There exist obvious annual oscillation periods of approximately 20 and 30 months for Antarctic ozone. The ozone variations are closely related to astronomical sunshine, stratospherical temperature field, polar

的振荡周期。臭氧变化与天文日照、平流层温度场、平流层冰晶云及人类活动有关。

关键词：南极地区 臭氧总量 变化趋势 振荡周期

stratospherical ice crystal clouds, and the presence of man-made CFCs and halons, etc.

Keywords: Antarctic, total ozone, variable trend, oscillation period

陈兴芳,
晁淑懿，1997，台风活动的气候突变, 热带气象学报, 13(2): 97-104

通过近40年西太平洋和南海台风资料的分析，发现台风活动有明显的气候振动，并且在70年代前期发生气候突变，表现为70年代前期以前台风数增多、台风偏强趋势；70年代中期以后则相反，为台风数减少台风偏弱趋势。80年代末台风数再次转为增多趋势，但强度的气候趋势没有发生。分析表明，台风活动的气候振动和气候突变与大气环流特别是西太平洋副高的气候变化有一定关系，同时与赤道太平洋和北太平洋海温的气候变化有一定的相关。

关键词：台风 短期气候振动 气候突变

Chen Xingfang and Chao Shuyi. 1997. The shift in climate of typhoon activities. Journal of Tropical Meteorology 13(2):97-104.

Data on typhoons over the West Pacific and the South China Sea for the last 40 years show that the short-term climatic oscillation of typhoon activities is anomalous. Results show that the variation in typhoon activity had a climatic shift in the early 1970s. Before the climatic shift, the number of typhoons and intensity increased, but after that the tendency of variation is contrary. In addition, the increased number of typhoons during the recent years also suggests a climatic shift in the late 1980s, but the intensity of typhoons has not increased at present. Analysis indicates that the short-term climatic oscillation and the sudden climatic change is related to the climatic oscillation of general circulation and sea surface temperature especially to the West Pacific subtropical high.

Keywords: typhoon, short-term climatic oscillation, climatic shift

王敬方,
吴国雄，1997，持续性东北冷夏的变化规律及其相关特征,
大气科学，21(5): 523-532

利用旋转主分量(RPC)方法，分析近40年来我国夏季温度变化的规律。得到了表示东北冷夏变化的指标(NETI)。利用该指标对东北气温和500hPa高度场，以及全球SST进行时滞相关分析发现，东北低温一般在当年5月开始，持续至第二年4月结束，构成一个“冷夏年”。而在前一年6月和后一年的6月有显著的暖夏，呈现着准两年韵律的特征。东北冷夏的这种变化规律与大气环流异常关系密切。
关键词：东北 冷夏 旋转主分量 时滞相关

Wang Jingfang and Wu Guoxiong. 1997. Evolution and characteristics of the persistent cold summer in Northeast China. Scientia Atmospherica Sinica 21(5):523-532.

The method of rotational principal component (RPC) was used to diagnose the evolution of the air temperature in summer over China in the last 40 years. An index presenting the cold summer in Northeast China was obtained. Time-lagged correlation analysis between this index and the 500 hPa geopotential height of the Northern Hemisphere and the global sea surface temperature (SST) shows that the lower temperature in Northeast China usually starts in May and persists for about one year, which composes a “cold-summer year.” In addition, the monthly mean temperature in June in the preceeding year and that in the following year are significantly warmer than normal, showing characteristics with a “quasi-biannual” duration. It was shown that these characteristics are significantly linked to an anomaly of the atmospheric circulation.

Keywords: Northeast China, cold summer, rotational principal component, time-lagged correlation

张一平,
彭贵芬，1997，低纬高原城市昆明的气候特征, 高原气象，
16(3): 319-325

利用昆明城内的实测资料及城郊气象站的资料，研究了低纬高原城市昆明城市内外的气候特征、变化规律及其差异。在此基础上，探讨了低纬高原城市气候形成的机制，为城市环境污染防治及城市建筑设计提供科学依据。
关键词：低纬高原、城市气候、热岛效应

Zhang Yiping and Peng Guifen. 1997. The characteristics of urban climate of Kunming in low latitude and plateau area. Plateau Meteorology 16(3):319-325.

Observation of the microclimates was carried out at the surface in the city and suburbs of Kunming, China. The main results are as follows: the wind speed in the suburbs is larger than in the city, and differences in the daytime temperature of the city is higher than that of the suburbs, with differences larger at nighttime. Another result of the complicated thermo-dynamics in the city is the humidity in city is less than that in the suburbs, but its differences vary at different time, sky, and surface conditions.

Keywords: low latitude and plateau, urban climate, urban heat island effects

庞文保, 杨文峰,
李兆元，1997，陕西省夏季降水量的长期变化趋势, 高原气象，
16(3): 326-330

对陕西省榆林、西安、汉中夏季降水量的历年变化进行趋势分析，并用灰色拓扑方法作了1996-2000年的趋势预测。分析表明，关中的初夏旱和伏旱突出，地处半湿润地区的西安夏季多年平均降水量比半干旱地区的榆林还少。自1951年以来，陕西夏季降水量的总趋势是:关中、陕南有下降趋势，而陕北则不明显。此外，关中、陕南夏季降水存在连续几年多雨或连续几年少雨的时期，而陕北则呈现少雨年和多雨年交替出现的高频振荡。
关键词：夏季 降水量 变化趋势

Pang Wenbao, Yang Wenfeng, and Li Zhaoyuan. 1997. Long-term trend of summer precipitation in Shanxi Province. Plateau Meteorology 16(3):326-330.

The trend of summer precipitation is predicted with the method of grey topology using summer precipitation data from stations at Yulin, Xi'an, and Hanzhong. Analysis shows that there are obvious droughts at the beginning and middle of the summer in the Guanzhong area. The mean summer precipitation in Xi'an (a semi-moist area) is less than in Yulin (a semi-drought area). Trends of summer precipitation have decreased in Guanzhong and the southern part of Shanxi Province since 1951, but the decreasing trend didn't change significantly in the northern part. In addition, more rain happened successively in Guanzhong and in the southern part, whereas high oscillation happened frequently in the northern part.

Keywords: summer, precipitation, variation trend

East Asia Monsoon

许建军, 朱乾根,
施能,1997,近百年东亚季风长期变化中主周期振荡的奇异谱分析,
气象学报，55(5): 620-627

依据1873-1990年海平面气压场资料，计算出东亚冬、夏季风强度指数，并利用奇异谱分析方法对近百年东亚季风强度变化的周期性及周期振荡分量的年际、年代际特点进行分析。研究表明：冬、夏季风都存在准2a（QBO），3-6a (LFO)年际振荡， 以及16-18a（IDO）的年代际振荡和长期变化趋势。各振荡分量都具有年代际的差异，其中QBO表现得最为典型。冬季风的

Xu Jianjun, Zhu Qiangen, and Shi Ning. 1997. The singular spectral analysis of periodic oscillation in long-term variation of East-Asian monsoon in recent century. Acta Meteorologica Sinica 55(5):620-627.

With sea level pressure data from 1873-1990, the paper calculates the East-Asia monsoon intensity index to analyze the periodic oscillation of East-Asian monsoon long-term variation in recent century using the method of singular spectral analysis (SSA). It indicates that: (1) Long-term variation in the East-Asian monsoon shows the interannual oscillation of the quasi-biennial (QBO) low-frequency oscillation (LFO) of 3-6 years and the interdecadal oscillation (IDO) of 16-18 years. (2) These oscillation components all exhibit the interdecadal variation and the QBO is particularly remarkable. (3) The amplitude of the QBO in winter monsoon is smaller before 1920s and shows a wavelike changing with greater amplitude of about 12 years and smaller

QBO在1920年以前振幅较小，大约呈现12a大振幅和6a
小振幅的波状变化特征；而夏季风则呈现6a大振幅和3a小振幅的波状变化。夏季风中的年代际变化影响较小。
关键词：东亚季风、年际、年代际、奇异谱分析。

of about 6 years. (4) The summer monsoon changing is opposite that of the winter monsoon with about 6 years greater and about 3 years smaller. (5) The interdecadal variation in summer monsoon is dominant.

Keywords: East-Asian monsoon, interannual, interdecadal, singular spectral analysis

许建军, 朱乾根, 施能，1997，近百年东亚冬季风与ENSO循环的相互关系及其年代际异常, 大气科学，21(6): 641-648

文章以东亚季风强度指数作为衡量冬季风强弱的标准，采用相关及滑动相关的计算技术，研究了近百年东亚冬季风与ENSO循环的相互关系及其年代际变化。此研究表明：1）东亚冬季风的强弱变化与赤道东太平洋海温变化之间具有显著的年代际变化特征；2）季风与ENSO循环之间的关系受到季风的准两年振荡（QBO）以及季风-
海洋系统的年代际背景配置关系的共同作用；3）当季风与海洋背景场处于相同的位相时，强冬季风有利于第二年冬季赤道东太平洋海温的升高，产生EI
Nino事件；当双方背景场处于反位相状态时，强冬季风则对应于第二年冬季的La Nina事件。
关键词： 东亚冬季风 ENSO循环 年代际异常

Xu Jianjun, Zhu Qiangen, and Shi Ning. 1997. The interaction of East Asian winter monsoon with ENSO cycle and their interdecadal variations in recent century. Scientia Atmospherica Sinica. 21(6):641-648.

The interaction of the East Asian monsoon with the El Niño/Southern Oscillation (ENSO) cycle and their interdecadal variation in recent century are discussed using the method of coherence and moving coherence analysis. The results point out: (1) the relationship of the East Asian monsoon and the east equatorial Pacific sea surface temperature (SST) on the interannual time scale shows a distinct interdecadal variation; (2) the interaction of monsoons with the ENSO cycle is influenced by the quasi-biennial oscillation (QBO) in the monsoon and the phase relation of monsoons to SST on the interdecadal time scale; (3) when the interdecadal variation of the East Asian monsoon is in phase with that of the east equatorial Pacific SST, the strong winter East Asian monsoon is favorable to the temperature increasing in the east equatorial Pacific in the next winter and leads to El Niño event; and when the two air-sea systems are out of phase, the strong winter monsoon corresponds to La Niña in the next winter.

Keywords: East Asian winter monsoon, ENSO cycle, interdecadal variations

阎俊岳，1997，南海西南季风爆发的气候学特征, 气象学报，55(2): 174-185

利用十多年的岛屿站、沿岸站、船舶观测记录及卫星观测的高反射云（HRC）资料，研究南海西南季风爆发的过程及有关气候学特征，包括环流场、云量场、降水场、海-气热交换场的迅速变化。南海西南季风爆发的平均时间为5月中旬，其年际变化达一个月左右。西南季风的爆发使南海云量和降水量增多，对流加强，但各海区具有不均匀性。强对流区稳定在南海中部，季风雨带之间没有明显的跳跃现象。在西南季风爆发一个月之前南海表层迅速升温，为季风爆发提供了热量和水气条件。南海海面热交换分量在4月至5月间有明显改变，尤其是潜热交换和蒸发量显著增大，这可能是触发西南季风爆发的原因之一。

关键词：南海 西南季风爆发 气候学特征

Yan Junyue. 1997. Climatological characteristics on the onset of the South China Sea Southwest Monsoon. Acta Meteorologica Sinica 55(2):174-185.

According to the records of meteorological stations, marine ship observation data, and high reflective clouds (HRC) data by satellite remote sensing of more than ten years, the circulation patterns and variability in elements during the onset and the established periods of the South China Sea (SCS) southwest monsoon are discussed. The averaged date of the onset of the Southwest (SW) monsoon over the SCS occurs in the middle of May climatically, and the interannual range of the dates of onset is about one month. Following the onset of the SW monsoon, the cloud amount and the precipitation increase while the convection activities increase over the SCS. But there is a strong spatial variation within the domain. After the onset of the SW monsoon, the strong convective area moves northwards, while the SCS rain band moves to the center and north. The sea surface temperature (SST) increases rapidly before the onset and the leading time is one month. The increment of SST supplies heat and vapor for the onset. In April, the surface heat fluxes display obvious changes (e.g., latent heat exchange and evaporation enhancement). Increased SST is one of the reasons why the SW monsoon bursts first over the SCS.

Keywords: South China Sea, southwest monsoon onset, climatological characteristics

王启纬,
丁一汇，1997，南海夏季风演变的气候学特征, 气象学报，
55(4): 466-483

采用1980-1986年4-9月ECMWF逐日次未初始化网格点资料和逐日两个时次（00时和12时）的OLR资料，选取南海北部地区纬向风速、经向风速、高度、温度、湿度及OLR随时间的变化讨论南海夏季风的演变情况。结论如下：南海北部5月第3候第1次跃升，对流层高层东风和北风爆发，东亚地区经向季风环流圈建立，这标志着南海夏季风建立；6月中旬，南海纬向风速第2次跃升，江淮流域梅雨季节开始；南海北部地区对流层低层纬向风速、比湿盛夏呈双峰型，纬向风速峰值分别出现6月第5候和8月第4候，比湿突升略后于风速峰值出现的时间，其峰值出现在6月6候和8月第5候。南海地区季风爆发前，温度是波动式上升的，爆发后是波动下降的。中国大陆东部及南海地区夏季对流层低层比湿有三次突变：4月中旬南海北部出现高比湿中心，而南海南部仍为最大比湿中心；5月中旬最大比湿中心已从南海南部跳到南海北部—华南；6月中旬—8月江淮流域比湿达到最大，南海高比湿带消失。

关键词：南海夏季风
孟加拉湾夏季风 气候学 突变

Wang Qiwei and Ding Yihui. 1997.
Climatological aspects of evolution of the summer monsoon over the northern South China Sea. Acta Meteorologica Sinica 55(4):466-483.

Some aspects of the climatology of the monsoon over the South China Sea (SCS) have been discussed using pentad mean European Center for Medium-Range Weather Forecasts (ECMWF) and Outgoing Longwave Radiation (OLR) data from April to September from 1980-1986. The studies revealed: that the onset of the northern SCS summer monsoon on the average is marked by the onset of the northerly at 200 hPa, the abrupt enhancement of the westerly at 850 hPa, and the formation of the meridional monsoon circulation of East Asia. Another abrupt enhancement of the westerly corresponds to the onset of Meiyu in the Yangtze River and Huaihe valley. The zonal wind and specific humidity appear with a two-peak pattern, and the abrupt increases of the zonal wind correspond well to the increase of the specific humidity. Before the onset of the summer monsoon, the temperature increases undulately, but drops down undulately after the onset. There are three abrupt changes in the distribution of specific humidity in East Asia. During the middle April, the humid band appears over the northern SCS; it suddenly jumps from the southern SCS to the northern SCS during middle May. From mid June to August, the high humid band appears over the Yangtze River and Huaihe valley and disappears over the southern SCS.

Keywords: SCS summer monsoon, Bay of Bengal summer monsoon, climatology, abrupt change

王启韦, 丁一汇, 1997,
东亚冬季风的演变特征,
应用气象学报, 8(2): 186-196

利用ECMWF的7年侯平均资料讨论了东亚冬季风演变的特征,
并与南亚做了比较。研究发现,
东亚地区冬季风演变主要表现为10月中旬经向环流的突变及9月初、11月中旬和1月末对流层低层温度的3次突变；而在南亚地区,
经向环流的变化不如东亚地区明显,
而且高层要先于低层变化,
对流层低层温度存在2次突变。整个冬季, 东亚地区冷涌的演变过程,
主要表现为南海地区冷涌在12月出现最高频率;
南亚地区冷涌也在12月出现最高频率,
但远小于东亚地区且衰减速度很快。另外,
东亚地区冷涌强度是向上衰减的,
南亚则是向上增强的。这些证明了东亚冬季风与南亚冬季风有本质的区别。
关键词：东亚冬季风 南亚冬季风 突变 冷涌

Wang Qiwei and Ding Yihui. 1997. Climatological characteristics of evolution of East Asian winter monsoon. Quarterly Journal Applied Meteorology 8(2):186-196.

This paper discusses the characteristics of the evolution of the East Asian winter monsoon and draws a comparison with those in South Asia. It found that there exists an abrupt change of meridional circulation in East Asia during the middle of October, which represents the onset of the East Asia winter monsoon circulation. Three abrupt changes of temperature occur in lower troposphere in early September, middle November, and late January. However, the change of the circulation in South Asia is not as strong as that in East Asia. The change of meridional wind in the upper troposphere is earlier than that in the lower troposphere. Two abrupt changes of the temperature in lower troposphere are weaker than in East Asia longitudinally. During the whole winter in East Asia, the frequency of cold surges has its maximum in the South China Sea in December, but in the western Pacific in January. On the other hand, in South Asia, the cold surges occur most frequently in December, but much less than in East Asia, and they decrease quickly with time. Another different aspect is that the cold surge frequencies decrease upward in East Asia, but increase in South Asia.

Keywords: East Asia winter monsoon, South Asia winter monsoon, abrupt change, cold surge

Historical Climate Change

翟盘茂,
任福民，1997，中国近四十年最高最低温度变化, 气象学报，
55(4): 418-429.

深入研究了1951-1990年期间我国最高、最低气温以及气温日较差变化规律，并探讨了可能影响的原因。（排除了由于测站迁移和城市热岛效应而对气候变化趋势的可能

Zhai Panmao and Ren Fumin. 1997. On changes of China's maximum and minimum temperatures in the last 40 years. Acta Meteorologica 55(4):418-429.

The paper discusses the spatial and temporal distributions of trends for maximum and minimum temperatures of China from 1951 to 1990 (minimizing the possible biases caused by station location and urban heat islands). It concludes that the increasing trends of maximum temperature are in the areas west to 95°E and north to the Yellow River, but

影响）。结论如下：
从地域分布上，最高温度在黄河以北、95° E以西以增温为主，其他地方则以降温为主；最低温度在全国表现出一致的增温，但在不同地区和不同季节其变化趋势有较大差异。这种变化使得日较差表现出显著的变小趋势。最高、最低温度变化线性趋势表现出明显的不对称性。中国近四十年的增暖反映了温室效应作用的持续加强。由相关分析可知，最高最低温度变化与日照条件及大气水分条件有关。
关键词：最高温度 最低温度 变化

decreasing trends were observed in other areas. Minimum temperatures are generally increasing throughout China, but there are great differences in different areas and seasons. The result is a very obvious decreasing trend for temperature daily range. The increase of temperatures during the last 40 years reflects evidence of the enhancement of the greenhouse effect. Further analysis revealed that the changes of maximum and minimum temperatures are mainly related to sunshine duration and atmospheric water vapor content.

Keywords: maximum temperature, minimum temperature, change

洪光,
刘春光，1997，青岛市气候变暖的特征, 气象，23(8): 55-57

利用青岛市近百年的气温资料研究了气温变暖的特征。青岛的年平均气温以0.05℃/10年的速度上升，而年平均最低气温则以0.13℃/10年上升。在近百年的时间序列中，后期气温明显高于前期，尤其是近四十年来，由于城市发展速度快，城市化影响强烈，所以在气候上反映出最低气温明显升高的趋势。
关键词：气候变暖 特征分析 青岛市

Hong Guang and Liu Chunguang. 1997. The characteristic analysis of climatic warming in Qingdao City. Meteorological Monthly 23(8):55-57.

The annual mean temperature for the last 90 years is warming at the rate of 0.05°/10 years in Qingdao City, whereas the annual mean minimum temperature is warming at 0.13°/10 years. In the time series, the annual mean temperature of later period is higher than that of the early days. The annual mean temperature for the last 40 years is warming faster than that of the past period, especially the annual mean temperature. The influence of Qingdao City development for the last 40 years on the climatic warming appears obvious in the minimum temperature increase.

Keywords: climate warming, characteristic analysis, Qingdao

王宝灵，1997，中国西北地区6月降水量最近30年明显递增，
气象，23(6): 37-39

对中国西北五省（区）89个测站标准三十年（1961－1990年）降水量月资料进行分析，并采用了标准化处理。指出近三十年西北地区6月的降水量占全年降水总量的比例有明显增多趋势，且变幅居各月之首。
关键词：中国西北地区 6月降水量 明显递增

Wang Baoling. 1997. A distinct increase of rainfall amount in June in Northwest China in the last 30 years. Meteorological Monthly 23(6):37-39.

Using monthly rainfall data from 89 stations in Northwest China from 1961 to 1990, the paper discusses the interannual and decadal change of precipitation in June. It points out that in the last 30 years the ratio of precipitation in June in Northwest China has an increasing tendency compared with the precipitation of the whole year, and this variation range ranked first every month.

Keywords: Northwest China, rainfall in June, distinct increase

陈兴芳，1997，1995－1996年冬季高原地区雪灾气候分析，
气象，23(6): 40-43

研究了形成1995-1996年冬季我国高原东部地区严重低温雪灾的降水和平均环流异常之间的关系，以及雪灾与高原地区冬季降水的气候振动和气候突变及其环流背景的关系。结果证明，高原冬季降水和雪灾从60－90年代呈递增趋势，并且目前仍处于冬季降水偏多时期，因此雪灾的发生率也较多。
关键词：青藏高原 雪灾 气候分析

Chen Xingfang. 1997. The short-term analysis of snow disaster over the Tibetan Plateau in winter 1995 and 1996. Meteorological Monthly 23(6):40-43.

The characteristics of precipitation and atmospheric circulation for snow disaster over the eastern part of the Tibetan Plateau in the winter of 1995 and 1996 are analyzed. The relationship between the climatic oscillation of the precipitation over Tibet and atmospheric circulation background is discussed. The results show that there is a tendency of increased snow disaster and precipitation in the winters from 1960 to 1990.

Keywords: Tibetan Plateau, snow disaster, climatic analysis

孙继敏, 丁仲礼，1997，
近13万年黄土高原干湿气候的时空变迁, 第四纪研究，(2): 168-175

黄土高原这一特定地区，其风成沉积序列在地域上的差异主要与东亚地区的季风环流在时间和空间上的变化有关。本文依据从毛乌素沙漠南缘到黄土高原南部的不同地域的土壤地层配置特点，借助磁化率曲线，探讨了近13万年来黄土高原季风环流在时空上的演变规律。此研究揭示出，近13万年里，最为显著的成壤期有6期，与这6个成壤期对应的时段也应当是夏季环流加强、气候温湿的时期；在空间上，地层配置有较大变化，全新世适宜期及末次间冰期中与深海氧同位素阶段5a，5c，5e对应的时期，夏季风足可以深入到毛乌素沙漠腹地，并具有占优势的环境效应。在阶段3的早、晚期及5b时期夏季风虽然也能深入沙漠一黄土边界带，但其环境效应在黄土高原北部及毛乌素沙漠南缘已不再显著。在阶段2、阶段4及阶段3的中期夏季风已不能深入沙漠一黄土边界带。

关键词：13万年 黄土高原
干湿气候 时空变迁

Sun Jimin and Ding Zhongli. 1997. Spatial and temporal changes of dry and wet climate during the last 130,000 years in the Loess Plateau. Quaternary Sciences (2):168-175.

The aeolian sequences in the Loess Plateau mostly respond in a coherent fashion to the cyclic variation of the East Asian winter and summer monsoon circulation. Based on the characteristics of stratigraphic correlation from the Mu Us Desert to the Loess Plateau (along the N-S transect) and the magnetic susceptibility profiles, the paper probed into the spatial and temporal changes of monsoon circulation over the last 130,000 years. The results indicated that there were six dominant soil-forming episodes during the last 130,000 years. These episodes should coincide with the intensified summer monsoon circulation. There were also spatial variations in stratigraphic correlation. During the Holocene Optimum and the sub-stages of 5a, 5c, and 5e, the enhanced summer monsoon could easily reach the far interior of the Mu Us Desert and dominated. During the earlier and later periods of stage 3 and sub-stage 5b, the summer monsoon could still reach the marginal zone of Mu Us Desert, but the geological records show that the summer monsoon was not the dominant monsoon circulation. During the stage 2 and stage 4, as well as the middle of stage 3, the summer monsoon could not reach the desert-loess transitional zone.

Keywords: last 130,000 years, Loess Plateau, dry and wet climate, spatial and temporal changes

张丕远,
葛全胜，1997,过去气候演化的阶段性和突变, 地学前缘，
4(1): 122-126

地球系统的历史信息是评估全球变化的一项重要因素。以前在对过去气候研究中发现了气候的突然变化的现象，突变证据大多出现在冰期、或由冰期向间冰期的过渡时期，并认为这是冰盖的成冰与溶解过程造成海水铅直运动的结果。而近些年的研究又发现在间冰期中也出现突变。我国的历史文献、冰芯和沉积的高分辨率的古气候恢复工作发现近2000年来中国气候明显存在着突变事件。这又给我们提出了新的问题、即间冰期气候的稳定性问题。如果气候突变的证据增多，这意味着气候系统很可能按两种方式进行。

关键词：过去的气候 突变 间冰期 末次冰期

Zhang Peiyuan and Ge Quansheng. 1997. Abrupt climate changes in the paleoclimate records. Earth Science Frontiers 4(1):122-126.

Historical information is an important factor in the assessment of global change. The paleoclimate records have shown that there were a lot of abrupt climatic changes at the global and regional level, in time scales, annual, and decadal and during the the periods of glaciation and transfer from one glacial period to another. Recently, some studies in China show that many abrupt climatic changes also existed in the Holocene interglacial, particularly in the past 2000 years. More and more evidence of abrupt climatic changes in the past is considered to be an important factor to prediction of climatic change in the future.

Keywords: paleoclimate, abrupt change, last interglacial, last glacial

范金松,
陈开喜，1997，近百年来南京降水变化的趋势和特征,
气象科学，17(3): 235-245

对1905-1994年南京实测 降水资料序列及其他统计特征进行了详细的分析，判断出其降水变化特征及长期趋势。南京地区年降水量的长期变化经历了4个多雨期和3个少雨期，40年代以前持续偏少，40年代后直到现在有增多趋势，而同期的气温变化几乎与其呈反位相；南京地区降水的年际变化具有3.2年的显著周期；90年代以来，降水量异

Fan Jinsong and Chen Kaixi. 1997. Tendency and features of precipitation variation in Nanjing in this century. Scientia Meteorologica Sinica 17(3):235-245.

The data sequences of precipitation amount measured in Nanjing from 1905 to 1994 has been analyzed in detail. The results show that the annual precipitation amount in Nanjing has experienced such long-term variations that there are four periods with abundant precipitation and three periods with small amounts of precipitation. But the temperature variation of same period provided some kind of reverse phase. The outstanding period of interannual precipitation variation is 3.2 years. Since the 1990s, the phenomena of abnormal precipitation amounts are obvious and the number of years tends to increase.

常现象明显，年数增多。
关键词：统计特征 反位相

Keywords: statistic features, reverse phase

张顺利, 1997,
西藏30年温度变化的气候特征,
气象, 23 (2): 21-24

利用西藏18个站1961-1990年的历年各月平均温度资料，分析了西藏30年来温度变化的特征。结果表明：各地年平均气温及冬季平均气温变化有较好的一致性,从60年代到80年代逐渐增高。气温异常暖在全年各季都可能发生，而异常冷则非常少见。22年、11年、4.4年、2-3年周期显著。西藏气温在后冬和夏季具有较好的持续性，但在10-11月易发生转折。
关键词：温度变化 气候特征 西藏

Zhang Shunli. 1997. The characteristics of temperature variation for 1961-1990 in Tibet. Meteorological Monthly 23(2):21-24.

According to the monthly mean temperature data of eighteen weather stations from 1961 to 1990, the variational characteristics of Tibetan temperature are analyzed. The results show that the monthly mean temperature is coldest during 1960s and is warmest during 1980s. In Tibet, an anomalous warmth may occur in different seasons, but anomalous cold is seldom. The 22-year, 11-year, 4.4-year and 2-3-year periodicity is significant. Temperature changes easily in October and November.

Keywords: temperature variation, climatological characteristics, Tibet

阎俊岳,
李江龙, 1997，东海及临近地区百年来的温度变化, 海洋学报，
19(6): 121-126

通过对东海及其临近地区1900－1987年的实地观测资料的分析，研究了近百年来东海气温和海温变化特征及与临近大陆、岛屿温度变化的关系。结果表明，东海气温与海温变化趋势一致；冬季东海气温与西侧陆上气温相关系数高，夏季东海水温与东侧岛屿气温相关系数较高；东海气温、水温存在着冷2a周

Yan Junyue and Li Jianglong. 1997. Climatic characteristics of the temperature variations in the East Sea and its adjacent areas during the last hundred years. Acta Oceanologica Sinica 19(6):121-126.

Based on field observational information from 1900 to 1987, the characteristics of the temperature variations of air temperature and seawater temperature in the East Sea and its adjacent areas as well as the relationship between variation in these two temperatures in the nearby continent and islands are discussed. The results show that the trend of air temperature variations and the trend of water temperature variations in the East Sea are coincident. In winter the correlation coefficient of air temperature between the East Sea and its western lands is high, whereas in summer the correlation coefficient

期振动，水温还有5-7a周期。
关键词：东海 研究区 百年
温度变化

of seawater temperature in East Sea to air temperature in its eastern island is high. There exists cold 2-year cycle oscillation in air and water temperatures in the East Sea and 5 to 7 year cycle oscillation in water temperature.

Keywords: East Sea, studied region, hundred year, temperature variations

张志华, 吴祥定，1997,
利用树木年轮资料恢复祁连山地区
近700年来气候变化, 科学通报,
42(8)：849-851

按照树木年轮气候学的基本原理和
概念, 采用最新的分析程序,
研究了年轮指数和温度、降水的关
系。在此基础上,
重建了一条祁连山地区过去湿润指
数变化序列,
探讨了该地区过去气候变化特征。
关键词：祁连山 树木年轮
湿润指数 气候变化

Zhang Zhihua and Wu Xiangding. 1997. The restoration of the temperature variations in the Qilian Mountain region during the last 700 years based on tree-ring information. Chinese Science Bulletin 42(8):849-851.

According to the radical principle and concept of the dendroclimatology, the relationship between the tree-ring index and temperature, and precipitation are studied using the newest analytical program. A sequence of humidity index variations of the past in the Qilian Mountain Region is reconstructed, and the characteristics of past climatic variations in this area are also discussed.

Keywords: Qiliangshan, tree-ring, humidity index, climatic variation

尤卫红, 傅抱璞,
林振山，1997，云南近百年气温变
化与8月低温冷害天气, 高原气象,
16(1): 63-72

利用小波理论对云南近百年气温变
化与8月低温冷害天气的气候学特征
进行了分析。结果表明：云南近百
年来的气温变化主要经历了4个较大
时间尺度的演变，分别是1919年以
前的偏冷期，1920－1954年的偏暖
期，1955－1986年的偏冷期及

You Weihong, Fu Baopu, and Lin Zhenshan. 1997. Climatic characteristics analyses of surface air temperature variations for Yunnan Province during the last one hundred years and chilling damage weather in August. Plateau Meteorology 16(1):63-72.

Using the multiresolving theory of wavelet analysis, the climatic characteristics of surface air temperature variations for Yunnan province during the last hundred years and chilling damage weather in August are analyzed. The results show that the surface air temperature variation for Yunnan Province can be divided into 4 hierarchies. They are the cold period before 1919, the warm period from 1920 to 1954,

1987年以后的偏暖期。对应于这4个层次演变，气温变化表现出了十分明显的突变特性，其冷暖交替的突变点分别发生在1920，1955和1987年。云南8月低温冷害天气发生在1955－1986年这一较大时间尺度的偏冷期中。

关键词：低温冷害天气 气温变化 保留信息

the cold period from 1955 to 1986, and the warm period after 1987. The larger time scale's hierarchical changes for Yunnan Province obviously show features of a climate jump. The years 1920, 1955, and 1987 are the jump points of climate change. The chilling damage weather for Yunnan Province in August is mainly during the cold period from 1955 to 1986.

Keywords: chilling damage weather, temperature change, conserved information

王宇，1997，本世纪昆明气温异常及突变的分析，高原气象，16(1): 73-80

根据昆明1921－1993年的年、夏季(6－8月)、冬季(12－2月)气温平均资料，分析研究了昆明的气温变化趋势、冷暖阶段、气温异常发生频率及气温突变点。结果表明：从本世纪20年代开始，昆明气温呈上升趋势，至40年代前后达最高，此后下降，70年代降至最低，80年代略有回升。1921－1954年为偏暖阶段，1955－1993为偏冷阶段。昆明高温异常出现在1950年以前，低温异常出现在1960年以后，且气温异常发生频率低。年平均气温突变点出现在1957年，冬季平均气温突变点出现在1955年，夏季平均气温未达到突变的标准。

关键词：昆明 气温变化 气温异常 气温突变

Wang Yu. 1997. Analysis of air temperature anomaly and catastrophe in this century in Kunming City. Plateau Meteorology 16(1):73-80.

Based on mean air temperature data for annual, summer (6-8), and winter (12-2) from 1921 to 1993 in Kunming City, the air temperature changing tendency, cold and warm ranges, and frequency of air temperature and air temperature catastrophe are analyzed. The results show that air temperature rose from the 1920s, air temperature reached the maximum about the 1940s, and then fell down. It reached the minimum in the 1970s and rose slightly from the 1980s in Kunming City. The warm range is from 1921 to 1954 and the cold range from 1955 to 1993. The high-temperature anomaly appeared before 1950, low-temperature anomaly after 1960, and the frequency is low. Air temperature catastrophe appeared in 1957 for the annual mean, in 1955 for the winter mean, and no catastrophe for the summer mean.

Keywords: Kunming City, air temperature change, air temperature anomaly, air temperature catastrophe

廉毅, 安刚,
*王琪*等，1997，吉林省40年来气温和降水的变化, 应用气象学报, 8(2): 197-204

选用吉林省有代表性的10个测站，用功率谱方法分析其40年来季节降水和气温变化趋势。结果表明：吉林省气候短周期变化与东亚季风的年际振荡准3.5年(QTO)和准2年(QBO)周期基本是一致的。10年际季节气温变化表明，冬季较50年代明显变暖，升温2℃左右，而夏季升温较弱，但与50－70年代的夏季低温周期相比，80年代以来进入了一个相当暖的周期。夏季副热带季风进退对吉林省的夏季气温和降水影响较大。
关键词：气温 降水 振荡周期

Lian Yi, An Gang, Wang Qi et al. 1997. Variation of temperature and precipitation during the last 40 years in Jilin Province. Quarterly Journal of Applied Meteorology 8(2):197-204.

Using a data set from 10 representative stations in Jilin Province for 40 years and the power spectral method, the seasonal variation of temperature and precipitation were analyzed. The results show that a period of short-term climatic change in Jilin that is almost consistent with that of the interannual oscillation of quasi-3.5-year (QTO) and quasi-biennial (QBO) of the East Asia monsoon. Furthermore, it found that the seasonal temperature got warm clearly about 2℃ higher than that of the 1950s in winter, but weak in the summer. As compared with the low-temperature period in summer from the 1950s to the 1970s, the temperature was relatively warm during the period of 1980s. Also, progression or retrogression of the subtropical summer monsoon has a great effect on the temperature and precipitation of the summer in Jilin Province.

Keywords: temperature, precipitation, oscillation period

江志红, 丁裕国,
金莲姬，1997，中国近百年气温场变化成因的统计诊断分析, 应用气象学报, 8(2): 175-185

利用BP-CAA方法，诊断中国近百年(1881－1992)气温场变化之成因。结果表明：(1) CO_2浓度增加所导致的温室效应加剧，与中国近百年增暖趋势的关系最为密切；(2) 80年代后，温室效应加剧所引起的主导作用更加明显，相应敏感区位于华北北部、东北、西北西部及长江中下游地区；(3) 火山活动对气 温变化的长期趋势所叠加的波动变化起

Jiang Zhihong, Ding Yuguo, and Jin Lianji. 1997. Statistical-diagnostic analysis of cause for the characteristic of China's temperature field during the last 100 years. Quarterly Journal of Applied Meteorology 8(2):175-185.

The cause for the changes in China's temperature fields during the last 100 years (1881-1992) is diagnosed using the canonical correction analysis (CAA) method. The results show that: (1) The enhanced greenhouse effect due to the increase of CO_2 is closely correlated with the linear trend of warming in China's temperature fields and the relationship appears more obvious since the 1980s. (2) The sensitive regions of the greenhouse effect are located in northern North China, Northeast China, western Northwest China, and the mid-lower reaches of the Changjiang River. (3) The effect caused by volcanism is of relative importance in the fluctuations in long temperature trends, and the

主要作用，敏感区位于35° N以南，中心位于西南地区；(4) 20年代至40年代增温可能是温室效应、火山活动和太阳活动多种因素综合作用的结果，而70年代以来的增温主要与温室效应的加剧有关。

关键词：典型相关分析 气候变化 温室效应

sensitive region lies to the south of 35°N, with the center in southwestern China. (4) The warming from the 1920s to the 1940s seems to be the joint result of the greenhouse effect, volcanism, and solar activity, and by the end of the 1970s may be mainly caused by an enhanced greenhouse effect.

Keywords: canonical correlation analysis (CAA), climatic variation, greenhouse effect

邓自旺, 林振山, 周晓兰，1997，西安市近50年来气候变化多时间尺度分析，高原气象，16(1): 81-93

利用Morlet小波变换法分析了西安市近50年月平均气温距平和月降水量距平变化的多层次时间尺度结构，发现西安市气候变化除1年的自然周期变化和20－40年尺度范围的周期变化信号在全时间区域中都强外，其它时间尺度的周期变化在时间域中分布很不均匀，具有很强的局部化特征。西安市月平均气温距平变化主要表现为随机振荡，无特征尺度，而月降水量距平变化则有显著的4－5个月的时间尺度。对于大时间尺度来讲，西安市气候呈暖干和冷湿结构排列，而对于小时间尺度而言呈现为复杂的冷暖和干湿结构。

关键词：气候变化 时间尺度 周期 Morlet小波变换

Deng Ziwang, Lin Zhenshan, and Zhou Xiaolan. 1997. Multiple time scales analysis of Xi'an climate change for the last 50 years. Plateau Meteorology 16(1):81-93.

Using the Morlet wavelet transformation, the anomalities of monthly mean temperature and monthly precipitation in Xi'an for the last 50 years are analyzed. The results show that the periodic variations are localized in the time domain with a 1-year natural period and 20 to 40 year long-term variations. Because of the special geographic location, the relationships between the climate variation in Xi'an and the El Niño/Southern Oscillation (ENSO) are not strong. The combinations of cold/warm and wet/dry climate states are different in long and short time scales. Climate change is regular on the long time scale, but the climate variation is random and complex on short time scales. Temperature variation is mainly random whereas the precipitation changes with a characteristic scale of 4-5 months.

Keywords: climate change, time scale, period, Morlet wavelet transformation

马晓波,
高由禧, 1997，中国西北地区和蒙古国40年气温时空特征及其变化趋势, 高原气象, 16(3): 282-291

利用我国西北地区及蒙古国共59个台站(作EOF分析时取25个站)1951—1990年逐月平均气温资料，采用EOF法分析了该地区40年来气温场不同季节的空间分布特征及其随时间变化的规律。结果表明气温场的空间分布主要有三种类型：
(1)全区一致型，(2)南北差异型，(3)东西差异型。各月、季、年的变化周期主要集中在三个时段：2-4年，5-8年和10-13年，夏季以短周期为主，冬季和年主要是长周期。气温变化趋势的空间分布不均匀，全区年、冬季升温，夏季降温，春、秋季则有升有降，幅度不大。
关键词：西北地区 气温 时空特征 变化趋势

Ma Xiaobo and Gao Youxi. 1997. Spatial and temporal characteristics and variation trend of air temperature in Northwest China and Mongolia in the last 40 years. Plateau Meteorology 16(3):282-291.

In this paper, monthly mean air temperature data from 59 stations in Northwest China and Mongolia from 1951 to 1990 are analyzed using the empirical orthogonal function (EOF) method (for 25 stations) to find out its spatial and temporal characteristics. There are three kinds of spatial distributions: (1) seasonal variation in all areas is identical, (2) north-south distribution, and (3) west-east distribution. The main variation periods are 2-4, 5-8, and 10-13 years; shorter periods dominante in summer, and longer periods in the winter and the whole year. Spatial distributions of air temperature trends are nonuniform. The mean air temperature rises in winter and annually, falls in summer, and rises or falls in spring and autumn, but the variation amplitude is small.

Keywords: Northwest China, air temperature, spatial and temporal characteristics, variation trend

陈兴芳,
宋文玲, 1997，近10年我国降水的QBO分析, 应用气象学报, 8(4): 469-476

近10年来我国东部地区降水分布趋势的年际变化具有QBO特征，双年的降水为中部地区少南北多，单年的降水为中部多南北少，其中江淮流域的降水变化最明显。分析表明，降水QBO的特征与西太平洋副高和冷空气活动有关，一般双年副高偏北、亚洲纬向环流发展，雨带偏北；单年相反，副高偏南，亚

Chen Xingfang and Song Wenling. 1997. Quasi-biennial oscillation analyses precipitation in China from 1986 to 1995. Quarterly Journal of Applied Meteorology 8(4):469-476.

During the last 10 years, the interannual changes of the precipitation distribution tendency in eastern China are characteristic of quasi-biennial oscillation (QBO). The precipitation in even-numbered years is less in central China and more in northern and southern areas, whereas the precipitation in odd-numbered years is contrary with more precipitation in the central area and less in northern and southern parts. The feature of precipitation change in the Changjiang- Huaihe River basin is the most obvious. The results show that the QBO feature of precipitation is related to the West Pacific subtropical high and

洲经向环流发展，雨带偏南，江淮流域降水较多。

关键词：夏季降水 准两年振动 副热带高压 冷空气活动

cold air actions. Generally, in even-numbered years, the subtropical high is north of its normal position, the zonal circulation of Asia develops, and a corresponding rain belt moves northward. The condition for odd-numbered years is the opposite.

Keywords: summer precipitation, quasi-biennial oscillation (QBO), subtropical high, cold air activities

王宁练,
刘时银，1997，从天山乌鲁木齐河源1号冰川变化估计近百年来该地区夏季升温, 冰川冻土，
19(3): 207-213

文章依据冰川变化来定量地研究气候变化，通过近百年来天山乌鲁木齐河源1号冰川的变化，确定其平衡线的变化，再依据该冰川平衡线的波动与气候要素之间的关系揭示出本世纪以来该河源地区的气候变化幅度，其中夏季气温上升了约0.23-0.25℃；同时，对于该冰川不同长度规模时的气候敏感性也进行了分析。

关键词：天山1号冰川 冰川变化 平衡线 气候敏感性 气候变暖

Wang Ninglian and Liu Shiyin. 1997. Summer temperature rise quantified from the change of Glacier No.1 at the source of the Urumqi River in the 20th century. Journal of Glaciology and Geocryology 19(3):207-213.

In this paper, an attempt is made to reveal climate change by analyzing glacier fluctuation quantitatively. The equilibrium line can be determinated from the change of Glacier No. 1 at the source of Urumqi River in the Tianshan Mountains. Based on the correlation between the fluctuation of the equilibrium line and climatic factors, summer temperature has risen about 0.23-0.25°C in this source area since the beginning of this century. Meanwhile, the climate sensitivity of the glacier under its different lengths is discussed.

Keywords: Glacier No.1 at the source of Urumqi River, glacier fluctuation, equilibrium line, climate sensitivity, climate warming

潘保田, 陈发虎，1997,
青藏高原东北部15万年来的多年冻土演化, 冰川冻土，19(2): 124-131

根据多年冻土遗迹特别是具有良好环境指示意义的冰楔假型和原生砂楔，证明青藏高原东北部最近15万年中至少存在4次多年冻土大规模扩展时期。分别是：140 ka BP的倒数第二次冰期，各地广泛发育冰楔；末次冰期早期(80－53 ka BP)，若尔盖盆地发育融冻扰曲；末次冰期最盛前期(27－23 ka BP)，高原东北缘出现冰楔；末次冰期最盛后期(21－10 ka BP)，巴颜喀拉山以南地区和若尔盖盆地发育冰楔，黄河源、共和及青海湖周围出现原生砂楔。不考虑构造抬升，上述冻土扩展时期多年冻土带下界高度较现代低1700－1800 m。

关键词：冻土演化 冰楔假型 原生砂楔 青藏高原东北部

Pan Baotian and Chen Fahu. 1997. Permafrost evolution in the northeastern Qinghai-Tibetan Plateau during the last 150000 years. Journal of Glaciology and Geocryology. 19(2):124-131.

Based on traces of permafrost, ice-wedge casts and fossil sand wedges are environmental indicators. There were at least four periods in which permafrost intensity expanded during the last 150 ka BP in the northeastern Qinghai-Tibetan Plateau. The first period, in which ice wedges developed extensively, was the penultimate glaciating period 140 ka BP. The second period was the early Last Glacial (80-53 ka BP), when involution appeared in the Zoige Basin. Ice wedges developed in the Gonghe Basin and the Qinghai Lake region in the third Period (27-23 ka BP). In the fourth period from 21 to 10 ka BP, the regional differences of the natural environment became very clear. Ice wedges developed in the Zoige Basin and Bayanhar Mountain because of the humid and cold climate. However, sand wedges appeared in the source of the Yellow River, Gonghe Basin, and Qinghai Lake region because of the dry and cold climate. The altitudes of lower limits of the permafrost zone in the cold periods were 1700-1800 m lower than at the present, leaving out the tectonic uplift.

Keywords: permafrost evolution, ice-wedges casts, fossil sand wedges, the northeastern Qinghai-Tibetan Plateau

张顺利,
黄晓清，1997，拉萨40余年温度变化的气候特征, 高原气象，16(3): 312-318

利用拉萨1952－1995年共44年逐月月平均气温资料，分析了拉萨温度变化的气候特征和影响因子。分析表明，44年来拉萨经历了暖－冷－暖－冷－暖5个时期，其中60年代是一长时期的冷期，四季明显；80年代以来是一长时期暖期。拉萨

Zhang Shunli and Huang Xiaoqing. 1997. The climatological characteristics of temperature variation more than forty years in Lhasa. Plateau Meteorology 16(3):312-318.

Using monthly mean temperature data from 1952 to 1995, the paper analyzes the 44 years variational characteristics of Lhasa temperature. It shows that in the last 44 years, there are warm-cold-warm-cold-warm evolution processes for Lhasa temperature, with a long cold period in the 1960s and a warm period in the 1980s to the 1990s. Temperature of Lhasa has good persistence in spring and summer, but this persistence is subject to change in August to September and December to January. The 3-

温度在春、夏季稳定性强，持续性好，但在8－9月
和12－1月温度持续性会发生转折；各季及年平均温度变化有3年短周期和11年、12年长周期。拉萨温度异常具有持续性、阶段性和突变性，主要受中纬度环流和太阳黑子的影响。
关键词：温度 气候特征

year, 11-year and 22-year periods are significant. Middle-latitude circulation and sunspot activity mainly affect Lhasa temperature.

Keywords: temperature, climatological characteristics

Impact

周筠钧,
周立华，1997，青海湖流域沼泽化草甸形成发育的主要气候因子，中国沙漠，17(3): 271-277

青海湖流域的沼泽化草甸的形成、发育和时空分布在一定程度上取决于生态环境中的一些主要气候因子：≥10℃的积温、5-
9月份的降水和年湿润系数。据此作出了湿地率与该环境形成发育的主要气候因子的数学模型。
关键词：青海湖流域 沼泽化湿地 形成发育 主要气候因子

Zhou Yunjun and Zhou Lihua. 1997. The main meteorological factors of formation and development of paludification meadow in the Qinghai Lake drainage area. Journal of Desert Research 17(3):271-277.

The paludification meadow in the Qinghai Lake drainage area is an ecosystem affected by eco-environmental factors. Its formation, development, and spatial and temporal distribution are governed by a few main meteorological factors in the eco-environment to a certain extent. The main meteorological factors are ≥10°C accumulated temperature, precipitation from May to September, and annual humidity coefficient. A mathematical model of the wetland rate and the main meteorological factors are given by multivariate linear regression in the paper.

Keywords: Qinghai Lake drainage area, paludification wetland, formation and development, main meteorological factors

李英年, 张景华, 1997,
祁连山气候变化及对高寒草甸植物生产力的影响,
中国农业气象，18(2)：29-32

分析了祁连山近36年来气候变化特征，以及对高寒草甸植物生产力和种群结构变化的影响。结果表明：祁连山年平均气温以10年0.15℃的速度增高；年平均气温的增高与冷季气温升高相关，暖季气温虽有升高现象，但对平均气温升高贡献不大。降水量基本在多年平均值上下振动，无明显变化趋势，但降水变率略有增大。在这种下，高寒草甸植物生产力有所下降，植物种群数量、结构也发生新的变化。
关键词：高寒草甸 生产力 气候变化 祁连山

Li Yingnian and Zhang Jinghua. 1997. The effect of climatic changes on biomass production of alpine meadow plants in Qilian Mountain. Agricultural Meteorology 18(2):29-32.

The paper analyzes the characteristics of climatic changes and their effect in the last 36 years. The results show annual average temperature rises of 0.15°C/10 years. This rise in annual average temperature is associated with the temperature raising in the cold season; the rise in the warm season contributed a little to annual average temperature. Precipitation usually oscillates with average value for many years and has no obvious trend to change, but the precipitation rate increased slightly. In this case, biomass production of alpine meadow plants decreased, and the number and construction of community show new changes.

Keywords: alpine meadow, biomass production, climatic change, Qilian Mountain

王廷贵, 潘成英,1997,
济宁地区水稻生产与气象因子关系分析, 气象，23(9): 43-45

利用济宁市31年(1964-1994年)的水稻产量资料和气象资料，分析了其水稻生产的不同气候年型、产量与气象因子的关系，找出了影响产量变异的关键时期和主导气象因子及其时间变化规律，并探讨了相应的对策措施。
关键词：水稻 产量 气象因子 对策

Wang Tinggui and Pan Chengying. 1997. The relationship between rice production and meteorological factors in the Jining District. Meteorological Monthly. 23(9):43-45.

The paper analyzes the relationship between meteorological factors and the type and yield of production using rice yield and meteorological data in the Jining district from 1964 to 1994. The main period of yield variability, the principal meteorological factors, and the varying rule are given, and countermeasures that respond to unfavorable factors are suggested.

Keywords: rice yield, meteorological factors, countermeasure

田贻品，1997，连云港市80年代以来的气候特点及其对国民经济的影响, 气象科学，17(1): 96-101

根据实际观测资料，采用相关分析法，研究了连云港市的气候变化特征。80年代以来，连云港市气候变化的主要特点是：冬季温暖且雨雪多，而盛夏气温略有下降且雨量明显减少，春季降水强，干旱现象频繁发生，寒潮低温危害严重。在此基础上还分析了其形成的形势背景及对国民经济产生的影响。

关键词：气候特点 经济影响

Tian Yipin. 1997. The climatic characteristics of Lianyungang since the 1980s and their impact on national economics. Scientia Meteorologica Sinica 17(1):96-101.

Based on field observation, the characteristics of climate variations in Lianyungang are discussed. The report points out that since the 1980s the air temperature increases in winter but has a slight decrease in midsummer; there is precipitation in winter and spring and less precipitation in midsummer; the drought occurred frequently; and cold waves and microtherms cause serious injury. The background of these climatic characteristics and impacts on the national economics are also analyzed.

Keywords: climatic characteristics, impact on economics

冯明，1997，湖北省气候变化及其对夏收作物的影响,
中国农业气象，18(4): 36-41

通过对80年代以来湖北省气候变化的分析研究，揭示了其气候变化的基本规律，分析了其对夏收作物的影响。结果发现：冬季变暖、夏季变凉是湖北气候变化的主要特点，年平均气温变化是以降温为主。气候变化加强了各种气象因子对小麦和油菜产量的影响。

关键词：气候变化 地理分布
夏收作物

Feng Ming. 1997. Climate change and its effects on summer harvesting crops in Hubei Province. Agricultural Meteorology 18(4):36-41.

Through detailed analysis on climate change in the period of 1981-1994 in Hubei Province, it was found that the gradual lowering of the yearly mean temperature and the climate getting warmer in winter and colder in summer were the main features of climate change in Hubei Province. These factors had obvious effects on the yields of wheat and rape-seed oil.

Keywords: climate change, geographic distribution, summer harvest crop

林举宾, 涂悦闲, 麦建辉, 1997，农业气象灾害对广东水稻生产的影响及防御措施, 中国农业气象，18(4)：42-45

从农业气候角度分析了影响广东水稻生产的主要气象灾害及其减产原因，并提出了防御对策，以促进广东水稻稳产高产。

关键词：水稻 农业气象灾害 对策

Lin Jubin, Tu Yuexian, and Mai Jianhui. 1997. The impacts of climatic disaster on rice production and countermeasure for defense in Guangdong. Agricultural Meteorology 18(4):42-45.

This paper analyzes the climatic disasters that affect the yields of rice in Guangdong and the reasons for decreases in yields. Counter-measures to accelerate rice generation and maintain steady and high growth are pointed out.

Keywords: rice, agrometeological disaster, countermeasure

王春红, 蒋全荣, 余志豪, 1997，北极III区海冰面积低频变化对北半球冬季大气环流异常的作用, 大气科学, 21(1)：123-126

讨论了北极III区（70^0~160^0E, 年平均海冰面积约200平方纬度）海冰面积变化与冬半年（11~4月）大气遥相关的联系问题。揭示出：1）北极III区海冰面积变化具有40个月左右（3~4年）的低频振荡周期。2) 北极III区海冰面积的低频变化所引起的热力强迫作用，可以激发产生EA型及类似于WP的大气遥相关型。冰气系统之间存在着3～4年的不规则振荡，在振荡过程中，它们是相互作用的。3）北极III区海冰面积异常对北半球冬季大气环流异常的影响。对比表明，在重冰年和轻冰年，北半球冬季中纬度地区大气环流以及我国的天气气候特征有十分明显的差异。

关键词：北极III区 海冰面积 大气环流异常 EA型

Wang Chunhong, Jiang Quanrong, and Yu Zhihao. 1997. Effect of low-frequency variability of the Region III Arctic sea ice cover on the Northern Hemisphere atmospheric general circulation anomaly in winter. Scientia Atmospherica Sinica 21(1):123-126.

The paper discusses the issues of teleconnection between the Region III Arctic sea ice cover variation and winter atmosphere. It shows: (1) Region III Arctic sea ice cover has a low-frequency variation of 3 to 4 year cycle. (2) The Eastern Atlantic (EA) pattern teleconnection and teleconnection like that of the western Pacific (WP) can be aroused by the low-frequency variability of the Region III Arctic sea ice cover. The irregular fluctuation of 3 to 4 years exists in the ice-air system. In the process of this fluctuation, the ice and the air affect each other. (3) The characteristics of the atmospheric circulation in winter in the mid-latitude region of the Northern Hemisphere and the characteristics of the weather-climate in China show the distinct difference in the heavy ice years and in the light ice years of the Region III Arctic sea ice cover.

Keywords: Region III sea ice cover, atmosphere general circulation anomaly, Eastern Atlantic (EA) pattern

傅抱璞，1997，我国不同自然条件下的水域气候效应，
地理科学，17（3）：246-253

根据分布在我国不同自然条件下的26个湖泊、水库和河流的实际观测资料和数据，并结合理论分析，阐明了各种水域在不同自然条件下气候效应的特点和规律，并提供了其对温度、湿度、风速和降水正负影响的大致数值范围。
关键词：水域 气候效应 自然条件

Fu Baopu. 1997. The climatic effects of waters in different natural conditions. Scientia Geographica Sinica 17(3): 246-253.

This paper presents studies of the climatic effects of waters in different natural conditions based on theoretical analysis and the observational results of twenty-six waters located in various regions in China. It also offers approximate numerical value ranges of positive and negative influences on temperature, humidity, wind speed, and precipitation.

Keywords: waters, climatic effects, natural condition

刘云鹏, 1997,
宜昌温度变化的统计特征及对农业生产的影响与对策,中国农业气象,
18(2)：36-39

通过对宜昌站1952~1991年的气温,积温等温度指标年际变化的统计分析,发现近40年来宜昌年平均气温大约以0.11℃/10年的倾向率下降,两极端温度趋于缓和,
夏季降温趋势明显。积温减少,
夏、秋季低温冷害日渐突出,
已对农业生产构成严重威胁。针对这种情况,提出了相应的对策和措施。
关键词：温度 年际变化 统计特征 农业影响 对策

Liu Yunpeng. 1997. The statistical characteristic of temperature variation in Yichang and its influence on agricultural production and countermeasures. Agricultural Meteorology 18(2): 36-39.

In recent years, annual mean temperature has been dropping at rate of about 0.11°C per ten years in Yichang. The lowest and highest temperatures in a year tend to be subsiding. The trend of temperature dropping in summer is most obvious. Because the accumulated temperature has decreased and cool injury has gradually become more significant, agricultural production has been seriously imperiled. The paper also proposes some suggestions and countermeasures.

Keywords: temperature, interannual variation, statistical characteristic, influence on agriculture, countermeasure

郑有飞, 万长建, 许维新, 1997,
未来气候变化时南京地区冬小麦气候生产潜力估算,
中国农业气象，18(3): 14-18

根据试验结果，研究了紫外线辐射增加对小麦产生的影响，包括导致小麦植株变矮、长势变差、生理活动受阻、产量下降等。在此基础上，综合评价了气候变化对小麦的影响，并对CO_2
倍增后南京地区冬小麦气候生产潜力进行了估算。
关键词： CO_2倍增 小麦 紫外辐射 气候生产力

Zheng Youfei, Wan Changjian, and Xu Weixin. 1997. Estimation of production potential of wheat in Nanjing influenced by future climatic changes. Agricultural Meteorology 18(3):14-18.

The experiment conducted showed that enhanced solar ultraviolet (UV) radiation could produce negative effects on wheat, leading to shortened plants, poor growth, inhibition of normal physiological activities, and decrease in yield. Based on the overall evaluation of climatic changes on wheat production, estimates of climatic production potential were obtained for winter wheat grown in Nanjing under a doubling CO_2 concentration.

Keywords: CO_2 doubling, wheat, UV radiation, climatic production potential

郭恩华, 陈海平,1997,
季风与地形对台湾降水的影响,热带地理，17(1)：23-29

通过对季风环流的季节变化及地形对台湾降水的影响的分析,
得出以下结论：东北季风和地形的共同影响造成了冬半年台湾北部多雨和西南部干旱；夏半年由于受西南季风的影响,出现了岛西部降水略多于岛东部的现象,
且缓解了西南部干旱。台湾地形对降水的影响居全国之冠,海拔每上升100m，年降水量递增值都大于100mm。
关键词：季风 地形 降水 递增值 台湾

Guo Enhua and Chen Haiping. 1997. The effects of monsoon and landform on rainfall in Taiwan. Tropical Geography 17(1):23-29.

The paper analyzes the impacts of seasonal variations of monsoon circulation and landform on precipitation in Taiwan. It reports that in the winter half of the year, the plentiful rains in the northeast part and the drought in the south-western parts are caused by the joint effect of the northeast monsoon and landform. In the summer half, the rainfall in the western part of the island is slightly more than that in the eastern part at the same latitude. The southwest monsoon rainfall in summer has the major contribution to alleviating the drought in the southwest. The altitude increase rate of annual rainfall is rather high, more than 100 mm per 100 meters of altitude.

Keywords: monsoon, landform, rainfall, increase rate, Taiwan

张强, 胡隐樵, 赵鸣, 1997,
降水强迫对戈壁局地气候系统水、热输送的影响, 气象学报,
55(4)：492-498

利用黑河实验中化音站(戈壁)加强期的湍流脉动场资料对影响降水强迫对戈壁局地气候系统水、热输送的过程进行了系统分析。结论为：降水对戈壁局地气候系统的强迫一般是通过辐射效应和土壤增湿效应两个过程对戈壁局地气候系统产生影响。降水作为强迫因子将使局地气候系统出现暂时的不平衡状态，这种不平衡气候系统要达到新的平衡状态必须通过一个物质和能量的重新调配过程。该过程可分为4个阶段，各阶段的感热和潜热及地表蒸发均有较大差异，从物质和能量输送特征来看，受降水干扰后戈壁局地气候系统达到新的平衡状态所需要的张弛时段大约为4d。在张弛时段内，地表接收的降水约有2/3通过地表蒸发后输送到大气，其余部分可能渗入地下。
关键词：降水强迫
戈壁局地气候系统 非平衡状态
水、热输送 张弛时段

Zhang Qiang, Hu Jinqiao, and Zhao Ming. 1997. Effects of rainfall forcing on the transport of water and heat in the local climate system of Gobi. Acta Meteorologica Sinica 55(4):492-498.

Using the data of turbulence observation from the Huayin Station in the Gobi area during the intensive observation period (IOP) of the Heihe River Field Experiment (HEIFE), the effects of rainfall forcing on the transport of water and heat in the local climate system of Gobi are analyzed. The results show the following: the local climate system becomes unbalanced due to the rainfall forcing; the unbalanced state can return to the balanced state after the rainfall through a new adjustment of substance and energy; the process of the new adjustment can be divided into four periods with the sensible heat flux, latent heat flux, and water vapor flux very different within the periods; the relaxation time of the unbalanced state is about four days; and about two-thirds of the rainfall is transported into the atmosphere by the evaporation of ground surface while the rest may permeate the ground.

Keywords: rainfall forcing, local climate system of Gobi, unbalanced state, transport of water and heat, relaxation time

柯东胜, 许时耕,1997,
ENSO对南沙海域气候状况的影响,
气象学报，55 (4)：506-511

利用1961-1990 年
(部分资料到1994年)南沙海域的观测资料, 对南沙海域气
候状况进行了统计分析。
结果表明：在ENSO发生的当年,
南沙海域的海平面气压呈正距平,

Ke Dongsheng and Xu Shigeng. 1997. The effect of El Niño/Southern Oscillation (ENSO) on the climate state in Nansha. Acta Meteorologica Sinica 55(4):506-511.

Based on the data observed from 1961 to 1990 (some data to 1994) and statistical analysis of the effect of ENSO, the following conclusions are reached. In an ENSO year the atmospheric pressure in Nansha waters is all positive anomaly, the annual precipitation is obviously little, and the annual number of tropical cyclones is fewer. The total cloud cover

年降水量明显偏少，并且热带气旋活动的日数一般偏少；在历次ENSO过程中,南沙海域的 总云量与SOI的变化趋势基本一致。
关键词：ENSO 南沙海域 气候

anomaly in Nansha waters is basically identical with the variation trend of Southern Oscillation Index (SOI) in each ENSO.

Keywords：ENSO, Nansha waters, climate

黄嘉佑, 张镡, 1997,
极冰对南方涛动的影响, 气象学报, 55 (2)：200-209

通过分析南、北极冰量与南方涛动序列的月、季和年尺度的变化过程线性相关关系, 发现北极冰量与南方涛动是反相关关系，而南极冰量与南方涛动是正相关关系。南极冰量与南方涛动的关系在月和季尺度上似乎较北极与大气的关系密切些。分析发现极冰与南方涛动之间存在较复杂的非线性关系。在前期极冰的强信号寻找中发现极冰与南方涛动在月系列的相关关系上存在周期变化现象。在文中还进一步探讨了月系列存在的周期变化的共同因素的影响。
关键词：时间尺度分析
非线性相关 统计动力模型模拟
周期模型

Huang Jiayou and Zhang Tan. 1997. The influence of the Southern Oscillation on sea ice of the Arctic and Antarctic. Acta Meteorologica Sinica 55(2):200-209.

The paper analyzes the relationship between Arctic and Antarctic sea ice and the Southern Oscillation Index on the temporal scales of month, season, and year. There is a negative correlation between Arctic sea ice and the Southern Oscillation Index, and a positive correlation was found between Antarctic sea ice and the Southern Oscillation Index. The variation of Antarctic sea ice seems to have a more important influence on the atmosphere. Their relationship seems more nonlinear than linear. The relationship between Arctic and Antarctic sea ice in the early stage and the Southern Oscillation Index exhibits periodicity. The periodic variation and the common factors in monthly series are also discussed in this paper.

Keywords: analysis for time scale, nonlinear relationship, simulation on statistic-dynamic modeling, periodic model

周鸣盛, 张廷, 1997,
一次雪面降温引起的异常寒冷天气分析, 气象学报, 55(2): 219-229

文章对1993年11月18日和1979年11月18日两次异常寒冷天气进行了对比分析，揭示出内蒙古东部雪面空

Zhou Mingsheng and Zhang Ting. 1997. The diagnosis analysis for the unusual cold weather due to the temperature dropping over snow cover. Acta Meteorologica Sinica 55(2):219-229.

The paper discusses two episodes of severe cold weather on 11/18/1993 and 11/18/1979 and reveals the formation process of cold high

气降温形成的强冷高压。按Brunt公式计算出晴天有效辐射,与实际情况相吻和。并按照对流层中下层相似的气温直减率,
得到当地新雪面空气制冷的净降温客观估计值。内蒙古东部高原雪面强冷高压的偏北气流顺坡南下在京津冀地区形成超低空急流,
促使当地气温剧烈下降,
出现异常低温天气。还给出强冷高压控制下,
华北东部特殊地形上的中尺度下坡风的物理图象。
关键词：雪面降温 冷高压
下坡气流 超低空急流

pressure as a result of radiative cooling over the snow surface east of the Inner Monggol Plateau. According to the Brunts effective radiation formulation and the normal lapse rate of temperature, the near-surface-layer air temperature as a result of snow cover radiative cooling was calculated. The results were very near the observational data. The cold air from the Inner Monggol Plateau moved down along the slope southward and an extra-low-level jet occurred over Beijing, Tianjin, and Hebei. So the surface temperature dropped sharply in this region. The physical mechanism for the occurrence of orographic downward wind was in the solenoid field.

Keywords: temperature dropping over snow surface, cold high pressure, orographic downward wind, extra-low-level jet

王谦谦, 钱永浦, 1997,
太阳辐射日变化对夏季风模拟特征的影响, 气象学报, 55(3): 334-345

利用60° S－60° N
范围内地气和海气相耦合的耦合模式系统,
进行了有无太阳辐射日变化的对比试验。研究表明:
太阳辐射日变化对于模拟的夏季风准平衡态平均环流形势影响不大。对平均夏季风形势的影响主要来自于海陆和地形分布。但模式中包含太阳辐射日变化后,
对大气高低层季风系统的模拟强度有所改善。日变化对降水场影响较大, 如无日变化,
大陆降水将大大减少,
而沿岸地区降水则增加,
增雨区和减雨区呈波状分布。太阳辐射日变化可以促使季风气候的准平衡态较早达到。
关键词: 太阳辐射日变化 夏季风
数值模拟

Wang Qianqian and Qian Yongpu. 1997. Effects of diurnal variation of solar radiation on the simulated properties of the summer monsoon. Acta Meteorologica Sinica 55(3):334-345.

Using an atmosphere-ocean coupled model system in a zonal domain between 60°S and 60°N, the comparative experiments are made with and without diurnal variation of solar radiation. The results show that the diurnal variation of the solar radiation does not have a very large influence on the mean monsoon system in the quasi-equilibrium state; the main influences may come from the land-sea and the topography distributions. But, its inclusion into the model does improve the simulations of the monsoon systems at the upper and the lower levels. The diurnal variation of the solar radiation influences the simulated precipitation pattern greatly. In the experiment without the diurnal variation of the solar radiation, the precipitation amount over the land areas is greatly reduced while it is increased over the areas along the coasts. The areas with increased precipitation and the areas with decreased precipitation are distributed in a wavelike form. The diurnal variation of the solar radiation can make the monsoon development reach the quasi-equilibrium state earlier.

Keywords: diurnal variation of solar radiation, summer monsoon, numerical simulations

陈千盛, 1997,
城市效应对福州市气候的影响,
气象, 23(1): 41-45

根据福州气象站1951-1993
年的气象资料,
分别建立了福州最热月平均气温、
最高气温、极端最高气温和全年出
现的最高气温 ≥35℃
日数的变化趋势方程,
计算了各自的倾向率,
揭示了福州气候的变化规律。通过
城区和郊区的气候资料对比分析,
发现城区存在热岛、雨岛、干岛、
浑浊岛等城市气候效应现象以及雾
、雷暴负效应现象。并讨论了这些
现象产生的原因。
关键词：城市气候 热岛效应
负效应

Chen Qiansheng. 1997. The influence of urbanization on climate in Fuzhou City. Meteorological Monthly 23(1):41-45.

Based on climatic information from 1951 to 1993, the paper discusses the air temperature tendency at Fuzhou City. The results show that there are some urban effects, such as heat island, rain island, dry island, and turbid island in Fuzhou City, and that there are also some negative effects of fog and thunderstorm. The causes of these effects are also discussed.

Keywords: urban climate, heat island effects, negative effects

李红梅, 刘文杰, 1997,
景洪市城市发展对气候的影响,
气象, 23(3): 38-41

选取景洪站与热作站自
60年代以来的气象资料进行对比分
析, 探讨了景洪城市发展对
气候的影响。结果表明,
景洪市城市热岛效应日趋明显,
年均温、平均最高温及平均最低温
差均有增大趋势,而降水量、空气湿
度、雾日数、日照时数、太阳辐射
量等逐年减少。城市热岛效应有明
显的季节性, 其规律是:

Li Hongmei and Liu Wenjie. 1997. Effect of development of Jinghong City on climate. Meteorological Monthly 23(3):38-41.

Based on the compared observations between Jinghong City and the rural area, the effects of the development of Jinghong City on climate are studied by analyzing long-term data (since 1960's). The results indicate that: (1) With the rapid development of Jinghong City, the urban heat island effect is gradually obvious. (2) The difference of the temperature and wind speed between city and rural area is gradually increasing. (3) The rainfall, air humidity, number of fog days, sunshine duration, and solar radiation over the city attenuate remarkably. The urban heat island effect is more obvious in the dry season than in the rainy season, far more obvious at night than day in

干季强于湿季, 干季夜间强于白天, 雨季白天强于夜间。
关键词：城市发展
局地气候　城市热岛效应

the dry season, far more obvious at day than night in the rainy season.

Keywords: development of city, local climate, urban heat island effect

许金镜, 唐文伟, 林仲平, 1997, 副高持续偏强对福建气候的影响, 气象, 23(1): 36-37

针对近几年副高持续偏强这一异常现象, 并以1951-1995年副高特征量和气温、降水等气象要素为基础, 分析了副高
持续偏强这一基本事实以及对福建的气温、降水、热带气
旋等天气气候的影响。
关键词: 副高强度指数 面积指数
天气气候

Xu Jinjing, Tang Wenwei, and Lin Zhongping. 1997. Effect of persistently strong subtropical high on Fujian climate. Meteorological Monthly 23(1):36-37.

In the study of the persistently strong subtropical high that existed for a few years, the subtropical high features, air temperature, and precipitation data from 1951 to 1995 are analyzed. Also the effects of the phenomenon on the weather and climate in Fujian Province are studied.

Keywords: subtropical high intensity index, area index, weather and climate

谢安, 刘,霞 叶谦, 1997, 赤道漩涡与南海夏季风爆发, 气象学报, 55(5): 611-619

利用1979-1995 年的 850hPa 风场和卫星资料 OLR, 讨论了南海夏季风爆发 和推进的特征, 着重分析了赤道漩 涡与夏季风爆发的可能联系。结果表明, 南海夏季风的爆发落后于其两侧的陆地和岛屿,但在东西方向上几乎是同时的, 具有某种驻波的特性。大多数年份的4、5月间, 在105°E附近有赤道漩涡形成，引导西南季风和赤道西风进入南海南部, 为南海夏季风

Xie An, Liu Xia, and Ye Qian. 1997. Equatorial vortex and the onset of the summer monsoon over the South China Sea. Acta Meteorologica Sinica 55(5):611-619.

Using National Meteorological Center (NMC) wind data and outgoing longwave radiation (OLR) data from the National Oceanic and Atmospheric Administration (NOAA) from 1979-1995, the characteristics of summer monsoon onset in the South China Sea (SCS) are discussed. The results show that the onset of the summer monsoon occurs later in SCS region than in peripheral island areas. But the onset of the summer monsoon in the eastern part of SCS is almost at the same time as that in the western part of SCS, which has a somewhat standing wave feature. In most years, an equatorial vortex forms near 105°E in April or May and the vortex leads the equatorial westerly in its upper reaches and the westerly in the Southern Hemisphere to the southern part of

爆发创造有利条件。在漩涡不活跃的年份，南海夏季风爆发偏晚，两者之间有某种联系。4月中旬漩涡的形成和105°E越赤道气流的初步建立有一定的联系，而南海夏季风与105°E的气流更密切。70-90°E附近的赤道西风对南海季风爆发也会产生重要影响。

关键词：南海夏季风爆发 赤道涡旋 东亚涡旋 105°E越赤道气流

SCS. This creates a favorable condition for onset of the SCS summer monsoon. In the years when the equatorial vortex is inactive, the onset of the summer monsoon in the SCS is late. There is some relationship between the equatorial vortex and the onset date of SCS summer monsoon. In middle April, the forming of the vortex and the preliminary building of cross-equatorial flows at 105°E is simultaneous. In May, these cross-equatorial flows enhance gradually and the activity of the SCS summer monsoon may be closely associated with these flows.

Keywords: summer monsoon onset in the South China Sea, equatorial vortex, East Asian vortex, cross-equatorial flows at 105°E

张爱华, 吴恒强, 覃武, 蒋伯仁，1997，南半球大气环流对华南前汛期降雨影响初探，气象，23 (8):10-15

本文利用南半球海平面气压场格点资料，通过差值场和相关分析，研究了南半球大气环流对华南前汛期降雨的影响。结论表明：无论是同期还是前期，华南前汛期多雨年和少雨年所对应的南半球大气环流系统基本呈反相，两者之间存在密切关系。就澳大利亚高压、马斯克林高压、南美对流活跃区等对华南前汛期降雨影响的可能机理进行了初步分析。

关键词：南半球 大气环流 华南前汛期降雨 澳大利亚高压 马斯克林高压

Zhang Aihua, Wu Hengqiang, Tan Wu, and Jiang Boren. 1997. The preliminary exploration for the influence of general circulation over the Southern Hemisphere on precipitation over South China during pre-flood season. Meteorological Monthly 23(8):10-15.

Using gridded field data of sea level pressure over the Southern Hemisphere, through the difference value fields and correlation analysis, the influence of the general circulation of the atmosphere over the Southern Hemisphere on precipitation over South China during the pre-flood season is analyzed. The result shows that: The general circulations of the atmospheric system over the Southern Hemisphere are basically out-of-phase for drought and waterlogging years, in the same term or earlier stage. The influence of the Australia anticyclone, the Mascarene anticyclone, and the convective active region of South America is preliminarily analyzed.

Keywords: Southern Hemisphere, general circulation of the atmosphere, precipitation over South China during pre-flood season, Australia anticyclone, Mascarene anticyclone

张苏平, 朱平盛, 胡桂芳, 1997,
山东夏季降水与北太平洋SST和大气环流的关系, 气象，23 (4):3-8

通过计算表明赤道东太平洋和北太平洋流区海温与山东夏季降水相关性好，在此基础上讨论了山东夏季旱涝年同期、前期SST异常的特征及其与大气环流的相互关系，发现同期SST异常显著，前期赤道东太平洋SST负异常与500hPa大气环流负WP遥相关型关系密切。利用2-4月高相关区SSTA做当年夏季降水趋势预测的试验和利用赤道东太平洋区3月、北太平洋区7月海温做长期夏季降水预测的试验表明SST可以对山东夏季的旱涝预测提供非常有价值的参考。
关键词：夏季降水 北太平洋海温 大气环流

Zhang Suping, Zhu Pingsheng, and Hu Guifang. 1997. Relationship among summer rainfall in Shandong and North Pacific sea surface temperature (SST) and atmospheric circulation. Meteorological Monthly 23(4):3-8.

Calculation shows a good correlation between summer rainfall in Shandong Province and sea surface temperature (SST) in the equatorial eastern Pacific (EEP) and in the North Pacific Current (NPC) areas. On the basis of the correlative analysis, the contemporary and antecedent SST anomaly features of rainy and dry summers and the relationship with atmospheric circulation is discussed. The contemporary SST departure is noted, and the negative SST anomaly in the EEP area prior to those summers is closely related to a negative West Pacific pattern, and the SST anomaly in NPC area is likely to be modulated by the anomaly of atmospheric circulation. The experiments using SST of February-April in highly correlative areas and SSTA of March in the EEP area and of July in the NPC area show that SST is of great reference value for long-term forecast of summer rainfall in Shandong Province.

Keywords: summer rainfall, North Pacific sea surface temperature, atmospheric circulation

张新时, 周广胜, 高琼, 倪健, 唐海萍, 1997,
中国全球变化与陆地生态系统关系研究, 地学前缘, 4(1-2): 137-144

文章对近年来我国在全球变化与生态系统关系研究方面的新观点、新认识及新进展作了评述。并指出我国进行全球变化与陆地生态系统关系研究时应注重以陆地样带研究为基础的各科学计划间的交叉以及应加强研究的领域。
关键词：全球变化 生态生理试验 模拟 荒漠化

Zhang Xinshi, Zhou Guangsheng, Gao Qiong, Ni Jian, and Tang Haiping. 1997. Study on global change and terrestrial ecosystems in China. Earth Science Frontiers 4(1-2):137-144.

This paper comments on the new understandings, new advances, and new points of view in recent research on the relationship between global change and the terrestrial ecosystem in China. It points out the need for future interplant study and presents some important suggestions.

Keywords: global change, ecophysiological experiment, modeling, desertification

张丕远, 葛全胜, 吕明, 陈晓蓉, 1997, 全球环境变化中的人文因素, 地学前缘, 4(1-2): 195-200

全球环境变化可能成为下一个世纪最为紧迫的国际问题。这是因为人类活动的能力已经大到足够影响到全球的环境,
而全球环境变化又给人类带来重大影响。文章探讨了人文因素在全球环境变化中所扮演的角色。由于人类在对待环境要素变化时,
有选择其行为的自由, 所以人文因素没有像大气、海洋那样,
称为全球环境变化的子系统。这一点在建模中应给以充分考虑。文章讨论了各类系统对气候变化适应的脆弱性定义,
并以海平面、农业、林业、
渔业和人类健康为例,
观测它们如何受到全球气候变暖的影响。
关键词: 全球环境变化 人文因素 影响

Zhang Peiyuan, Ge Quansheng, Lu Ming, and Chen Xiaorong. 1997. Human dimension in the global environmental change. Earth Science Frontiers 4(1-2):195-200.

Global change may be one of the urgent international issues in the coming century. Because of humankind's unprecedented importance as an agent of global change and the potential for future environmental changes to alter societal arrangements, no one would argue that there are no connections between human activities and changes in global climate. What connections should exist between natural science research on change to the earth system and social investigations of the humandimensions of global change is explained in brief. Generally speaking, the human dimension is one of the subsystems in the global change, however, it has not been given the name of subsystem, but dimension. This is based on its special characteristics. Mankind can select activities that either cope with the environmental change or not. We have to select a more flexible model to deal with such characteristics. The vulnerability of a system's response to climate change is discussed as are examples of the impacts of climate change on vulnerable systems, such as sea level, agriculture, forestry, fishery, and human health are explained.

Keywords: global environmental change, human dimension, impacts

朱震达, 1997, 全球变化与荒漠化, 地学前缘, 4(1-2): 213-219

分析了干旱、半干旱地区沙质荒漠化的成因过程、发展趋势。指出干旱是荒漠化形成的原因,
而不合理的人类活动则加剧了它的发展。在中国北方荒漠化土地的成因类型中, 过度放牧占30.1%,
过度开垦占26.9%, 过度樵采占32.7%,水资源利用不当占9.6%,
而由于在工交建设中不重视环境保护而造成的占0.7%。由此可知,

Zhu Zhengda. 1997. Global changes and desertification. Earth Science Frontiers 4(1-2):213-219.

The origin and trend of sandy desertification in the arid and semi-arid regions was analyzed. It is pointed out that although sandy desertification is caused by drought, the irrational human activities in recent times are responsible for the increased development of desertification. In North China, 30.1% of sandy desertification was caused by overgrazing, 26.9% by over-reclamation, 32.7% by excess woodcutting, 9.6% by misuse of water resources, and 0.7% by industrial mining and communication activities. Using land rationally and taking protective measures is the most

护而造成的占0.7%。由此可知，合理利用土地以及采用相应的防治措施是防治荒漠化的重要途径。

关键词: 荒漠化 沙质荒漠化 现状 趋势

and taking protective measures is the most important way to defend against desertification.

Keywords: desertification, sand desertification, status, trend

刘国东, 丁晶, 1997,
应用BP网络研究气候变化对雅砻江和嘉陵江流域水资源环境的影响,
中国环境科学, 17(5)：414-417

依据1960-1990年(雅砻江)和1960-1987年的实测资料,
采用人工神经网络模型建立了雅砻江和嘉陵江流域年平均气温、年降水量与年径流之间的BP网络模型。定量研究并模拟了气温和降水变化对雅砻江和嘉陵江流域水资源环境的影响。结果表明气温增高和降水量减少将造成水资源量的大量减少，对生态环境造成威胁。

关键词：气候影响 BP神经网络 水资源环境

Liu Guodong and Ding Jing. 1997. Applying the backpropagation (BP) neural networks to study effects on water resources in Yalongjiang and Jialingjiang River catchments due to variations of climate factors. China Environmental Science 17(5):414-417.

In order to investigate the effect of climate on the water resource environment, two backpropagation (BP) neural networks, in which the atmospheric temperature (T) and precipitation (P) are input neurons and the run off (Q) is an output neuron, are designed for Yalongjiang and Jialingjiang River catchments using information of Yalongjiang and Jialingjiang River catchments from 1960 to 1990. The results indicate that water resources will decrease greatly in these two river catchments when atmospheric temperature rises and precipitation decreases.

Keywords: climate influence, BP neural network, water resource environment

张宏, 樊自立, 1997,
气候变暖对渭干河三角洲农业的影响, 干旱区研究, 14(3)：65-68

研究了在未来气候变暖条件下渭干河三角洲≥0℃ 和≥10℃ 两种活 动积温及其持续日数的变化规律。结果表明, 随着气温的升高, 活动积温及持续日数也相应增加。在此基础上, 讨论了农业种植制 度随积温的变化而进行调整的可能性。

Zhang Hong and Fan Zili. 1997. The influences of climate warming on active-accumulated-temperature (AAT) and agricultural-planting-system (APS) in Weiganhe Delta. Arid Zone Research 14(3):65-68.

The two kinds of active-accumulated-temperature (AAT), titled ≥0°C and ≥10°C and sustainable time were calculated under two different climate-warming scenarios in the Weiganhe Delta. The two AATs will enhance to some extent the annual temperature increase. Meanwhile, the possibility of change of agricultural planting system (APS) in the Weiganhe Delta to matching the changed AATs is discussed.

关键词：气候变暖 活动积温
农业种植制度 渭干河三角洲

Keywords: climate warming, active-accumulated-temperature (AAT), agricultural-planting-system (APS), Weiganhe Delta

马淑梅,
李宝英, 1997，气象因素对大豆灰斑病发生的影响,
中国农业气象，18(5)：7-8

根据多年的观测和试验，发现影响大豆灰斑病发生程度的主要气象因子是湿度和雨量。其农业气象指标：重发生年为7月中旬-8月中旬，降水量均超过300mm，相对湿度在80%以上；轻发生年为7月中旬-8月中旬，降水量在150mm以下，相对湿度在75%以下；中度发生年的降水量和相对湿度介于上述两者之间。

关键词：雨量 相对湿度
大豆灰斑病 发生影响

Ma Shumei and Li Baoying. 1997. Impacts of meteorological factors on the occurrence of gray speck of soybean. China Agricultural Meteorology 18(5):7-8.

Based on observation and experiments in recent years, the impacts of meteorological factors on the occurrence of gray speck of soybean were discovered. The results show that the important climatic factors that caused the gray speck of soybean are humidity and precipitation. The agricultural climate index shows that years with the precipitation and the relative humidity more than 300 mm and 80% respectively in the period from the middle of July to the middle of August are the serious years, whereas years with precipitation and humidity less than 150 mm and 75% are the slight years. Years with the humidity and precipitation between the stated ranges are the moderate years for gray speck of soybean.

Keywords: precipitation, relative humidity, gray speck of soybean, impact on

郑循华, 王明星, 王跃思, 沈壬兴, 张,文 龚晏邦, 1997,
温度对农田N_2O产生与排放的影响,
环境科学, 18(5): 1-5

以太湖地区稻麦轮作生态系统为研究对象, 采用基于箱法-气相色谱法的自动连续观测系统, 对 N_2O 的排放和温度进行 了同步自动连续观测, 并在实验室中进行了一系列模拟实验,研究了 N_2O 产生与排放的温室效应。实验结果表明, 在土壤湿度适宜的情况下,

Zheng Xunhua, Wang Mingxing, Wang Yuesi, Shen Renxing, Zhang Wen, and Gong Yanbang. 1997. Impacts of the temperature on the generation and emission of N_2O in farmland. Environmental Science 18(5):1-5.

The synchronous, automatic, and continuous observations on N_2O emission from rice-wheat rotation systems and temperature in the Taihu Lake Region of Southeast China were conducted using box-gas chromatographic method. A series of simulated tests were carried out in order to study the greenhouse effects caused by N_2O generation and emission. The results showed that under the condition of suitable soil humidity, the dependence of N_2O emission on temperature can be prescribed by

N_2O 排放通量对温度依赖性可用指数函数$F=Ae^{at}$来表示；轮作周期内显著 N_2O 排放发生频率随温度的变化呈正态分布,67%的排放量都集中在15℃-25℃之间；在旱地阶段,温度是影响 N_2O 排放季节变化的关键因子,在水田阶段则不是这样；水田和旱地 N_2O 排放具有相同的规律性及日变化形式。

关键词：N_2O排放 温度 排放通量 稻麦轮作系统 农田 太湖地区

exponential function $F = Ae^{at}$. In the rotation of period, it is evident that the frequency of N_2O emission occurred in a normal distribution corresponding to the temperature variations, and that 67% of emission flux concentrated on the range from 15°C to 25°C. In the dry land, temperature is the major factor that influenced the seasonal variations of N_2O emission, but it was different in paddy fields. The N_2O emission has the same regulation of diurnal variation both in dry land and paddy field.

Keywords: N_2O emission, temperature, emission flux, rice-wheat rotation system, farmland, Taihu Lake area

武炳义, 高登义, 黄荣辉, 1997, 冬季格陵兰、喀拉海和巴伦支海海冰年际变化与ENSO事件的关系, 科学通报, 42(18): 1979-1981

讨论了冬季格陵兰、喀拉海和巴伦支海海冰年际变化与ENSO事件的关系,表明该海域海冰面积异常可以引起北半球大气环流异常响应,尤其当海冰面积变化超前大气变化3年时,可诱发大气高度场产生PNA型异常。EISO事件都发生在海冰面积变化速度为极值点的时机。

关键词：年际变化 海冰 ENSO 变化速度

Wu Bingyi, Gao Dengyi, and Huang Ronghui. 1997. El Niño/Southern Oscillation (ENSO) events and interannual variations of winter sea-ice in the Greenland, Kara, and Barents Seas. Chinese Science Bulletin 42(18):1979-1981.

The paper discusses the relationship between El Niño/Southern Oscillation (ENSO) events and interannual variations of winter sea-ice in the Greenland, Kara, and Barents Seas. The results show that the extent anomaly of winter sea-ice in those sea regions would result in a Northern Hemispheric atmospheric circulation anomaly, especially when atmospheric circulation lags the sea-ice 3 years, and that the sea-ice extent variations would lead to a Pacific-North American (PNA) pattern anomaly. ENSO events happened when the variation velocities of the sea-ice extent reached an extreme value.

Keywords: interannual variation, sea-ice, ENSO, variation velocity

汤懋苍,
董文杰，1997，青藏高原的抬升和夷平过程对气候与环境的影响，高原气候, 16(1): 23-29

系统地讨论了高原隆起前的早第三纪至现代青藏高原的7次抬升过程对气候和环境的影响，应用气象学理论分析了当时气候形成的原因。认为：(1) 高原隆起前的干热气候是由于隆起前全球地势平坦，导致大气热机效率较低之故；(2) 渐新世初高原的水平尺度达到了斜压大气地转适应的临界尺度，大气环流从南北两极“两涡对峙”突变成地球三极的“三涡鼎立”，气候发生突变；(3) 分分析了2.5 Ma时高原抬升到2000 m这一临界高度后大气环流的一系列相应变化；(4) 计算、比较了最大冰期地气系统能力平衡与现代的差异，并由此分析了当时的气候状况。
关键词：高原隆起 夷平作用 地质气候突变 最大冰期 能量平衡

Tang Maocang and Dong Wenjie. 1997. Influence of seven Tibetan Plateau raising processes on climate and environment. Plateau Meteorology 16(1):23-29.

In this paper, the influences of seven Tibetan Plateau raising processes on climate and environment are discussed. The cause of climate formation is analyzed using meteorological theory. The main conclusions are as follow: (1) the cause of the hot-dry climate before the elevation of the plateau is that the efficiency of the atmospheric heat engine is lower than after the elevation because of the flatter global landform. (2) At the beginning of Oligocene Epoch, the horizontal scale of the plateau reached the critical scale of geostrophic adjustment of the baroclinic atmosphere, following which atmospheric general circulation changed from “two vortexes” to “three vortexes.” (3) A series of variability in atmospheric general circulation corresponding to the plateau’s reaching 2000 m, at 2.5 Ma BP is analyzed. (4) The energy balance of the earth-atmospheres system at the Great Ice Age is estimated, and the difference between the energy balance at the Great Ice Age and at present is contrasted.

Keywords: uplift of the Plateau, planation, abrupt change of geological climate, maximum glacial age, energy balance

张琼, 钱正安,
陈敏连，1997，关于夏季南亚高压的进一步研究——与我国西北地区降水关系的统计分析, 高原气象, 16(1): 52-62

利用1970－1985年7－8月逐日历史天气图及降雨量等资料，统计了南亚高压脊线和中心活动的基本特征；划分了逐日东、西部型及带状型南亚高压及持续的东、西部型南

Zhang Qiong, Qian Zhengan, and Chen Minlian. 1997. The further study about the South Asia High in summer: Statistical analyses of the relationship between the South Asia High and precipitation distribution over Northwest China. Plateau Meteorology 16(1):52-62.

In this paper, using daily historical synoptic map data and precipitation map of July and August during the period from 1970 to 1985, the basic activity characteristics of the South Asia High (SAH) and the relationship between the SAH and precipitation over Northwest China are analyzed. The results show: (1) The 100 hPa SAH in summer stays mainly over the

亚高压过程，还区分了西北区东、西部的多雨、少雨日。结果表明：南亚高压脊线和中心位置(特别是持续的东、西部型南亚高压过程)与东、西部多雨和少雨过程有密切关系。

关键词：100hPa南亚高压
西北地区降水
东、西部型SAH过程

Qinghai-Xizang Plateau and its neighborhood, which suggests impacts of the Plateau on the SAH. (2) When the monthly mean SAH ridgeline is located somewhat south, the precipitation over Northwest China will increase. (3) During the continuous processes of eastern pattern of the SAH, it will be rainy in the eastern part of Northwest China but dry in the western part of Northwest China. (4) We also sum up the distribution of rainy area of eastern pattern of the SAH.

Keywords: 100 hPa SAH, precipitation of Northwest China, eastern- and western-pattern SAH processes

刘子臣, 梁生俊, 张建宏，1997，登陆台风对黄土高原东部暴雨的影响, 高原气象, 16(4)：402-409

Liu Zichen, Liang Shengjun, and Zhang Jianhong. 1997. The effect of making land typhoon depression on heavy rain in eastern part of the Loess Plateau. Plateau Meteorology 16(4):402-409.

对80年代以来3次登陆台风低压外围影响黄土高原的大暴雨作了气候分析，对9608号台风进行了天气动力诊断分析。结果表明：登陆台风低压外围产生大暴雨的主要机制是台风外围低空偏东急流与西风带低值系统的共同作用以及地面冷锋的动力抬升作用。这一结果可为此类暴雨预报提供理论依据。

关键词：登陆台风低压外围暴雨
低空东风急流 西风带低值系统

This paper reports a climatic analysis of 3 cases of heavy rain on land typhoon depression in the Loess Plateau since the 1980s and a diagnostic analysis of torrential rain around 9608 typhoon depressions. The results show that the main mechanism of heavy rain formation is the influence of the easterly jet around a typhoon depression, a low-pressure system in the westerly belt, and the lifting of the surface cold front. The result provides the theoretical basis for forecasting this kind of torrential rain.

Keywords: heavy rain around typhoon depression, low-level easterly jet, low-pressure system in westerly belt

白虎志,张焕儒,张存杰，1997，兰州城市化发展对局地气候的影响, 高原气象, 16(4)：410-416

Bai Huzhi, Zhang Huanru, and Zhang Cunjie. 1997. The influences of Lanzhou urban development on local climate. Plateau Meteorology. 16(4):410-416.

研究了兰州气候变化特征及其城市化发展对局地气候的影响，发现80

Features of the climatic variation of Lanzhou and the influences of urbanization development on the local climate of city and suburbs are

年代之后，兰州年平均温度相对于60－70年代平均气温的上升幅度是全省气温上升幅度的近4倍，其它要素的年、季变化均表现出明显的特征。兰州城市与郊区年、季平均气温差、平均最高和最低气温差有逐渐增大的趋势；年、季降水日数差、日照时数差有明显的减少趋势。

关键词：城市化发展 气候影响 气温

studied. The results show that the rise of mean temperature in Lanzhou since the 1980s is about four times that of the Gansu province in the 1960s and 1970s. The interannual and seasonal variation characteristics of other factors are clear. The differences of the annual and seasonal mean temperature and the mean maximum and minimum temperature between Lanzhou City and its suburbs are gradually increasing. The annual and seasonal differences of rain day and sunshine duration are decreasing.

Keywords: urbanization development, climatic effect, air temperature

江灏, 王可丽, 吴国雄, 1997，青藏高原地区地表温度及其取值对大气长波辐射冷却的影响, 高原气象, 16(3): 250-257

针对辐射传输模式在青藏高原地区的应用问题，使用Liou-Ou一维辐射传输模式及1982年8月－1983年7月青藏高原热源观测实验期间青藏高原地面、高空与卫星观测资料，在高原辐射传输模式中区分了下垫面温度与地表空气温度的作用，并利用卫星观测资料对模式改进后的实际效果进行了验证；分析了地表温度的日变化和季节变化幅度，得到了下垫面温度的简单参数化方法。

关键词：青藏高原 地表温度 辐射传输

Jiang Hao, Wang Keli, and Wu Guoxiong. 1997. Effects of surface temperature on atmospheric longwave radiative cooling over the Qinghai-Xizang Plateau. Plateau Meteorology 16(3):250-257.

In order to achieve the goal of using the atmospheric radiative transfer model over the Qinghai-Xizang Plateau region, surface temperature in the model and effects of that on the calculation results of atmospheric longwave radiative cooling are analyzed with the Liou-Ou one-dimension radiative transfer model based on the data set of surface, radiosonde, and satellite observation over the Qinghai-Xizang Plateau during the period from August 1982 to July 1983. The effects of both underlying surface temperature (T_g) and near-surface air temperature (T_a) are distinguished in the radiative transfer model, and the effectiveness is verified using satellite observation data. The diurnal cycle and seasonal cycle of T_g and T_a are analyzed, and a simple method to calculate the T_g from the T_a is presented.

Keywords: The Qinghai-Xizang Plateau, surface temperature, radiative transfer

戴晓苏，1997，气候变化对我国小麦地理分布的潜在影响，
应用气象学报, 8(1): 19-25

根据GCM模拟结果，分析了CO_2增加对我国小麦生产地理分布的潜在影响。结果表明：在CO_2加倍的气候条件下，我国小麦生产区将进一步向北和向西扩展，小麦栽培特点和品种类型也有较大变化，气候增暖可能对东北地区产生有利影响。但在中部和南部则可能产生高温应力。小麦生长期间平均温度的升高，特别是收获前的高温会增加对更早熟、更耐热品种的需求。
关键词：气候变化 二氧化碳
气候影响 农作物地理分布

Dai Xiaosu. 1997. Potential effects of climatic variation on geographical distribution of wheat in China. Quarterly Journal of Applied Meteorology 8(1):19-25.

The potential CO_2-induced impacts on the geographical shift of wheat growth zones in China are analyzed based on General Circulation Model (GCM) outputs. The results show that the wheat growth regions may move northward and westward under conditions of a doubled CO_2 climate. The wheat cultivation features and variety types may also experience significant changes. Climatic warming would have a positive influence in Northeast China, but high-temperature stress may be produced in some regions of central and southern China. Higher mean air temperatures during wheat growth, particularly during the reproductive stages, may increase the need for earlier maturing and more heat-tolerant cultivates.

Keywords: climate variation, carbon dioxide, climate impact, crop geographical distribution

庄丽，1997，北印度洋气候对冬夏航线选择的影响, 应用气象学报, 8(4): 445-451

本文结合中央气象台海洋气象导航中心近10年来的实船导航业务，分析了北印度洋气候对冬、夏季航线选择的影响因素，指出应结合北印度洋的冬、夏季气候变化及地形特点选择不同的气象航线。该文为在实际工作中根据不同的季节及船型情况选择不同的航线、规避大风和巨浪出现频率高的区域，以及保持良好的航行条件提供了依据。
关键词：北印度洋 气候变化
航线选择

Zhuang Li. 1997. Impact of climate over the North Indian Ocean on choice of shipping routes in winter and summer. Quarterly Journal of Applied Meteorology 8(4):445-451.

The impact factors of climate over the North Indian Ocean on the choice of shipping routes in winter and summer are summarized on the basis of the operation in the last 10 years of the Center of Ocean-Meteorological Route in the Central Meteorological Observatory. Analysis shows that different Meteorological routes should be chosen by combining winter and summer climate variation over the North Indian Ocean and characteristics of ocean orography. This work supplies a valuable basis for choosing different routes to avoid regions with high-frequency strong wind and huge wave according to the conditions of different seasons and ships.

Keywords: North Indian Ocean, climate change, route choice

翟盘茂, 周琴芳, 1997,
北半球雪盖变化与我国夏季降水,
应用气象学报, 8(2): 230-235

利用1973-1995年北半球卫星雪盖资料，研究了北半球、欧亚和北美3个地区雪盖的气候特征及其变化，指出在70年代是雪盖变化明显扩张时期，1978年达到最高值。80年代以来雪盖逐步收缩，1986年以后持续低于正常。对东亚雪盖与我国夏季降水相关分析的结果表明，东亚冬季雪盖与长江中下游至江南地区夏季降水量呈显著反相关；春季雪盖对中国夏季降水的影响与冬季有所不同，显著的反相关区出现在45^{0}N以北的东北和西北地区。

关键词：雪盖变化 夏季降水 相关

Zhai Panmao and Zhou Qinfang. 1997. The change of Northern Hemisphere snow cover and its impact on summer rainfalls in China. Quarterly Journal of Applied Meteorology 8(2):230-235.

Based on the analysis Northern Hemispheric snow cover data from 1973 to 1995, climatological characteristics and changes of snow cover extent over the Northern Hemisphere, Eurasia, and North America are studied. It is found that the 1970s are a period of snow cover expansion with the maximum in 1978. After the 1980s, snow cover decreased significantly. Correlation analysis shows that East Asia winter snow cover is negatively correlated to summer precipitation in the areas from the mid-lower reaches of the Yangtze River to south of it. Spring snow cover is significantly correlated with rainfalls in northern Xinjiang and northern Northeast China. Significant reverse correlations were found between East Asia winter snow cover and the Meiyu duration when El Niño/Southern Oscilation (ENSO) years are excluded.

Keywords: change of snow cover, summer precipitation, correlation

朱平盛, 张苏平, 1997,
华北夏季旱涝的前期环流异常及其与北太平洋海温的关系,
应用气象学报, 8(4): 437-444

分析了华北地区夏季旱涝的前期春季大气环流和北太平洋海温异常(SSTA)分布特征，探讨了SSTA与异常环流的关系，并用OSU-AGCM进行黑潮地区热源异常强迫的数值试验。结果表明，当春季北极低涡明显减弱，欧亚大陆中高纬度纬向环流加强，西太平洋副高位置偏北偏西，且存在负PNA型异常环流时，华北地区夏季多雨涝；反

Zhu Pingsheng and Zhang Suping. 1997. Atmospheric circulation anomaly prior to drought/flood of summer in North China and its relationship to North Pacific sea surface temperature (SST). Quarterly Journal of Applied Meteorology 8(4):437-444.

The atmospheric circulation anomaly and the North Pacific sea surface temperature anomaly (SSTA) in the spring prior to droughts/floods of summer in North China are analyzed, and the relationships between SSTA and atmospheric circulation anomaly are discussed. Then numerical simulation by heat source anomaly in the Kuroshio current area is made using the Oregon State University (OSU) atmospheric general circulation model (AGCM). The results show that rainy summers in North China would occur if Arctic low vortices weaken significantly and zonal circulation strengthens

之则少雨干旱。此时，西北太平洋和赤道东太平洋SST分布分别存较大的正、负异常，它们与春季环流异常密切相关，正的SSTA是造成华北夏涝年的前期春季异常环流形势的重要因素。

关键词：夏季旱涝 异常环流
副热带高压 海温异常

middle-high latitudes in Eurasia, the West Pacific subtropical high lies northerly and westerly, and a remarkable negative Pacific North American (PNA) pattern exists in spring. Otherwise, there would be dry summers in North China. At the same period, positive and negative SST departures exist in the Western North Pacific and in the equatorial east Pacific respectively, which are closely related to atmospheric circulation anomalies in spring. Positive SSTA in the Kuroshio current area is an important factor for the anomalous atmospheric circulation pattern prior to flood of summer in North China.

Keywords: drought/flood of summer, anomalous atmospheric circulation, subtropical high, sea-surface temperature anomaly (SSTA)

*王兴荣, 时珍玲, 严学峰*等，1997，副热带高压活动与日月运行的关系, 热带气象学报, 13(1): 92-96

本文依据公开发表的资料，系统地研究了副热带高压活动与日月运行的关系。证实了各类副高活动均与日月运行的某种周期活动有关，主要表现形式为周期性泊松联系和与天文奇异点同步效应两种，并且指出，副高活动类型不同，则所对应的联系对象和联系方式也不同。

关键词：副高活动 日月运行
周期性泊松联系
天文奇异同步效应

Wang Xingrong, Shi Zhenling, Yan Xuefeng et al. 1997. Relationship between the action of subtropical high and the movement of the sun and the moon. Journal of Tropical Meteorology 13(1):92-96.

In this paper, based on published data, the relationship between the action of a subtropical high and the movement of the sun and moon is systematically studied. It shows that all types of action of subtropical highs are related to various periodical actions of the sun and the moon and that the forms of relation reveal both a Poisson periodicity and a synchronous tendency to astronomical singularities. The paper also points out that if the types of subtropical high are distinct, the related periodical action of the movement of the sun and the moon and forms of relation are distinct.

Keywords: action of subtropical high, movement of the sun and the moon, periodicity Poisson relation, synchronous tendency to astronomical singularities

邹力, 倪允琪, 1997,
ENSO对亚洲夏季风异常和我国夏季降水的影响, 热带气象学报, 13(4): 306-314

首先对ENSO过程中亚洲夏季风环流的变化进行了诊断分析，结果表明在El Nino事件和La Nina事件中夏季风系统各成员均发生不同程度的变化，甚至出现相反的变异特征。其次，对我国东部地区夏季降水进行了EOF分析，并在此基础上分析了赤道太平洋SSTA对我国东部地区夏季降水影响的程度和区域，该影响与ENSO循环的发展阶段密切相关，且在长江中下游地区和华南地区最为显著。
关键词：ENSO 亚洲夏季风 合成分析

Zou Li and Ni Yunqi. 1997. Impact of El Niño/Southern Oscillation (ENSO) on the summer monsoon over Asia and the summer rainfall in China. Journal of Tropical Meteorology 13(4):306-314.

In this paper, the variability of the Asia summer monsoon circulation during the El Niño/ Southern Oscillation (ENSO) period is diagnostically analyzed. Evidence suggests that every member of the Asia summer monsoon system change in varying degrees, even, oppositely, during El Niño and La Niña events. Then, on the basis of the summer rainfall in east China analyzed by using empirical orthogonal function (EOF), both the region and the extent of the impact of the equatorial Pacific sea surface temperature anomaly (SSTA) on the summer rainfall in East China are analyzed. The impact is related closely with the development phase of ENSO cycle, being most notable in the middle-lower reaches of Yangtze River and South China.

Keywords: ENSO, Asian summer monsoon, composite analysis

于淑秋, 林学椿, 1997,
北太平洋海温的气候跃变及其对中国汛期降水的影响, 热带气象学报, 13(3): 265-275

应用滑动T检验方法对北太平洋海温10年际的气候跃变进行了研究，指出在70年代末至80年代初确实存在着一次明显的气候跃变，而跃变前后北太平洋海温结构、厄尔尼诺事件的发展过程都明显不同，进而讨论了北太平洋海温跃变前后对我国6－8月汛期降水量的影响，指出海温跃变前我国汛期降水量在东北地区偏少、华北偏多；长江流域偏少、华南偏多。而跃变后相反。
关键词：气候跃变 海温 汛期降水

Yu Shuqiu and Lin Xuechun. 1997. Climatic jump of North Pacific sea surface temperature (SST) and its effect on precipitation of floods season in China. Journal of Tropical Meteorology 13(3):265-275.

This paper presents a study of the annual climatological jump of sea surface temperature (SST) in the northern Pacific by means of a moving T test. An obvious climatic jump is indicated in the late 1970s through the early 1980s, and there are significant differences before and after the jump in terms of its SST structure and the evolutionary processes of an El Niño event. The study of the effect of the jump on rainfall in June-August floods season in China concludes that the seasonal precipitation is less (more) than usual in the northeast of China and Yangtze River Basin (North China and South China) before the jump and vice versa.

Keywords: climatic jump, SST, rainfall in floods season

胡增臻,
黄荣辉, 1997，冬季热带西太平洋对流活动异常的年际变化及其对北太平洋风暴轴的影响。大气科学，21 (5): 513-522

通过诊断分析表明，80年代菲律宾周围的对流活动2—4年周期振荡比较明显；北太平洋风暴轴中心有线性增强、偏北、偏东的趋势；在2—4年时间尺度上，菲律宾周围对流活动的变化与北太平洋风暴轴的变化有密切联系：当菲律宾周围活动强(弱)时，北太平洋风暴中心偏强(弱)、偏东(西)、偏北(南)。产生这种联系的物理机制是，当菲律宾对流活动强(弱)时，在东亚—北太平洋—北美地区产生一个距平波列(ANA)，位于美国西海岸的正(负)距平及其北侧的负(正)距平，使气压梯度增大(减小)，北太平洋急流和风暴轴中心强度增强(减弱)、北抬(南退)、东伸(西退)。
关键词：菲律宾 对流活动
北太平洋风暴轴
东亚—北太平洋—北美遥相关型
2—4年周期振荡

Hu Zengzhen and Huang Ronghui. 1997. The interannual variation of the connective activity in the tropical West Pacific in winter and its effect on the storm track in the North Pacific. Scientia Atmospherica Sinica 21(5):513-522.

Diagnostic analysis shows that convective activities around the Philippines have a 2 to 4 year period of oscillation in the 1980s. The storm track in the North Pacific has a linear strengthening, a northward and eastward trend, and the obvious 2 to 4 year period of oscillation. There are close connections between the anomaly of convective activities and storm track variation in the North Pacific on the 2 to 4 year time scale. The center of the storm track in the North Pacific is strong (weak), eastward (westward), northward (southward) when the convective activities around the Philippines are strong (weak). The physical mechanism producing this connection is considered to be a forced anomaly wave train from east Asia to North America (ANA) via North Pacific when the convective activities around the Philippines are strong (weak). At the same time, both the positive (negative) anomaly in the west coast of the U.S.A. and the negative (positive) anomaly to its north increase (decrease) the pressure gradient, so that the jet stream and the storm track centered in the North Pacific are strong (weak), northward (southward) and eastward (westward).

Keywords: Philippines, convective activities, storm track in the North Pacific, East Asia-North Pacific-North America teleconnection pattern, 2 to 4 year period of oscillation

蒋全荣, 郑定英,
余志豪, 1997，副热带高气压季节性移动与海温场的联系,
大气科学，21(2): 199-204

本文通过EOF分解，分析讨论了西北太平洋副热带高压季节性移动与海温场之间的联系。结果表明：副高的两次北跳与东西进退都与海温

Jiang Quanrong, Zheng Dingying, and Yu Zhihao. 1997. The relationship of the seasonal movement of the subtropical high over the northwestern Pacific with sea surface temperature (SST). Scientia Atmospherica Sinica 21(2):199-204.

Based on empirical orthogonal function (EOF), the relationship of the seasonal movement of the subtropical high over the northwestern Pacific with sea surface temperature (SST) is discussed. The results show that the two north jumps and

场的扰动加热有关，海洋的热力强迫作用是引起大气环流系统季节性变化的重要原因之一。

关键词：副热带高压 海温 季节性移动

east-west movement of the subtropical high are closely related with the perturbation of SST. The role of the oceanic thermal forcing is one of the most important reasons causing the seasonal variation of the atmospheric circulation.

Keywords: subtropical high, sea surface temperature, seasonal movement

卞林根, 陆龙骅, 贾朋群，1997，南极地区温度和海冰的变化特征及相互关系，大气科学，21(5): 564-572

对南极地区温度和海冰的时空变化特征及相互关系进行了初步研究，结果表明：近30年来南极地区有明显的变暖趋势，时空差异比较明显。其中以南极半岛地区的变暖趋势最大，是整个东南极沿岸增温率的2－3倍。近20年来，平均南极海冰面积和南极平均温度的变化趋势相反，年际变化的相关关系不显著。经过聚类分析划分出不同的气候区，能清楚地显示出这两者的关系。

关键词：南极 温度 海冰 时空特征

Bian Lingen, Lu Longhua, and Jia Pengqun. 1997. Characteristics of Antarctic surface air temperature and sea ice variations and their relationship. Scientia Atmospherica Sinica 21(5):564-572.

Temporal-spatial characteristics of Antarctic surface air temperature and sea ice variations are statistically analyzed. Results show that, during the last 30 years there is an obvious warming trend in Antarctica, but there exist substantial differences in different regions and different time periods. The most significant warming trend occurred in the Antarctic Peninsula, about 2 to 3 times greater than in the whole east Antarctica. In the last 20 years the correlation between Antarctic mean temperature and mean sea ice area is low and insignificant, but their linear trends are found to be opposite in all regions, that is, sea ice extent is reduced when temperature is high. The different climate regions defined by cluster analysis clearly show a close relationship between the two parameters on an inter-seasonal time scale.

Keywords: Antarctica, temperature, sea ice, temporal-spatial characteristic

王晓春,
吴国雄，1997，中国夏季降水异常空间模与副热带高压的关系，
大气科学，21(2): 161-169

利用1959－1994年6、7、8月全国范围47个5° ×5° 经纬度网格降水资料分析了夏季降水异常空间模的月际差异，并在此基础上用西太平洋副高指数及青藏高原指数*B*分析降水异常空间模与环流的关系，为检验环流指数与降水相关场的整体信度，还对8月份降水资料进行了Monte-Carlo检验。
认为中国夏季总降水异常的空间模在一月份中并非表现的同样清楚，江淮流域与河套及华南的反相关在8月份表现的最清楚。而青藏高原中东部南北两侧的负相关在6月及8月很清楚，7月次之。8月份西太平洋副高北界异常对江淮流域与河套及华南地区降水异常反相关的产生有很大的作用。
关键词：夏季降水异常空间模 西太平洋副高指数 青藏高原指数*B* 整体信度

Wang Xiaochun and Wu Guoxiong. 1997. The analysis of the relationship between the spatial modes of summer precipitation anomalies over China and the atmospheric general circulation. Scientia Atmospherica Sinica 21(2):161-169.

The precipitation data at 5° by 5° grid (June, July, and August) from 1959 to 1994 are used to analyze the monthly change of the spatial mode of summer precipitation anomalies over China. The relationship between the spatial mode of summer anomalies and the atmospheric general circulation is analyzed using indices of the Northwestern Pacific high and the geo-potential height index *B* of the Tibet Plateau. The Monte-Carlo method is used to evaluate the significance level of the collective significance of the correlation field between the circulation index and precipitation. The results show that the negative correlation between the precipitation anomaly over the lower-reaches of the Yangtze River and Huaihe River valley (LRHY region) and that over the middle-reaches of the Yellow River (MRY region) and over South China is the most significant in August. The negative correlation between the precipitation over the southern part of the eastern Tibetan Plateau is more significant in June and August than in July. The analysis for the correlation between indices of the Northwestern Pacific high and monthly precipitation show that the anomaly of the north boundary of the Northwestern Pacific high in August has the greatest influence on LRHY region.

Keywords: spatial mode of summer precipitation anomalies, indices of the Northwest Pacific high, geo-potential height index *B* of the Tibet Plateau, collective sigificance

林而达，1997，气候变化与农业——最新的研究成果与政策考虑，
地学前缘，4(2): 221-226

全球气候变化将严重地限制世界农业生产，并引起广泛的饥荒，这已经引起了人们的关注和争论。未来

Lin Erda. 1997. Climate change and agriculture: Research finding and policy consideration. Earth Science Frontiers 4(2):221-226.

Global climatic change that would seriously limit agricultural production and cause widespread famine and starvation has been studied closely and is a source of controversy. The agricultural impacts of potential climate change have now

气候变化对农业的可能影响目前已经进行了一些详细的研究，虽然还有许多不确定性，但还没有发现全球的食物供应会受到严重威胁。采取适应对策在一些国家可以产生节省成本的后果，但随之而来的新增成本会给发展中国家造成严重的障碍。农业减缓政策的顺利实施取决于能否减少技术转让与扩散的障碍，是否能获取可用资金。

关键词：气候变化 农业影响 适应对策 减缓对策 政策考虑

been investigated in some detail. Although uncertainties remain, overall studies conducted do not find the global food supply seriously threatened. Even though some adaptation strategies could result in cost savings for some countries, the incremental costs of adaptation strategies could result in a serious burden for developing countries. Agricultural mitigation depends on reducing barriers to the diffusion and transfer of technology, mobilizing financial resources, and supporting capacity building in developing countries.

Keywords: climate change, agricultural impact, adaptation, mitigation, policy consideration

柯长青，李培基，王采平，1997，青藏高原积雪变化趋势及其与气温和降水的关系，冰川冻土，19(4)：289-294

根据青海、西藏60个地面基本气象台站1957－1990年逐日雪深、月平均气温、月降水量观测记录，采用自回归滑动平均模型分析了青藏高原积雪变化趋势，结果表明，高原积雪变化呈普遍增进趋势。青藏高原气温与降水的变化趋势也是增加的，积雪深度与冬季气温之间呈现弱负相关关系，而与冷季降水呈正相关。表明积雪的增加是由冷季降水的增加所引起的。

关键词：青藏高原 积雪 变化趋势 全球变暖 二元回归分析

Ke Changqing, Li Peiji, and Wang Caiping. 1997. Variation trends of snow cover over the Tibetan Plateau and their relationship to temperature and precipitation. Journal of Glaciology and Geocryology 19(4):289-294.

Daily snow depth data, together with monthly average temperature and monthly total precipitation, at 60 primary weather stations from 1957 to 1990 were analyzed using autoregressive moving average (ARMA) (p,q) and multiple linear regressive analysis. The results show an increasing trend of snow volume almost omnipresent over the entire Tibetan Plateau, with some local decreasing trends. The secular trend of cold season temperature and precipitation in the Tibetan Plateau is also increasing. A significant positive correlation exists between snow cover and precipitation, but the correlation of snow cover and temperature is negative over the Tibetan Plateau. The increase of snow cover results from the increase of precipitation during the cold seasons with global warming.

Keywords: Tibetan Plateau, snow cover, variation trends, global warming, multiple linear regressive analysis

赖祖铭，1997，试论温室效应对我国西部河川径流的影响。冰川冻土，19(1): 10-16

本文利用假设气候情景和统计模型，讨论并估计了我国西部河川径流在CO_2加倍情况下的可能变化。大气中日益增多的温室气体导致我国西部地区的气候在四十年来出现了干暖化趋势，河川径流量明显减少。据统计，从50年代后半期到80年代，新疆地区的河川径流量减少了6.4%；西藏东南部的三条大河从60年代到80年代则平均减少了13.2%，其减少量远大于新疆。主要因为气温升高使冰雪融水增加，新疆的河流受到冰雪融水的补偿。

关键词：温室效应 河川径流 影响

Lai Zuming. 1997. Impact of the greenhouse effect on runoff in West China. Journal of Glaciology and Geocryology 19(1):10-16.

In this paper, the climatic variations in West China are discussed and analyzed using climate scene and statistics modeling. In the last forty years, climate warming and decreasing precipitation are notable in West China because of the rapid development of industries and agriculture, increasing the greenhouse gases in the atmosphere. According to statistics from the late 1950s to the 1980s, the total runoff was reduced 6.4% in the Xinjiang Region, and from the 1960s to the 1980s it was reduced 13.2% on average in the three large rivers in the southern Tibet Region. The decreasing range in the Xinjiang Region is less than that in the southeastern Tibet Region. The reason is that decreasing precipitation is compensated by increasing glacier and snow meltwater in the Xinjiang Region.

Keywords: greenhouse effect, runoff, impact

尚可政, 杨德保, 王式功, 孟梅芝，1997，黄河上游水电工程对局地气候的影响，干旱区地理，20(1)：57-64

本文介绍了黄河上游段水电工程概况，并以刘家峡和龙羊峡水库为主对库区周围各站建库前后各5年或10年的气象资料进行了对比分析，揭示了水库对周围地区各气候因子的影响程度。结果表明：水库对库区周围地区气候环境起到了不同程度的改善作用，对水库及水库下游的水温起到了不同程度的调节作用，改善了黄河流域的农业生产条件。

关键词：水电工程 气候效应 黄河上游

Shang Kezheng, Yang Debao, Wang Shigong, and Meng Meizhi. 1997. Influence of water conservancy and power projects on local climate at upper reach of the Yellow River. Arid Land Geography 20(1):57-64.

A survey of the water conservancy and power projects at the upper reaches of the Yellow River is briefly introduced. The influence of the Liujiaxia Reservoir and the Longyangxia Reservoir on the local climate is studied by comparing the analyzed results of the meteorological data from the meteorological stations near the two reservoirs. The results are as follows: After the reservoirs were built, the mean annual air temperature and water temperature went up, and the daily differences of air temperature and water temperature were lower at the areas near two reservoirs and the lower reaches of the Yellow River as a result of the heat storage of the reservoirs. The reservoirs are relatively cold sources in spring and summer and warm sources in autumn and winter. The atmospheric layer is stablized, which makes

convection, low-level clouds, and thunderstorms decrease and sunshine duration increase at the reservoir areas.

Keywords: water conservancy and power project, climatic effect, upper reaches of the Yellow River.

李峰，1997，全球气候变化与我国荒漠化监测的关系，
干旱区资源与环境, 11(3): 28-33

在全新世以来我国主要沙地和沙漠景观动态变化与全球气候波动对应关系分析的基础上，对全球气候变化与我国荒漠化监测的关系进行了研究。结果表明：全球气候变化在时空两方面影响着我国的荒漠化监测，尤其是全球气候变化在空间范围上对土地荒漠化的不同影响。这包括我国东部和西部地区土地荒漠化对全球气候变化的响应度和灵敏度两方面。

关键词：全球气候变化 土地荒漠化 荒漠化监测

Li Feng. 1997. Global climatic variation and desertification monitoring in China. Journal of Arid Land Resources and Environment 11(3):28-33.

The paper analyzes the relationship between global climatic fluctuation and dynamic landscape changes of the main sandy lands and deserts in China since the Holocene. The monitoring showed that global climatic variation affected desertification in China in both space and time, especially spatial influences. The responsiveness and sensitivity to climatic changes are different in the eastern part and western part of China.

Keywords: global climatic variation, land desertification, desertification monitoring

Modeling

董敏, 李跃凤,
沈文海，1997，东亚气候的模拟与验证研究，
气象学报，55（6）：692-702

文中利用NCAR的气候模式CCM2对东亚气候进行了模拟研究，并应用美国环境预测中心重新分析资料和中国降水资料对模拟结果进行了检验。检验表明，该模式能够较好

Dong Min, Li Yuefeng, and Shen Wenhai. 1997. Validation study on the East Asian climate simulated by CCM2. Acta Meteorologica Sinica 55(6):692-702.

Using the National Center for Atmospheric Research (NCAR) community climate model 2 (CCM2), the simulated East Asian climate was analyzed and checked against observation data and information. The large-scale features of the East Asian climate were simulated pretty well by the model, though there are still some discrepancies between the model output and

地描述东亚地区的大尺度气候特征，模拟的高度场、温度场等比较接近实际。对东亚季风气候具有决定性影响的系统，如副热带高压、蒙古高压、印度低压以及西风急流等也模拟比较好。检验结果还表明，对湿度场的不如高度、温度及风场的模拟，夏季西风急流的模拟不如冬季。CCM2对东亚降水的模拟效果较差。这表明CCM2在模式物理过程方面（如：对流参数化，垂直输送过程，陆面过程及地形等）需要进行较大改进。

关键词：东亚季风 模拟 验证

observation. The simulated geopotential height, wind, and temperature fields are very close to the observation. The large-scale systems, such as the subtropical high, Mongolia high, and Indian low, which have an important influence on the East Asia Monsoon are also simulated pretty well. The moisture field is not simulated as well as the fields just mentioned. The simulated precipitation of the model has a rather big difference from the observation. These differences suggest that some physical processes in the CCM2 need to be improved.

Keywords: East Asia climate, simulation, validation

张荣华, 曾庆存, 周广庆，1997，一个混合型热带海洋一大气耦合模式——I.模式构成及热带太平洋气候态模拟, 大气科学，21（2）：129-140

此项研究基于由一阶斜压模表示的自由大气和混合行星边界层所组成的简单热带大气模式（ML）和大气物理研究所高分辨自由表面热带太平洋环流模式(OGCM)创建了一个用于探索热带海洋一大气系统相互作用和El Nino/Southern Oscillation
动力过程的混合型耦合模式。两模式之间进行如下耦合：简单大气模式计算出海表风应力，热通量由松驰公式计算，淡水通量（蒸发与降水之差）由观测资料给定，它们一起作为海洋环流模式
（OGCM）的强迫场；而OGCM计算出海表温度（SST），在其以外地区给定观测到的气候海表温度或陆地温度，作为大气模式的边界条

Zhang Ronghua, Zeng Qingcun, and Zhou Guangqing. 1997. A hybrid coupled tropical atmosphere-ocean model part I: Model formulation and simulated tropical Pacific climatology. Scientia Atmospherica Sinica 21(2):129-140.

The research developed a hybrid coupled model (HCM) of the tropical atmosphere-ocean to study the tropical air-sea interactions and El Niño/Southern Oscillation (ENSO) cycles. The atmospheric component is a simple tropical model consisting of a well-mixed planetary boundary layer (Lindzen-Nigam model) and a free troposphere represented by the first-order baroclinic model (Gilltype model) in the tropical Pacific. The oceanic component is the Institute of Atmospheric Physics (IAP) free-surface tropical Pacific oceanic general circulation model (OGCM). The coupled model can produce both annual mean and seasonal cycle climatology as well as short-term climate variations. The coupling procedure consists of exchanging the surface fluxes (i.e., the surface wind stress) estimated from the simple atmosphere together with the heat flux calculated by the Haney relation formula and the prescribed water flux are used to force the OGCM; the OGCM calculates sea surface temperature (SST) within the domain and uses the observed surface temperature outside the domain, which gives the surface boundary condition for the atmospheric model. The

件。并采用逐日、同步耦合方案，未采用任何通量修正进行了26年数值分析，对热带太平洋气候态进行模拟。结果表明，耦合模式未出现气候漂移现象，并且非常成功地再现了热带太平洋大气和海洋环流平均态及其季节变化。

关键词：简单热带大气模式 海洋环流模式 海气耦合 气候态模拟

simulations of the tropical Pacific climatology are conducted using synchronous daily coupling and numerical results without flux correction. It is shown that the coupled model is free from climate drift and is able to accurately reproduce the observed tropical Pacific climatology of the atmosphere and ocean and their seasonal variations.

Keywords: simple tropical atmosphere model, oceanic general circulation model (OGCM), coupling simulated climatology of the tropical atmosphere and ocean

叶佰生，陈克恭，施雅风，1997，冰川及其径流对气候变化响应过程的模拟模型——以乌鲁木齐河源1号冰川为例，地理科学，17（1）：32-40

应用冰川动力学模型结合冰川径流模型模拟乌鲁木齐河源1号冰川东支达到稳定状态的过程以及不同气候变化条件下冰川的响应过程。结论如下：1号冰川在维持目前气候变化条件下稳定长度约为1600m；若未来气温升高1℃（加之冰川冷却作用减少，冰川区实际升温约为2℃），1号冰川东支将退缩为只有300m的悬冰川；目前1号冰川的径流量正处于一个相对稳定状态的高峰值；气温升高将引起冰川径流在升温初期增加，之后将迅速减少；径流在升温初期的增加量及峰值出现时间取决于升温的速度。

关键词： 冰川 径流 气候变化 乌鲁木齐河

Ye Baisheng, Chen Kegong, and Shi Yafeng. 1997. Responses of glacier and glacial runoff to climatic change: A model to simulate Glacier No. 1 in headwaters of the Urumqi River. Scientia Geographica Sinica 17(1):32-40.

Using a dynamic glacier model, the processes and responses of Glacier No. 1 in the headwaters of the Urumqi River to various future climatic scenarios are discussed. The conclusion is as follows: Glacier No. I in headwaters of the Urumqi River will continue to retreat if current climatic conditions prevail until it reaches a steady state of 1600 m in length. If the air temperature were to rise 1°C (rise of 2°C actually, because the cooling function of the glacier would decrease), the glacier would degenerate and become a hanging glacier with a length of 300 m after 700 to 800 years. The current glacial runoff is higher in comparison with that of the equilibrium state under the current climatic condition. If the air temperature continues to rise, however, the runoff of the glacier would increase and reach a new peak but then decrease rapidly.

Keywords: glacier, runoff, climatic change, Urumqi River

杜鹏，李世奎，1997，农业气象灾害风险评价模型及应用，
气象学报，55（1）：95-102

根据灾害风险分析原理，以改进的农业生态地区法为基础，建立了一个经三级放大的农业灾害风险分析实用模型（概念模型、过渡模型、实用模型）。并以华南荔枝生产为例进行了农业气象风险分析，计算了主要的农业气象灾害以及风险体系的风险度。

关键词：农业气象灾害
风险评价模型 荔枝

Du Peng and Li Shikui. 1997. An agro-meteorological disaster risk analysis model and its application. Acta Meteorologica Sinica 55(1):95-102.

On the basis of the principles of disaster risk analysis and the method of improved agricultural ecological areas, a practical model of agro-meteorological disaster risk analysis is established. It was developed from the gradual three-level enlargement of a basic concept model (basic concept model, transitional model, practical model). The risk degrees of main agro-meteorological disasters and risks of litchi cultivation in Southern China are analyzed and calculated.

Keywords: agro-meteorological disaster, risk analysis model, litchi

邓北胜，熊廷南，周小刚，
1997，三峡地区枯水期区域性强降水的一种天气模型，气象，
23(5):22-25

根据长江三峡地区1961-1994年10月一1月逐日降水资料及三峡地区枯水期区域性强降水标准确定了该地区发生区域性强降水的雨日，并运用天气统计学方法对同期的历史天气图进行分析产生区域性强降水的原因、影响系统以及环流形式特征。总结出三峡地区产生区域性强降水的两脊两槽型大气环流形式的环流特征，归纳出一种较为实用的预报模型，概括出两脊两槽环流型前期预报指标。通过利用1995年的检验和1996年10、11月试报的结果证明，该模型及前期预报指标是具有预报参考价值。

Deng Beisheng, Xiong Tingnan, and Zhou Xiaogang. 1997. A synoptic model for regional severe precipitation forecast in the dry season in Sanxia on the Changjiang. Meteorological Monthly 23(5): 22-25.

Using the daily date of precipitation during October to January from 1961 to 1994 and the criteria of regional severe precipitation in the dry season in the Sanxia area, the days of regional severe precipitation in the area are ascertained. The reasons, the impacting systems, and the features of general circulation for regional severe precipitation in the area are analyzed using the historic synoptic charts for the same period. The features of general circulation of two ridges and two troughs models during regional severe precipitation in Sanxia area are summarized. A synoptic model for forecasting regional severe precipitation in the dry season in the Sanxia area on the Changjiang is given. The predictive indexes of the circulation pattern are drawn. The operational experiment shows that the two ridges and two troughs model and its predictive indexes are of preferential value to forecast the regional severe precipitation in dry season in Sanxia on the Changjiang.

关键词：强降水　大气环流
预报指标

Keywords: severe precipitation, general circulation, forecast index

刘景涛, 高涛,
康玲，1997，寻找相似天气过程的一种数学模型,
应用气象学报，8(1):78-84

文章设计了一种寻找相似天气过程的数学模型，利用Saaty论述的方法构造判别矩阵进行判别，从而计算出实时天气图与历史资料库中天气图的相似排序及相似度。这种方法经预报试验证明效果良好。

关键词：相似技术　数学模型
预报试验

Liu Jingtao, Gao Tao, and Kang Ling. 1997. A mathematical model for searching analogue weather process. Quarterly Journal of Applied Meteorology 8(1):78-84.

The paper developed a new mathematical model for searching the analogue weather process, in which the discriminant matrix is made by means of the Staay method. The analogue order and analogue degree are calculated using the matrix, and the model has proved to be very useful in operational weather forecasting.

Keywords: analogue technique, mathematical model, forecast test

范广洲, 罗四维,
吕世华，1997，青藏高原冬季积雪异常对东、南亚夏季风影响的初步数值模拟研究, 高原气象,
16(2)：140-152

利用一个耦合了简化的简单生物圈模式的大气环流谱模式(SSIB-GCM)，初步探讨了青藏高原冬季积雪异常对东、南亚夏季风环流和降水的影响及其机理。结果表明：高原地区冬季积雪增加将使随后的夏季东、南亚季风明显减弱，主要表现为东、南亚季风区降水减少，索马里急流、印度季风槽和印度西南气流减弱。另外，还提出了欧亚大陆雪盖与整个高原雪盖和高原东部雪盖对东、南亚夏季风影响的敏感性问题。

Fan Guangzhou, Luo Siwei, and Lu Shihua. 1997. The preliminary numerical experiments of the effect of anomalous snow cover over the Plateau in winter on east and south Asian summer monsoon. Plateau Meteorology 16(2):140-152.

A general circulation model, which has been coupled with a simple biosphere model, was used to assess the influence of anomalous Plateau snow cover in winter on the east and south Asian summer monsoon circulation and rainfall. The results point out that the summer monsoon in east and south Asia is weakened when the winter snow cover over the Plateau is increased. The main features are that the precipitation is reduced in the east and south Asian summer monsoon region and the Somali jet, the Indian monsoon trough, and the Indian southwest air flow are weakened. In addition, the sensitivity of the effects of the snow cover over Eurasia and the east Plateau on the Asian monsoon are also examined. It is found that the Plateau snow cover was more sensitive than that over Eurasia.

关键词：高原积雪 东、南亚夏季风 数值模拟

Keywords: snow cover over the Plateau, east and south Asian summer monsoon, numerical experiments

吴爱明，
倪允琪，1997，青藏高原对亚洲季风平均环流影响的数值试验，
高原气象, 16(2): 153-164

利用垂直方向具有9层σ面、水平方向菱形截断波数为15的全球大气环流谱模式和有、无青藏高原大地形两种情况下10年积分的模拟结果，研究了青藏高原大地形对亚洲积分平均环流的影响。结果表明：有、无青藏高原大地形，亚洲冬、夏季积分平均环流均存在很大的差异。
关键词：大气环流模式 青藏高原 亚洲季风平均环流 季节变化

Wu Aiming and Ni Yunqi. 1997. Numerical experiments of the influence of the Qinghai-Xizang Plateau on the mean circulation of the Asian monsoon. Plateau Meteorology 16(2):153-164.

An atmospheric general circulation model (AGCM) resolution (with 9 sigma levels in the vertical and rhomboidal truncation at wave number 15 in the horizontal) was run for 10 years with and without Qinghai-Xizang Plateau respectively (called TP and NTP experiments hereafter). Comparing the results of TP and NTP experiments, the influence of Qinghai-Xizang Plateau on the mean circulation of Asian monsoon is investigated. It found clear differences between the mean circulation of Asian monsoon with and without Qinghai-Xizang Plateau either in summer or in winter.

Keywords: atmospheric general circulation model (AGCM), Qinghai-Xizang Plateau, mean circulation of Asian monsoon, seasonal variation

Radiation and Trace-Gas Emission

郑循华，王明星，王跃思，沈壬兴，上官行健，M. Kogge，J. Heyer，H. Papen，金继生，李老土，1997，
华东稻田CH_4和N_2O排放，
大气科学，21（2）：231-237

以太湖地区麦茬稻为例，对稻田CH_4和N_2O
排放进行了同步自动连续观测研究，揭示了二者的相互关系。稻田CH_4和N_2O排放的季节变化规律完

Zheng Xunhua, Wang Mingxing, Wang Yuesi, Shen Renxing, Shangguang Xingjian, M. Kogge, J. Heyer, H. Papen, Jin Jisheng, and Li Laotu. 1997. CH_4 and N_2O emissions from rice paddy fields in East China. Scientia Atmospherica Sinica 21(2):231-237.

The study reveals the mutual connection between methane (CH_4) and nitrous oxide (N_2O) emissions on the basis of a synchronous automatic observation series on the CH_4 and N_2O emissions from the Tai Lake rice paddy fields. The seasonal variations of CH_4 and N_2O emissions from rice fields are completely different. The N_2O emission intensively increases whereas CH_4 emission decreases

全不同，二者的排放通量随土壤水分条件的变化而互为消长，但它们的日变化形式却有共同之处。晴天时的CH_4和N_2O排放日变化规律明显，主要表现为下午单峰模态，有时CH_4排放在夜间出现一个次峰。CH_4和N_2O排放总量因肥料类型的不同而不同，堆肥加尿素处理比NH_4HCO_3处理少排放N_2O 30%，多排放CH_4 12%。

关键词：CH_4排放 N_2O排放 稻田

because of drainage. However, their patterns of diurnal variation are similar. On clear days, the order of CH_4 and N_2O emission is distinct, the maximum emissions of both gases usually occur in the afternoon. Sometimes, another smaller peak of CH_4 emission is observed during the night. Significant effects of fertilizer application on emissions were also detected.

Keywords: CH_4 emission, N_2O emission, rice paddy fields

孙庆瑞, 王美蓉, 1997,
我国氨的排放量和时空分布,
大气科学，55（5）：590-598

根据我国实际情况确定了各种氨排放源的排放因子，并采用排放因子的方法按省计算了我国历年的氨排放量和排放密度。我国自1960年以来，氨的排放量逐年增加，1993年达12Mt,
在各种氨源中以动物的贡献最大，占52%。在测定的6个省市（北京、广西、广东、湖南、江西、山东）中，北京的氨有明显的季节变化，春、夏浓度高,冬季低。氨的日变化中，一般夜间浓度高于白天。还测定了氨的垂直分布，计算了氨浓度的标高。

关键词：氨 排放量 日变化

Sun Qingrui and Wang Meirong. 1997. Ammonia emission and concentration in the atmosphere over China. Scientia Atmospherica Sinica 55(5):590-598.

Statistical figures on ammonia (NH_3) emission amounts for 27 provinces and 3 cities of China are presented and emission factors are determined. Since 1960, the amount of ammonia emission in China has increased year after year. The total ammonia emission amount was 12 Mt in 1993 with a major contribution (52%) from livestock wastes. The NH_3 concentrations in the atmosphere were measured in Beijing, Guangdong, Guangxi, Hunan, Hubei, Jiangxi, and Shandong. The NH_3 concentrations varied with season in Beijing. From the diurnal pattern, it can be seen that NH_3 concentrations at night were often higher than those observed during the day. The ammonia concentrations were also measured at different elevations.

Keywords: ammonia, emission amounts, diurnal pattern

王木林, 程红兵, 李兴生, 温玉璞, 1997,
中国部分清洁地区大气中N_2O的浓度,气象学报，55(3): 363-370

根据1993年4月–1995年8月对中国部分清洁地区大气的N_2O浓度进行的现场观测，（中国农科院试验田、中国科学院农业生态实验站二个农田及临安、龙凤山、瓦里关山三个大气本底站）并采用气相色谱分析法，对大气中N_2O的背景特征及日、季变化进行了初步研究。研究表明：农田大气中N_2O平均浓度高达322.1－343.4ppbv，这是土壤排放N_2O 的结果；临安、龙凤山和瓦里关山大气本底观测站（WMO/GAW）平均浓度分别为318.8±8.4ppbv，317.4±4.7ppbv和314.0±4.2ppbv。在此基础上，对大气中N_2O的分布及变化特征进行了分析。并且还初步分析和评价了现场取样和浓度测量技术。
关键词：氧化亚氮 本底浓度 气相色谱法

Wang Mulin, Cheng Hongbing, Li Xingsheng, and Wen Yupu. 1997. The background levels of atmospheric nitrous oxide in some regions of China. Acta Meteorologica Sinica 55(3):363-370.

The paper discusses the background feature of nitrous oxide (N_2O) and its diurnal and seasonal variation according to observation of atmospheric N_2O concentration in some unpolluted regions of China from April 1993 to August 1995. Results show that the average mixing ratios of N_2O over agricultural fields are from 322.1 to 343.4 ppbv. The larger values and variations of N_2O are the result of emission of N_2O from fertilized soils. The mean mixing ratios of N_2O at the Linan and Longfengshan Background Air Pollution Monitoring Station and Waliguanshan World Meteorological Organization/Global Atmosphere Watch (WMO/GAW) baseline observatory are 318.8±8.4ppbv, 317.4±4.7ppbv and 314.0±4.2ppbv, respectively. The distribution and variation of N_2O are discussed. Also, the sampling technique and measuring method of the mixing ratio of N_2O are specially analyzed and assessed.

Keywords: nitrous oxide, background levels, gas chromatography

郑循华等, 1997，华东稻麦轮作生态系统NO_2的排放研究,
应用生态学报，8(5)：493-499

根据对华东稻麦轮作周期的NO_2排放及其影响因子的连续观测结果，分析了NO_2排放的季节变化和日变化。同时还分析了温度、土壤水分状况、施肥和土壤NO_2和NH_3量对NO_2排放的影响，并对稻田NO_2和CH_4排放进行了比较分析。结果表明：华东稻麦轮作生态系统的NO_2和CH_4排放具有完全不同的季节变化

Zheng Xunhua et al. 1997. Nitrogen dioxide (NO_2) emission from rice-wheat ecosystems in East China. Chinese Journal of Applied Ecology 8(5):493-499.

Based on the observation of NO_2 emission from rice-wheat rotation in East China, its seasonal and diurnal variation and the effects of temperature, soil moisture, fertilization, and availability are discussed. Meanwhile, the methane (CH_4) and NO_2 emissions from the rice season are analyzed comparatively. The study shows that the amount of NO_2 emitted during the rice season only accounts for about 30% of the whole rotation cycle. The CH_4 emission increases 26% with flooding in the rice season, and NO_2 emissions from rice-wheat rotation

规律。在稻麦轮作周期内，其生长季的NO_2排放量仅占30%,
稻田持续淹水比常规灌溉增加CH_4排放量26%, 减少NO_2排放量11-26%
关键词：NO_2排放 时间变化
控制因子 CH_4排放 稻麦轮作系统

cycle are reduced 11 to 26%, compared with normal irrigation.

Keywords: NO_2 emission, temporal variation, regulating factor, CH_4 emission, rice-wheat rotation system

卢维盛等, 1997，广州地区晚稻田CH_4和NO_2的排放通量及其影响因素, 应用生态学报，8(3): 275-278

采用密闭箱法同时观测了广州地区晚稻田CH_4和NO_2的排放通量，研究了水分管理及水旱轮作的影响。研究表明：连续淹水、常规轮作和水旱轮作等三种处理方式的CH_4平均排放通量分别为17.63、2.84和0.36mg・m^{-2}・h^{-1}，而NO_2的平均排放通量分别6.47、11.69和55.07μg・m^{-2}・h^{-1}，这说明稻田NO_2和CH_4排放之间存在着消长关系。稻田连续淹水显著增加CH_4的排放而降低NO_2的排放，水旱轮作降低CH_4排放却增加NO_2的排放。并且讨论了这两种气体排放的影响因素及各自对温室效应的相对贡献。
关键词：稻田 CH_4和NO_2排放通量 水分管理 水旱轮作

Lu Weisheng et al. 1997. Methane (CH_4) and nitrogen dioxide (NO_2) fluxes from late-rice fields in the Guangzhou region and the factors affecting emission. Chinese Journal of Applied Ecology 8(3):275-278.

Using a closed chamber method, methane (CH_4) and nitrogen dioxide (NO_2) emissions from late-rice fields in the Guangzhou region were measured simultaneously. It is revealed that when treated by continuous flooding, rotation succession cropping, and rice-vegetable rotation, the mean CH_4 emissions are 17.63, 2.84, and 0.36 mg・m^{-2}・h^{-1} respectively, whereas the mean NO_2 emissions are 6.47, 11.69, and 55.07 μg・m^{-2}・h^{-1} correspondingly. This indicates a trade-off between CH_4 and NO_2 emission. The continuous flooding can greatly increase CH_4 emission, while significantly reducing NO_2 emission. But with a rice-vegetable rotation the reverse is true. The factors affecting CH_4 and NO_2 emissions are also discussed, and the contribution of CH_4 and NO_2 to global warming is preliminarily analyzed.

Keywords: rice field, CH_4 and NO_2 fluxes, water management, rice-vegetable rotation

李晶等, 1997，水稻田甲烷的减排方法研究，中国农业气象，18(6)：9-18

通过1987年以来对我国五大水稻产区稻田甲烷排放量的野外观测，对

Li Jing et al. 1997. Studies on the mitigation of methane emission from rice fields. Agricultural Meteorology 18(6):9-18.

Based on field observation of the generation and emission factors of methane since 1987, the paper discusses three promising methods for mitigation of methane from rice fields. The effectiveness and

控制稻田甲烷排放的因子，甲烷在土壤中产生转化的机理，减排方法以及模式进行了研究。目前主要的减排方法：用其他肥料代替传统有机肥、种植低甲烷排放的水稻品种、灌溉管理等。适宜于我国国情的方法是用杂交水稻代替常规稻、沼渣肥代替有机肥。前者经济效益好，但后者社会效益和环境效益显著。

关键词：甲烷 排放 杂交稻 沼渣 层次分析法

economic benefits of each method for mitigation of methane emission from rice fields were analyzed using the cost-benefit analysis method Analytic Hierarchy Process (AHP). The major methods are using biogas pit residue to substitute for fresh organic fertilizers, rice cultivar selection, and water regime. Using the hybrid rice instead of conventional rice cultivars and using biogas pit residue to substitute for fresh organic fertilizers are appropriate for China. The economic benefit of the first one is significant, but the social and environmental benefits of the second method make it better than the first method.

Keywords: methane, emission, hybrid rice, biogas pit residues, AHP

王文兴，卢筱凤，庞燕波，汤大纲，张婉华，1997，我国氨排放强度的地理分布，环境科学学报，17(1)：2-7

根据我国畜禽、氮氨肥施用和生产以及人口数量和相应的排放因子，计算了全国氨的排放量、排放强度地理分布和1951-1992年历年的排放量。结果表明，1991年氨的排放总量为891.8kt，其中畜禽、氨肥施用、人粪便与氨肥生产的排氨量分别为64%、18%、17%和1%。氨的排放强度最大的地区在我国中东部和四川的成渝地区。全国平均氨排放强度为0.9kg(NH_3) / (km^2a)。

关键词：动物 肥料 地理分布 氨排放强度

Wang Wenxing, Lu Xiaofeng, Pang Yanbo, Tang Dagang, and Zhang Wanhua. 1997. Geographical distribution of NH_3 emission intensity in China. Acta Scientiae Circumstantiae 17(1):2-7.

The anthropogenic emissions of ammonia in China are calculated based on the number of livestock, poultry, fertilizer applications, and human beings. The results show that the emission of ammonia reached 891.8 kt in 1991, among which NH_3 emissions from animals, nitrogen fertilizer application, human beings, and fertilizer production accounted for 64%, 18%, 17%, and 1%, respectively. The geographical distribution of emission intensity and emission trends were also estimated.

Keywords: animals, fertilizer, geographical distribution, NH_3 emission intensity

许晓斌等，1997，中国东北区域本底大气中酸性气体的研究,中国环境科学，17(4)：345-348

介绍了首次在我国黑龙江龙风山大气本底污染监测站取得的NO_X和SO_2一年的连续观测资料及分析结果。龙风山大气中NO_X和SO_2浓度低于我国空气质量I级标准，有明显的季节变化，夏季值最低，冬季值最高。NO_X和SO_2浓度与风速、温度、相对湿度等气象要素有密切关系。
关键词：NO_X SO_2 浓度变化 来源

Xu Xiaobin et al. 1997. A study on acidic gases in the regional background air in Northeastern China. China Environmental Science 17(4):345-348.

The paper introduces the in situ measurements of nitrogen oxides (NO_X) and sulfur dioxide (SO_2) in the surface air at Longfengshan for the first time. The data show that the levels were much lower than those of the Class I in the China National Air Quality Criteria. The obvious seasonal variations, with the lowest points in summer and the highest points in winter, were also observed. The concentrations of both gases were found to be closely related to the meteorological parameters, such as wind speed, temperature, and relative humidity.

Keywords: NO_X, SO_2, variation of concentration, source

傅立新，郝吉明，周学龙，何东全，赵磊，1997，中国东部地区能耗和SO_2
排放趋势预测研究,中国环境科学，17(4):349-352

在系统研究我国东部18个省、市、自治区近几年能源消耗和SO_2排放现状的基础上，以1986－1990年的数据为现状背景值，以1990年为基准年，利用LEAP模式和排放系数法分别进行了2000年, 2010年, 2020年的能耗和SO_2排放趋势预测。并考虑了三峡工程及核电等一些因素的影响。在结合点源排放状况后，SO_2排放的结果采用科学方法进行了经纬度的网格化。
关键词：能源消耗 SO_2排放 趋势预测

Fu Lixin, Hao Jiming, Zhou Xuelong, He Dongquan, and Zhao Lei. 1997. Trends of energy consumption and SO_2 emissions in the east part of China. China Environmental Sciences 17(4):349-352.

The Long-range Energy Alternatives Planning (LEAP) model and emission factor analysis are used to predict the future trends for 2000, 2010, and 2020 on the basis of systematic research on the current situation of energy consumption and sulfur dioxide (SO_2) emission in 18 provinces in East China. The factors, including the Three Gorges project, nuclear power plants, and so on, are taken into account. Given power plants as point source, emission data are divided into 100×100 km^2 geographical grids.

Keywords: energy consumption, SO_2 emission, trend prediction

于肖岚, 汤洁, 李兴生，1997，中国西部清洁大气中SO_2和NO_2的观测和分析，应用气象学报，8(1)：62-72

1994年8月-1995年7月，利用浸渍膜法在青海瓦里关大气本底站采集大气中SO_2和NO_2，并使用离子色谱分析其浓度。测量结果表明，SO_2和NO_2的平均浓度分别为0.417×10^{-9}和0.055×10^{-9}，SO_2和NO_2都具有较好的相关性，相关系数r=0.87，它们的平均比值为2.6左右。SO_2和NO_2的浓度受风向和季节的影响。偏东风时浓度较高，偏西风时浓度较低。冬季时SO_2和NO_2的浓度水平较低而夏季浓度较高。

关键词：SO_2 NO_2 清洁大气观测

Yu Xiaolan, Tang Jie, and Li Xingsheng. 1997. Observation and analysis of sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) in clean air of Western China. Quarterly Journal of Applied Meteorology 8(1):62-72.

Atmospheric SO_2 and NO_2 were sampled during the period from August 1994 to July 1995 using the filter packs (FP) method, and the concentrations of these gases were analyzed with ion chromatography (IC) at the Waliguan background baseline station of Qinghai Province. The results indicate that the average concentrations of SO_2 and NO_2 are 0.417×10^{-9} and 0.055×10^{-9}, respectively. There is a good correlation between SO_2 and NO_2 concentrations with a coefficient of 0.87, the ratio of SO_2 to NO_2 given a linear regression of about 2.6. The concentrations of SO_2 and NO_2 vary with season and wind direction. Higher concentrations are easterly, and lower are westerly. The concentrations of SO_2 and NO_2 are lower in winter and higher in summer.

Keywords: SO_2, NO_2, clean air, observation

翁笃鸣, 李炬, 高,歌 孙治安，1997，晴天太阳总辐射的参数化及气候计算，气象科学，17(1)：1-9

利用北京、拉萨等站1753次实测资料，并参考有关文献，讨论了应用M.E别尔梁德理论式$Q_0=I_0\sinh / 1+fm$ 作晴天总辐射参数化的可能性。提出了f的新参数化方案，这一新参数化方案不仅保持了较高的拟合精度，而且具有普遍适用性。按此方案计算的各地晴天总辐射廓线形式，与国内外探测结果一致。对青藏高原6站所作的晴天总辐射气候计算也与实际值相符。

关键词：晴天太阳总辐射 参数化 气候计算

Weng Duming, Li Ju, Gao Ge, and Sun Zhian. 1997. Parameterization of clear-sky total radiation and climatic scheme. Scientia Meteorologica Sinica 17(1):1-9.

Based on the 1753 samples from Beijing and Lahsa, the expression $Q_0 = (I_0\sinh)/(1 + fm)$ is used to investigate parameterization of clear-sky total radiation with a new scheme for calculating f. The new scheme has high universality in addition to maintaining a high fitting accuracy compared with the original scheme. It is superior to seven parameterization schemes and two radiation models as revealed by a comparison of computations. The form of the profile from the scheme agrees with observed profiles from home and abroad. The climatic calculation of the total radiation for six stations over the Tibetan Plateau agrees with these measurements.

Keywords: clear-sky solar total radiation, parameterization, climatic calculation

张一平，1997，城市区域内不同下垫面的有效辐射特征，
气象科学，17(2)：169-175

以昆明为研究对象，利用城市区域内气候观测资料，定量分析了城市区域内不同下垫面的有效辐射特征、变化规律。结果表明，城市区域内有效辐射的时间变化午前变化较缓，午后较快；城市区域内有效辐射的时间变化既受下垫面性质也受其所处的位置的影响。屋顶面因受遮蔽物影响较小，昼间有效辐射均大于庭院中央；道路面由于遮蔽最大，昼间有效辐射多小于庭院中央，并且它们之间的差值变化随时间的不同而不同。城市区域内有效辐射，不仅在下垫面状况和所处位置不同时存在差异，并且在不同时段，其数值和变化也有所不同，这势必影响市内不同地域的辐射平衡特征和小气候特征。

关键词：城市区域 有效辐射
不同下垫面

Zhang Yiping. 1997. A study on the characteristics of net long-wave radiation on different underlying surfaces in the urban area. Scientia Meteorological Sinica 17(2):169-175.

Microclimatic observation was conducted at different underlying surfaces in the urban area of Kunming City. The net long-wave radiation was calculated with observed data. The results showed that in the urban area, the variation of the net long-wave radiation is moderate in the morning, but marked in the afternoon; the variations of the net long-wave radiation are considerably affected by the nature and position of the surface. In the daytime, on the rooftop, the net long-wave radiation is larger than at ground level. On the road, the net long-wave radiation is lower than at ground surface. The difference of the net long-wave radiation on the grass and the ground surface varies with time; the values and variations of the net long-wave radiation vary with time.

Keywords: urban area, net long-wave radiation, different underlying surfaces

王可丽，
钟强，1997，青藏高原地气系统云辐射强迫的气候学特征，
高原气象，16(1)：10-22

利用1985－1988年ERBE-S4和ISCCP-C2 月平均资料分析了青藏高原这一特殊气候区域地气系统云辐射强迫的气候学特征。结果表明，冬、夏季云对地气系统辐射强迫的场分布形势有明显差异。高原地区冬季云的温室效应大于云的反射率效应，而春、夏、秋三季的情况则与之相反。

Wang Keli and Zhong Qiang. 1997. The climatic characteristics of cloud radiative forcing of earth-atmosphere system over Qinghai-Xizang Plateau. Plateau Meteorology 16(1):10-22.

The climatic characteristics of cloud radiative forcing of earth-atmosphere system over Qinghai-Xizang Plateau are analyzed based on the data set of the Earth Radiation Budget Experiment (ERBE)-S4 and the International Satellite Cloud Climatology Project (ISCCP)-C2 from 1985 to 1988. It reveals that there are distinct differences in cloud radiative forcing of the earth-atmosphere system between winter and summer. Also the greenhouse effect of clouds is stronger than the reflective effect of clouds in winter and weaker in other seasons.

关键词：青藏高原 地气系统
云辐射强迫

Keywords: Qinghai-Xizang Plateau, earth-atmosphere system, cloud radiative forcing

张宪洲, 王辉民, 张谊光, 1997,
青藏高原冬小麦田辐射能量收支的初步研究, 应用气象学报,
8(2): 236-241

通过对青藏高原地区冬小麦田的净辐射各分量的观测,
探讨了净辐射及其各分量的日变化特征。结果如下,
冬小麦田反射率和净辐射具有明显的日变化；在冬小麦抽穗-成熟期,
麦田平均反射率为13.3%,
麦田平均净辐射在白天占总辐射75.0%,
包括夜间占67.4%；麦田净辐射和总辐射之间存在良好线性关系,
并提出了由总辐射计算计算净辐射的经验公式。
关键词：青藏高原 冬小麦
辐射能量收支

Zhang Xianzhou, Wang Huimin, and Zhang Yiguang. 1997. A study on the radiation budget of a winter wheat field on the Tibetau Plateau. Quarterly Journal Applied Meteorology 8(2):236-241.

The components of the radiation budget in a winter wheat field on the Tibetau Plateau were measured, and then their diurnal variations were analyzed. The results were as follows: There are obvious diurnal variations in reflectivity and net radiation; the average reflectivity was 13.3%, and the average net radiation was 75% of the global radiation in daytime or 67.4% of the global radiation including day and night during the measuring period. A linear relationship between net radiation and global radiation that can be used to calculate net radiation from global radiation was established.

Keywords: Tibetau Plateau, winter wheat, radiation budget

文军, 王介民, 1997,
绿洲边缘内外近地面辐射收支分析,
高原气象, 16(4): 359-366

1995年8月在甘肃河西黑河流域绿洲边缘内外进行了“干旱地区环境综合监测计划”的野外观测实验,
并对所收集到的近地面辐射收支观测资料进行了分析。结果表明,
在绿洲边缘内外,
近地面辐射收支特征、地表反射率及各辐射分量对净辐射通量密度的

Wen Jun and Wang Jiemin. 1997. An analysis of the surface radiation budget over the inside and outside of the Oasis boundary. Plateau Meteorology 16(4): 359-366.

A field experiment of “Arid Environment Comprehensive Monitoring 95” was done in August 1995. The experimental sites were near the Oasis boundary area in Hei River basin of Northwest China. Analytical results of the observational data show that the characteristics of the radiation budget, surface albedo, and contribution of radiation flux density components to net radiation flux density are different inside and outside of the Oasis site. The discrepancy of downward radiation flux density

贡献都存在差异；入射辐射通量密度值比较接近；绿洲上的反射率小于戈壁上的，

戈壁上反射率随太阳天顶角的变化主要是由近红外波段反射率随太阳天顶角的变化引起的；向上长波辐射通量密度白天戈壁大，

夜间绿洲大,并且戈壁上有明显的日变化过程；白天绿洲有效辐射通量密度小于戈壁上的，

夜间两者比较接近；白天近地面净辐射通量密度绿洲大于戈壁上的，

绿洲和戈壁上近地面净辐射通量密度的不同主要是由地表吸收太阳辐射通量密度特性的不同而引起的。

关键词: 绿洲边缘 辐射 反射率

between two sites is small. Albedo is bigger over the Gobi site than over the Oasis site. Variation of albedo with solar zenith angle is mainly caused by near-infrared albedo. The upward long-wave radiation over the Gobi site is bigger than that over the Oasis site during daytime. Net radiation flux density over the Oasis site is bigger than that over the Gobi site. Albedo and the thermal condition of the land surface mainly cause the discrepancy of net radiation.

Keywords: Oasis Edge, radiation, albedo

温玉璞, 汤洁, 邵志清, 张晓春, 赵玉成, 1997,
瓦里关山大气二氧化碳浓度变化及地表排放影响的研究，应用气象学报, 8(2): 129-136

利用非色散红外气体分析方法，在不受人为直接污染影响的瓦里关山进行了大气CO_2的连续测量，研究了我国内陆高原大气 CO_2 本底浓度的变化特征。观测结果表明, 内陆大气随陆地植被的生长而有明显的季节和日变化；其季节变化规律与全球大气 CO_2 本底值的地理分布相一致。地表CO_2排放的观测得出了冬季高原草甸土壤的排放特征，即在冬季陆地植被光合作用基本停滞的情况下, 土壤的CO_2排放率相对增强,最大排放量可达170mg/m^2 • h。

Wen Yupu, Tang Jie, Shao Zhiqing, Zhang Xiaochun, and Zhao Yucheng. 1997. A study on atmospheric CO_2 concentration variations and emissions from the soil surface at Mt. Waliguan. Quarterly Journal of Applied Meteorology 8(2):129-136.

Continuous measurements of atmospheric CO_2 were carried out using the non-dispersive infrared (NDIR) method at Mt. Waliguan where the environment is unaffected directly by local anthropogenic pollution. The characteristics of the atmospheric background CO_2 concentration variation for the inland Plateau of China are presented in this paper. The results show that the area has clear diurnal and seasonal variations related to the growing cycle of the land's vegetation and that the pattern of seasonal variation corresponds with the global geographical distribution of atmospheric CO_2. Furthermore, the emission rates of CO_2 from the Plateau grassland soil were also measured. The results show that the CO_2 emission rate from the soil surface increases relatively in winter with the largest value above 170 mg/m^2 • h when the photosynthesis of vegetation is essentially stagnant.

关键词：大气 CO_2 本底浓度 变化 地表排放

Keywords: atmospheric CO_2, background concentration, variation, emission of grassland soil surface

季国良,
吕兰芝，1997，格尔木太阳辐射与气温的多年变化，高原气象，16(1):30-35

利用格尔木1956－1994年的气温和太阳总辐射资料，分析了该地区太阳总辐射和气温的多年变化特征及其相关关系。结果表明：30多年中该地区太阳总辐射没有明显的减少趋势；年平均气温60年代为低值，70年代迅速上升，比东部平原地区提前，且呈现“冬暖夏凉”的变化趋势；70年代到90年代年平均气温与太阳总辐射呈现滞后一年的正相关；夏季气温与同期太阳总辐射有很好的正相关，但冬季的气温变化则与太阳总辐射呈负相关。
关键词：能量收支 太阳辐射 气温变化

Ji Guoliang and Lu Lanzhi. 1997. Secular variation characteristics of solar radiation and air temperature at Golmud. Plateau Meteorology 16(1):30-35.

The secular variation characteristics and the relationship between global radiation and temperature are analyzed using the data of air temperature and global radiation from 1956 to 1994 at Golmud. The results show that the decreasing tendency of global radiation was not obvious in these 39 years. The annual mean air temperature is low in the 1960s, and rapidly increases in the 1970s about 10 years earlier than in the eastern plain. There is a tendency toward warming in winter and cooling in summer. The relationship between annual air temperature and global radiation shows a positive correlation with a delay of one year from the 1970s to the 1990s. The relationship between air temperature and global radiation for the same period shows a positive and negative correlation in summer and in winter.

Keywords: energy budget, solar radiation, air temperature variation

马耀明, 王介民, Massimo Menenti, Wim Bastiaanssen,
1997，黑河实验区地表净辐射区域分布及季节变化，
大气科学，21(6)：743－749

利用卫星遥感信息和地面观测资料，分析研究地表净辐射的区域分布及季节变化特征。结果表明，卫

Ma Yaoming, Wang Jiemin, Massimo Menenti, and Wim Bastiaanssen. 1997. The distribution and seasonal variation of regional net radiation in the Heihe area. Scientia Atmospherica Sinica 21(6):743-749.

By means of satellite remote sensing and field observation, the distribution and seasonal variation of regional net radiation in the Heihe area were analyzed. The results showed that the reasonable regional distribution and seasonal variation of surface albedo, surface

星遥感结合地面观测，首先可以得到较为精确的地表反射率和地表温度变化，进而得到较为合理的地表净辐射的区域分布和季节变化特征。

关键词：黑河实验区 卫星遥感 地表净辐射 区域分布 季节变化

temperature, and net radiation could be obtained with the aid of remote sensing and field observation.

Keywords: Heihe area, satellite remote sensing, net radiation of land surface, regional distribution, seasonal variation

陈渭民,
高庆先，1997，由GMS卫星资料获取我国夏季地表辐射收支,
大气科学，21(2)：238－246

分析了卫星可见光和红外波段测值与地表辐射收支的基本关系。在此基础上,
利用GMS静止气象卫星可见光和红外通道数值化资料和地表辐射收支观测资料，建立了几个由卫星资料估计地面辐射收支的模式，选择效果最佳的一种模式，通过内插方法求取全国辐射收支分布。回归效果与实测结果比较表明，此方法有实际应用价值。

关键词：静止气象卫星 可见光辐射 长波红外辐射 估计模式 地面辐射收支

Chen Weimin and Gao Qingxian. 1997. Estimating surface radiation budgets over China in summer from geostationary meteorological satellite (GMS) data. Scientia Atmospherica Sinica 21(2):238-246.

In this paper the basic relationship between the measurements from the visible/infrared channel in a satellite and the surface radiation budgets has been derived. Based on this relationship, some useful models of estimating the surface radiation budgets are obtained with observational data from the visible/infrared channel in geostationary meteorological satellite (GMS) and the observational data from surface radiation budget stations. With the best of these models, the distribution of radiation budgets across China is obtained by the interpolation method. When compared with actual observational data, this distribution has a better consistency with the actual results, which shows that this model is very effective in estimating the radiation budgets in China.

Keywords: geostationary meteorological satellites (GMS), visible radiation, longwave infrared radiation, estimate model, radiative budgets of surface

胡列群，1997，塔克拉玛干沙漠地面有效辐射研究，
干旱区地理，20(1)：25-32

利用1988－1990年塔克拉玛干沙漠的整年沙漠辐射观测资料，结合沙漠及周围地区有效辐射计算值，分析了沙漠有效辐射的日变化及影响因子的作用，同时分析研究了沙漠及周围地区有效辐射的年变化以及有效辐射的地理分布。
关键词: 塔克拉玛干沙漠
地面有效辐射

Hu Liequn. 1997. Research on surface effective radiation in the Taklimakan Desert. Arid Land Geography 20(1):25-32.

Based on the surface effective radiation data collected from 1988 to 1990 in the Taklimakan Desert and the calculated data of surface effective radiation in the surrounding areas of the desert, the features of daily variation of surface effective radiation and some influencing factors on surface effective radiation in the desert are analyzed. The temporal and spatial distribution of surface effective radiation is also studied for the desert and its vicinities.

Keywords: Taklimakan Desert, surface effective radiation

Ancient Climate

刘会平，王开发，1998，沪杭苏地区若干文化遗址的孢粉-气候对应分析，地理科学，18(4): 368-373

本文运用了对应分析方法研究了沪、杭、苏地区三个文化遗址孢粉与气候的关系。结果表明，马家浜文化期和崧泽文化期（属全新世大西洋期）年均温比现在高1~3℃；良渚文化期（属全新世亚北方期）温度则比现在低1.5℃左右。年降水量各地有所不同，以马家浜期末和崧泽期初最为潮湿，降水量比现在高150~300 mm。

关键词：文化遗址 孢粉 气候变迁 对应分析

Liu Huiping and Wang Kaifa. 1998. A study on the relation between spore-pollen assemblages and climate in the New Stone Age of Changjiang Delta by correspondence analysis. Scientia Geographica Sinica 18(4):368-373.

Based on data of some spore-pollen assemblages from three culture ruins, the climate features of the Late Stone Age in the Changjiang Delta were revealed by correspondence analysis. In Majiabang and Songze culture stages, the climate was warmer and the mean annual temperature was 1 to 3°C higher than that at present. In the Liangzhu culture stage, the climate was cooler and the mean annual temperature was about 1.5°C lower than that at present. Precipitation was very different in different stages and areas. In the late Majiabang stage and the early Songze stage, it was humid and the mean annual precipitation was 150 to 300 mm higher than that at present.

Keywords: culture ruin, spore-pollen, climate change, correspondence analysis

*王建力*等，1998，临夏盆地早更新世东山古湖沉积的高分辨率气候及录，地理科学，18(4): 349-354

本文根据临夏盆地东山古湖沉积采样数据，建立了气候变化曲线，并对曲线进行周期分析，结果表明，东山古湖所反映的气候波动具有明显的41,000a主导周期，表明东亚季风在建立初期具有不稳定性。

关键词：早更新世 气候波动 东亚季风 临夏盆地

Wang Jiangli et al. 1998. Early Pleistocene of lacustrine high resolution climate of Dongshan Lake in Linxia Basin. Scientia Geographica Sinica. 18(4):349-354.

A model of climate changes was built based on data of carbonate samples taken from lacustrine deposits in the Linxia Basin. The spectrum analysis results show that the paleoclimate had a clear 41,000 year dominant periodicity, suggesting that the monsoon climate was not stable in the Early Pleistocene.

Keywords: Early Pleistocene, climate change, East Asia monsoon, Linxia Basin

*朱士光*等，1998，历史时期关中地区气候变化的初步研究，第四纪研究，1998(1): 1-11

本文根据历史资料将关中地区历史时期气候划分出全新世早期寒冷、全新世中期暖湿、西周冷干、春秋至西汉前期暖润、西汉后期至北朝凉干、隋唐前中期暖湿、唐后期至北宋凉干、金前期温干、金后期和元凉干等10个气候变化阶段，从而建立起该地区历史时期完整的气候变化序列。

关键词：历史时期 关中地区 气候变化

Zhu Shiguang et al. 1998. Study on climate variations in the region of Guanzhong in the historical period. Quaternary Sciences 1998(1):1-11.

Based on data of historical record, the authors divided climate changes in the area in the historical period into 10 stages as follow: (1) The early Holocene (10,000–8,000 year BP), frigid climate period. (2) The middle Holocene (8,000–3,000 year BP), warm and humid climate period. (3) The 11th Century BC–8th Century BC, frigid and arid climate period. (4) The 8th Century BC–1st Century BC, warm and humid climate period. (5)The 1st Century BC–6th Century AD, cold and arid climate. (6)The 7th Century AD–8th Century AD, warm and humid climate. (7) The 9th Century AD–11th Century AD, cold and arid climate period. (8) The 12th Century AD was a warm and arid climate period. (9) The early 13th Century AD– Early 14th Century AD, cold and arid climate. (10) The early 14th Century AD– Early 20th Century AD, frigid and arid climate.

Keywords: historical period, Guanzhong area, climatic changes

*丁仲礼*等，1998，灵台黄土－红粘土序列的磁性地层及粒度记录，第四纪研究，(1): 86-93

本文研究了甘肃灵台县任家坡黄土－红粘土序列的磁性地层及粒度记录。结果表明，中国北方连续的风成堆积可下推到7.05 Ma BP。第三纪红粘土的粒度组成从上到下变化很小，与黄土-古土壤序列的粒度大幅度变化形成强烈的反差，意味着晚第三纪时期的气候总体上要比第四纪时期稳定。

关键词：第三纪红粘土 风成堆积 古季风

Ding Zhongli et al. 1998. Magnetostratigraphy and grain size record of a thick red clay-loess sequence at Lingtai, the Chinese Loess Plateau. Quaternary Sciences (1):86-93.

Magnetostratigraphy and the grain-size record of a thick red clay-loess sequence at Lingtai in the Chinese Loess Plateau are studied in this paper. The results suggest that the eolian red clay at Lingtai began to accumulate at about 7.05 Ma BP. The grain-size record shows that in the entire red clay sequence, the particle size of all the samples does not show significant variation. This contrasts strikingly with the overlying loess-paleosol sequence in which the grain size of loess beds is proportionally coarser than that of soils. These results suggest that the climate during this period could have been relatively stable.

Keywords: Tertiary red clay, eolian deposit, paleomonsoon

*周杰*等，1998， 130ka BP
前后黄土高原东部地区的气候侵蚀事件，中国沙漠，
18（2）：105-110

通过黄土高原塬区、梁峁区和断陷谷区典型沟谷的阶地堆积、侵蚀面ji及其与之相邻的黄土一古土壤地层序列研究，并结合古气候特征分析，提出倒数第二次冰期冬季风向末次间冰期夏季风过渡期高原东部地区发生了强烈的气候侵蚀事件。沉积物特征研究和古气候复原结果表明，此次侵蚀是一次以暴雨为主要动力的快速侵蚀事件。
关键词：黄土高原 季风
气候过渡期 侵蚀事件

Zhou Jie et al. 1998. Climatic erosion event occurred in the eastern Loess Plateau at about 130 ka BP. Journal of Desert Research 18(2):105-110.

From a study of the terrace deposits, erosion surface, and the neighboring loess-paleosol sequence from different erosion profiles located in flat land and hill land as well as in valley regions of the Loess Plateau, and links to the analysis of proxy indices of paleo-climate, three results are concluded. (1) The development of T3 terraces of the gullies in flat land, hill land and valley regions of the eastern Loess Plateau, and their identical deposit features, which include sand-gravel, sub-clay, and fluvial loess layers, indicate that they are sediments from a period of strong erosion. (2) The analysis of climatic proxy indices, such as magnetic-susceptibity, carbon-13 and variablity of magnetic-susceptibility, reveal a greater climatic gradient or greater precipitaton variability at about 130 ka BP, which shows, on one hand, that precipitation increased sharply, and on the other hand, that the precipitation contribution with time was rather uneven. (3) The deposits on the T3 terrace were sand mixed with gravel. The poor sorting implies that this erosion event was probably driven by high-intensity rainstorms.

Keywords: Loess Plateau, monsoon, climatic change period, erosion event

*靳鹤龄*等，1998，0.8Ma BP
以来西藏雅鲁藏布江中游地区沙地演化和气候变化，中国沙漠，
18（2）：97-104

根据地表沉积相特征及其对气候变化的反映，着重探讨了西藏雅鲁藏布江中游地区沙地形成时代、演化过程和气候变化。沙地早在中更新世中期的0.8Ma BP就已出现，经历了强烈发展、缓慢发展和相对稳定

Jin Heling et al. 1998. The sandy land evolution and climatic change in the middle course area of the Yarlung Zangbo River in Tibet, China since 0.80 Ma BP. Journal of Desert Research 18(2):97-104.

This paper uses sedimentary facies, magnetic susceptibility and some chemical elements, and debris minerals as indices to analyze the sandy land evolution and climatic changes in middle course area of the Yarlung Zangbo River. The period and model of sandy land evolution and climatic changes were set up as: (1) 0.80-0.518 Ma BP sandy land was developing slowly with narrowing, fixed intervals and a climate

和缩小与固定的多次迭覆更替，并呈不断扩大趋势。与此同时，气候也经历了冷干和暖湿的多次变化，并表现出不断向干冷化方向发展的趋势。
关键词：西藏 雅鲁藏布江 沙地演化 气候变化

characterized as warm-humid dominantly, but warm-humid alternating with cold-arid appearance. (2) 0.518-0.08 Ma BP, the eolian sand deposit increased which showed that the sandy land area was developing quickly and that the climate was cold and showed semi-arid or arid conditions. (3) 80-10 ka BP, eolian sand almost covered everywhere, which indicated sandy land persistent drought, and the contemporary sand-field pattern was formed in this period. (4) After 10 ka BP, the sandy land had been fixed, which reflected the warm-humid climate in the optimum period followed by a period of frequent climate fluctuations.

Keywords: Tibet, Yarlung Zangbo River, sandy land evoution, climatic changes

许英勤，1998，新疆博斯腾湖地区全新世以来的孢粉组合与环境，干旱区地理，21（2）：43-49

本文通过对新疆博斯腾湖地区沉积物的孢粉分析，讨论了全新世以来的植被和气候变化的四个阶段，并结合其它沉积特征，反映了这一时期湖泊的水面的收缩和扩张的状况和自然环境的演变。
关键词：博斯腾湖 孢粉组合 环境

Xu Yingqin. 1998. The assemblage of Holocene spore pollen and its environment in Bosten Lake Area of Xinjiang. Arid Land Geography 21(2):43-49.

Bosten Lake located in the Yanji basin on the southern slope of the Tianshan Mountains. The paper presents results of pollen analyses on sediment of the Holocene in which six pollen zones are defined. According to assemblage characteristics of the spore-pollen, vegetation change was defined in four stages since the Holocene. Analysis shows that the climate of the Bosten Lake area has been arid since the Holocene. During the period from the middle of the middle-Holocene to the early late-Holocene, the climate has been relatively warm and humid. Since the Holocene, under the influence of climate change, the Bosten Lake area has expanded or shrank many times.

Keyword: Bosten Lake, spore-pollen assemblage, environment

*贾铁飞*等，1998，乌兰布和沙漠北部沉积物特征及环境意义，干旱区地理，21（1）：36-42

根据乌兰布和沙漠北部地区典型剖面记录，对各层沉积物进行了结构分析，在对沉积物性质、特点进行分析判断的基础上，初步揭示了各层沉积物的环境意义，并依次对乌兰布和沙漠的形成、发展与环境变迁间的关系做了初步探讨。认为乌兰布和沙漠的形成演化主要受自然环境变化的影响，人为因素应是叠加其上的辅助因素。

关键词：乌兰布和沙漠 沉积物特征 沉积环境 环境变迁

Jia Tiefei et al. 1998. On the features and meaning of sediment in northern Ulan Buh sandy land. Arid Land Geography 21(1):36-42.

On the basis of field investigations at the northern part of the Ulan Buh Sandy Land, two profiles were selected for analysis. This paper covers the analysis of sedimentary grain size, triangular diagram, and cumulative curve. The main conclusions are as follows: (1) Ulan Buh Sandy Land is not a man-made desert after the Han Dynasty, but is the result of natural environmental evolution. (2) The forming time of the Ulan Buh Sandy Land is early Holocene or even the late stage of the late Pleistocene, which is an eolian sand epoch in Northern China. (3) The evolution pattern of Ulan Buh Sandy Land is the same as that of environmental change in Northern China, and the human factor is only a subordinate factor. (4) The forming and evolution of Ulan Buh could be connected with the alluviation of the Yellow River which may be a focus of a study of Ulan Buh's environmental evolution in the future.

Keywords: Ulan Buh Sandy Land, feature of sediment, sedimentary environment, environmental evolution

曾永年，1998，柴达木盆地沙漠沉积中的新仙女木事件记录，干旱区地理，21（1）：25-28

对柴达木盆地晚更新世沙漠演化过程的研究，发现青藏高原沙漠沉积中清楚地记录了新仙女木事件，并呈干冷降温的气候效应。进一步分析得出：新仙女木事件在我国不同自然气候带呈单一的干冷降温效应，并作为多模式效应。

关键词：新仙女木事件 沙漠沉积 柴达木盆地

Zeng Yongnian. 1998. The record of Younger Dryas event in eolian sand deposit in Qaidam Basin. Arid Land Geography 21(1):25-28.

According to the environmental record and the areas of stratigraphy in the Xiaxitai section in the southeastern part of Qaidam Basin, this paper concludes that the desert development, formation of the cold-dry climate, evolution of the natural environment, and reverse changes have occurred frequently since the late glacial. In eolian sand deposits, the Younger Dryas event clearly appears, which manifests that it was a dry-cold climate period. Now there are two different opinions about the climatic effect of the Younger Dryas. According to our predecessors' research and the field work of the authors, it is considered that the Younger Dryas event not only exists in different climatic zones in China, but also manifests a unitary dry-cold climatic effect.

Keyword: Younger Dryas event, eolian sand deposit, Qaidam Basin

杨志荣，1998，大青山调角海子地区全新世低温波动研究，地理研究，17（2）：138-144

根据调角海子剖面寒冬现象的野外观测和测量、室内测年分析等资料，对调角海子地区全新世低温波动进行了探讨，并与邻近地区的多种研究资料进行了对比。经过初步研究认为，大青山调角海子地区一万年以来的低温波动主要有6次，时代分别为9100aB－8800aBP、8000aBP－7800aBP、7000aBP－6900aBP、6000aBP－5800aBP、5300aBP－4700aBP、和3100aBP－2400aBP，除了第2、4两次为弱低温波动，可能仅限于大青山地区外，其余均具有较广泛的区域意义；每次低温波动的极端低温较短，可能仅有50年-60年，低温波动时年气温只比现在下降1°C-3°C。

关键词：大青山 全新世 低温波动

Yang Zhirong. 1998. A study on the low-temperature fluctuations since the Holocene in the Diaojiaohiazi Lake area, Daqingshan Mountains, Inner Mongolia. Geographical Research 17(2):138-144.

Based on field observation and measurement of periglacial phenomena, radiocarbon dating, and spore-pollen analysis of the samples from the Diaojiaohaizi section, this paper examines the low-temperature fluctuations in the Holocene in the Daqingshan Mountains. The research concludes: (1) There are six periods of low-temperature fluctuations in the Holocene including those in 9100 years BP-8800 years BP, 8000 years BP-7800 years BP, 7000 years BP-6900 years BP, 6000 years BP-5800 years BP, 5300 years BP-4700 years BP, and 3100 years BP-2400 years BP. These fluctuations have extensive regional signficance except the 2nd and the 4th fluctuations which are relatively weak and confined to the Daqingshan Mountians. (2) The characteristics of the sand wedge in the Diaojiaohaizi section indicates that the extreme low-temperature interval in the cold stage of the Holocene was short, which was only 50-60 years.

Keywords: Daqingshan Mountains, Holocene, low-temperature fluctuation

Climate Variation

*康世昌*等，1998，北极Svalbard地区气候变化特征及其与青藏高原对比，地理科学，18(4): 312-319

本文分析了Svalbard 地区近80年来的气候变化，结果认为，其总趋势为缓慢变暖，但70年代后期降温，是全球升温的一个例外。另外，该地区与青藏高原气候变化存在着一定的相关性，但局地的气候变化原因导致了两地之间的某些差异。

关键词：Svalbard 地区 青藏高原 气候变化

Kang Shichang et al. 1998. Characteristics of climatic change in Svalbard in the Arctic and comparison with the Qinghai-Xizang Plateau. Scientia Geographica Sinica 18(4):312-319.

Characteristics of climatic change in the Svalbard area in the last 80 years are analyzed in the article. It found a general warming trend. But a decreasing temperature since the mid-1970s in the Svalbard area is an exception in the background of global temperature rising. The study concludes that there is a good correlation in climatic change between the Svalbard area and the Qinghai-Xizang Plateau, and there are differences because of local climatic change.

Keywords: Svalbard area, Qinghai-Xizang Plateau, climate change

*郝永萍*等，1998，柴达木盆地东缘晚更新世气候变化的（古）土壤发生记录，地理科学，18(4): 249-254

本文根据柴达木盆地东缘晚更新世气候变化的（古）土壤及其黄土母质的宏观特征和理化分析揭示全球冰量影响的气候波动以及东亚季风气候的强弱变化特征。作者认为，气候变化过程中温度和降水并不同步。降水和低温是导致前5~3万年间气候相当湿润的重要原因。
关键词：土壤发生特征
气候变化信息 东亚夏季风增强
柴达木盆地 晚更新世

Hao Yongping et al. 1998. The characteristics of climatic fluctuation recorded by soil formation since the Late Pleistocene in the eastern region of the Qaidam Basin. Scientia Geographica Sinica 18(4):249-254.

Based on characteristics of soil macro-structure and physical-chemical analysis of samples from the Amgutan section in the eastern region of the Qaidam Basin, the authors studied climate fluctuations, which were affected by global ice and characteristics of the East Asia monsoon. The authors believe that temperature and precipitation in the climate system do not coincide with each other and precipitation and low temperature are important factors in the humid episode from 50 to 30 Ka BP.

Keywords: pedogenic properties, information of climatic fluctuation, East Asia summer monsoon enhancement, Qaidam Basin, Late Pleistocence

*金会军*等，1998，天山乌鲁木齐河源冰达坂多年冻土温度监测，冰川冻土，20(1)：25-29

本文对天山乌鲁木齐河源冰达坂天山山脉海拔最高（3,900m）的地温观测孔多年冻土温度的监测数据进行分析。结果表明，基岩温度呈现明显的昼夜、季节和年际变化，其中2m左右受山坡粗砾石中径流热扰动和降水热渗浸的强烈影响，地温年变化深度约在25-30m之间，0.5、1.0和2.0m处温度呈现明显升高趋势，而10和18m处地温缓慢下降。
关键词：冻土温度 气候波动 天山
冻土降温

Jin Huijun et al. 1998. Permafrost temperature in the ice pass at the source of the Urumqi River, Tianshan Mountains. Journal of Glaciology and Geocryology 20(1):25-29.

Permafrost temperature, measured in borehole no. 5 in the ice pass at the source of the Urumqi River [the highest (3,900 m a.s.l.) borehole in the Tianshan Mountains] since September 1991, was analyzed. The results of the temperature measurements indicate significant diurnal, seasonal, and annual variations. Strong influences from flowing water and percolation have been detected in a coarse gravel layer at a depth of about 2 m during autumn each year. The depth of annual temperature change is estimated down to 25 to 30 m. The ground temperature indicates a rising trend at the active layer and a cooling one at 10 and 18 m in the permafrost during the 5 year observation.

Keywords: permafrost temperature, climatic fluctuation, Tianshan Mountains, permafrost cooling

柯长青，李培基，1998，用EOF方法研究青藏高原积雪深度分布与变化，冰川冻土，20(1)：64-67

本文对青藏高原1963－1992年逐日积雪深度记录进行了EOF分析。结果表明，青藏高原积雪空间分布极不均匀，高原东部是高原积雪年际变化最显著的地区。从60年代到80年代积雪年际波动幅度有明显增加的趋势。

关键词：青藏高原 积雪深度 EOF分析 空间分布与变化

Ke Changqing and Li Peiji. 1998. Research on the characteristics of distribution and variation of snow cover on the Tibetan Plateau using EOF analysis. Journal of Glaciology and Geocryology 20(1):64-67.

Daily snow depth data from 1963 to 1992 over the Tibetan Plateau was analyzed by using the empirical orthogonal function (EOF) method. The results showed that the spatial distribution of snow cover over the Plateau is very inhomogeneous. The heavy snow cover region in the east of the Plateau is the region where the most significant inter-annual variation of snow cover occurs. There is an increasing trend of inter-annual fluctuation amplitude of snow cover over the plateau from the 1960s to 1980s.

Keywords: Tibetan Plateau, snow depth, EOF analysis, spatial distribution and variation

刘勇，邓晓峰，1998，希夏邦马峰－珠穆朗玛峰地区地貌与环境演化问题探讨，冰川冻土，20(1)：79-84

希夏邦马峰－珠穆朗玛峰地区是新生代以来，在欧亚板块与印度板块碰撞的地质背景下，迅速隆起的极高山地区。本文研究了该地区的地貌与环境演化问题，认为进入第四纪以来，强烈的构造隆升，使这些山地上的冰川进退、河流发育和湖泊变迁都发生了重大变化，带来整个地貌格局的变化。

关键词：冰期 环境演化 河流劫夺

Liu Yong and Deng Xiaofeng. 1998. An approach on the geomorphological and environmental development in the Xixiabangma–Qomolangma area. Journal of Glaciology and Geocryology 20(1):79-84.

The Xixiabangma–Qomolangma area has uplifted rapidly since the Cenozoic era, under the geological background of the collision of the Eurasia Plate with the Indian Plate. The geomorphological and environmental development is studied in the paper. With the dramatic tectonic uplift in the Quaternary, advance/retreat of glaciers, development of rivers, and change of lakes all underwent dramatic shifts and induced a change of the entire geomorphological pattern.

Keywords: glaciation, environmental evolution, capture of river

邓晓峰，刘勇，1998，希夏邦马峰北麓佩枯错湖堰塞成因的解释，冰川冻土，20(1)：85-87

本文研究了希夏邦马峰北麓佩枯错湖堰塞的成因，发现希夏邦马峰北麓第四纪不同时期的冰水相沉积物曾对门曲谷地有过不同程度的堰塞作用，从而提出了佩枯错湖为堰塞的成因。

关键词：佩枯错湖 堰塞成因 环境变迁

Deng Xiaofeng and Liu Yong. 1998. An explanation of the dam of the Peikucuo Lake at the northern foot of Mt. Xixiabangma. Journal of Glaciology and Geocryology 20(1):85-87.

The dam of the Peikucuo Lake at the northern foot of Mt. Xixiabangma is discussed in the paper. During the Quaternary, the glacio-fluvial deposition at the northern foot of Mt. Xixiabangma choked the Menqu River valley and formed Peikucuo Barrier Lake. Evolution of the lake corresponds to the change of glacier types from valley glacier and piedmont glacier to valley glacier.

Keywords: Peikucuo Lake, cause of damming, environmental evolution

潘安定，1998，青藏高原东北边缘第四纪孢粉及其环境，冰川冻土，20(2)：141-149

本文研究了青藏高原东北边缘第四纪孢粉记录及其环境演变。根据孢粉组合分析，早更新世早期是第四纪期间水热条件最为优越的时期。2.2 Ma B P 以来气候向干冷发展，1.8－1.77 Ma B P 湿润程度最高，1.7－1.6 Ma B P 前后，伴随黄土沉积出现，植被与环境发生历史性转折。

关键词：孢粉组合 第四纪 环境演化

Pan Anding. 1998. The Quaternary palynological record and environment at the northeast margin of the Tibetan Plateau. Journal of Glaciology and Geocryology 20(2):141-149.

The Quaternary palynological record and the evolution of the environment at the Northeast margin of the Tibetan Plateau are discussed in this paper. According to the spore-pollen assemblage analysis, 22 main and secondary cycles are recognized and the best humidity and temperate conditions appeared in the early Pleistocene during the Quaternary. The climate has become dry-cold since 2.2 Ma BP with the highest level of moisture between 1.8-1.77 Ma BP; a historic turning point occurred about 1.7-1.6 Ma BP together with the appearance of loess sediment.

Keywords: spore-pollen assemblage, Quaternary, environmental evolution

*张平中*等，1998，江西九江地区晚更新世生态变迁的土壤有机质碳同位素证据，冰川冻土，
20(2)：150-156

本文对我国江西九江地区4个土壤剖面的土壤有机质及其$\delta^{13}C$值进行分析，结果认为末次冰期旋回内生态转型是由于季风效应和CO_2共同作用的表现；北大西洋末次冰期内的Heinrich事件对中国东部的气候也产生剧烈的影响，其分布直接控制着C_3和C_4植物的转型及其沉积物的类型。CO_2及其温室气体可能是Heinrich事件的重要驱动力。
关键词：碳同位素 土壤有机质 生态变迁 晚更新世 东南季风

Zhang Pingzhong et al. 1998. Carbon isotope evidence of the soil organic matter for the ecological variation during the Late-Pleistocence in the Jiujiang Region, Jiangxi Province. Journal of Glaciology and Geocryology 20(2):150-156.

The authors discuss soil organic matter content and $\delta^{13}C$ from four soil profiles in Jiujiang Prefecture, Jiangxi Province. The results indicate that the ecological shift in last glacial cycle was driven by the monsoonal effect and the change of CO_2 concentration. The North Atlantic Heinrich events also had dramatic impacts on the climate in eastern China, and their distribution directly controls the shift of C_3 and C_4 plants and type of sediments. The CO_2 concentration and other greenhouse gases may be one of the important factors forcing Heimrich events.

Keywords: carbon isotope, soil organic matter, ecological shift, Late Pleistocene, southeast monsoon

施淑燕，曹秋萍，1998，黑龙江省无霜期的气候变化，气象，
24（1）：25-30

对黑龙江省的初、终霜日和无霜期按地区、年代进行了较详细的统计、分析。结果表明：60/70年代终霜较晚，初霜较早，无霜期较短；80年代以来，多数地区终霜日有所提前，各区及全省初霜日明显推后，无霜期延长，反映出了60、70年代较冷，80年代变暖，90年代前期持续变暖的气候特征。
关键词：无霜期 变化 分析

Shi Shuyan and Cao Qiuping. 1998. A climatic analysis of the frostless season in Heilongjiang Province. Meteorological Monthly 24(1):25-30.

The spatial and temporal variations of the frost seasons in Helongjiang Province were investigated. The main results are as follows: during the 1960s, the onsets of the frost seasons are earlier than normal, the ends of the frost seasons are later, and the frostless seasons are shorter. Since the 1980s the ends of the frost seasons have been earlier and their onsets are later in most parts of Heilongjiang Province, thus the frostless season is longer. These changes show that the climate was colder than normal before the 1970s, after which it changed to warmer.

Keywords: frostless seasons, variation, analysis

叶英，董波，1998，西北太平洋强热带气旋活动的年代际变化，气象，24（7）:29-34

统计分析了1951年-1995年西北太平洋强热带气旋活动的气候特征和大气环流特征及其相互关系。结果表明，50和60年代是强热带气旋活动的异常期，60和70年代是台风活动异常期。并指出台风与副热带高压、西风环流、青藏高原指数有很好的相关性。

关键词：强热带气旋 气候特征 大气环流 台风

Ye Ying and Dong Bo. 1998. Interannual change of severe tropical cyclone activities over the Northwest Pacific. Meteorological Monthly 24(7):29-34.

The climatic characteristics of severe tropical cyclone activities over the Northwest Pacific and general circulation features of the atmosphere and their relationship from 1951 to 1995 were statistically analyzed. The results show that the 1960s and 1970s were two periods of anomalous typhoon activities. Results also show that typhoons were well correlated with the subtropical high, the westerly circulation, and the Qinghai-Xizang Plateau index.

Keywords: severe tropical cyclone, climatic characterisic, atmospheric circulation, typhoon

陈隆勋，朱文琴，王文，1998，中国近45年来气候变化的研究，气象学报，56(3): 257-271

利用1951－1995年约400站的月平均气温、降水和1961－1995年200余站的最高和最低气温、相对湿度、总云量和低云量、日照时数、蒸发、风速和机学日数和深度以及0－3.2m共8层土壤温度等资料，对近45a来中国气候变化特征做了一个较全面的分析研究。

关键词：中国气候变化 气温和降水 最高和最低气温 相对湿度和日照

Chen Longxun, Zhu Wenqin, and Wang Wen. 1998. Study on climate change in China in recent 45 years. Acta Meteorologica Sinica 56(3):257-271.

Climate change and its characteristics in China in the last 45 years have been analyzed comprehensively on the basis of data of monthly mean air temperature and precipitation from 1951-1995 from about 400 stations, and from data on maximum and minimum air temperature, relative humidity, total cloud and low-cloud cover, sunshine duration, evaporation, wind speed, snow-covered days and depth, and soil temperatures in 8 layers from 0 to 3.2 m, from 200 stations from 1961-1995.

Keywords: climate change in China, air temperature and precipitation, maximum and minimum air temperature, relative humidity and sunshine

柯长青，李培基，1998，青藏高原积雪分布和变化特征，地理学报，53（3）：209-215

本文根据对青藏高原SMMR候积雪深度、NOAA周积雪面积、地面台站积雪深度进行了分析。结果表明青藏高原东西两侧多雪与腹地少雪形成鲜明的对比，高原东部是高原积雪年际变化最显著的地区，它主导了整个高原积雪的年际变化，并且与西部多雪区年际波动呈反位关系。从60年代到80年代积雪年际波动幅度有明显增加趋势，积雪变化具有3年左右的准周期。随着全球变暖，青藏高原积雪将会有增加。
关键词：青藏高原积雪 EOF分析 谱分析 空间分布与变化特征

Ke Changqing and Li Peiji. 1998. Spatial and temporal characteristics of snow cover over the Qinghui-Xizang Plateau. Acta Geographica Sinica 53(3):209-215.

In this paper, three complete Qinghai-Xizang Plateau snow cover data sets consisting of Scanning Multichannel Microwave Radiometer (SMMR) microwave pentad snow-depth maps, operational National Oceanic and Atmospheric Administration (NOAA) weekly snow cover extent charts, and daily snow-depth data at 60 primary weather stations covering 36 years were used to investigate the spatial and temporal characteristics of snow cover on the Qinghai-Xizang Plateau. The empirical orthogonal function (EOF) method and spectral analysis, as well as trend estimate analysis, were used in the study. The results show that the spatial distribution of snow cover over the Qinghai-Xizang Plateau evidently compares with the light snow cover in the vast interior of the Qinghai-Xizang Plateau. The heavy snow cover region in the east of the Qinghai-Xizang Plateau is the most significant region of the interannual variation of snow cover on the Qinghai-Xizang Plateau and dominates the interannual variation of snow cover in the whole Plateau. There is an opposite phase relationship between the western parts and the eastern parts of the Qinghai-Xizang Plateau in the interannual fluctuation of snow cover from the 1960s to the 1980s.

Keywords: snow cover on the Qinghai-Xizang Plateau, EOF analysis, spectral analysis, characteristics of spatial distribution and variation

袁玉江，1998，塔克拉玛干地区近四十年的干湿变化，干旱区地理，21（1）:18-24

利用塔克拉玛干、周围山区、及相邻地区的48个气象站近40年的降水资料，分析塔克拉玛干地区年与四季干湿变化的阶段与周期，并与周围山区及相邻地区进行相关性分

Yuan Yujiang. 1998. The wet-dry change in recent 40 years in the Taklimakan Desert area. Arid Land Geography 21(1):18-24.

Using the precipitation data for the last 40 years from 48 meteorological stations in the Taklimakan Desert, surrounding mountains and neighboring areas, the stages and periods of the wet-dry changes in annual precipitation and four seasons in the Taklimakan area are analyzed. The correlation of precipitation change in the Taklimakan Desert and in surrounding mountains

析，探讨其与极涡位置的关系。
关键词：塔克拉玛干地区 干湿变化

and the wet-dry change in the Taklimakan area is compared and some statistical conclusions are made.

Keywords: Taklimakan area, wet-dry change

姜逢清，1998，新疆气候与环境的过去、现在及未来情景，干旱区地理，21（1）：1-9

在分析近年来新疆地质时期与历史时期气候与环境研究方面大量文献资料与成果，并对现代器测时期的气候变化问题进行讨论的基础上，利用综合分析法构画了新疆下世纪上半叶气候与环境的可能情景，认为新疆气候与环境初建于晚白垩世，主要形成于第三纪，至今总的干旱情势并未改变。但在漫长的地质时期中也存在过由于气候波动而出现冷暖与干湿的变化。预计下世纪上半叶新疆干旱的总格局不会改变，但比目前会略显湿润，气温将略有增加，此后会向百年尺度冷的方向发展。
关键词：新疆 气候与环境 气候情景

Jiang Fengqing. 1998. Studies in past climate and its possible trends in Xinjiang. Arid Land Geography 21(1):1-9.

A review of the past climate and environment in Xinjiang classifies the studied period into three different time scales (i.e., geological, historical, and instrumental) and analyzes the characteristics of past climate and the environment in Xinjiang and then predicts trends. It concludes that the arid condition in Xinjiang has remained since the early age of the Tertiary. However, climate and environmental variations that were characterized by dry-damp and cold-warm alternation have taken place during this long time. Periods of climate and environmental variation, such as 100 and 1000 years, are clearly found. By prediction, the arid condition in Xinjiang will continue into the middle of the next century. The air temperature will rise slightly in winter and decrease in summer. The precipitation will increase a little.

Keywords: Xinjiang, climate and environment, climate trend

*袁玉江*等，1998，塔克拉玛干地区近40年来的冷暖变化，中国沙漠，18（2）：118-122

利用塔克拉玛干、周围山区、及相邻地区的48个气象站近40年的温度资料，分析塔克拉玛干地区年与四季冷暖变化的阶段、周期、趋势，比较与周围山区及相邻地区的相关性，探讨与其欧亚环流指数的关系

Yuan Yujiang. 1998. Temperature variation in the recent 40 years in the Taklimakan area. Journal of Desert Research 18(2):118-122.

Using the temperature data for the last 40 years from 48 meteorological stations, the paper analyzes the stages, periods, and trends of temperature change. The author also compares the temperature change in the Taklimakan area with that of the surrounding mountains and adjacent areas, and discusses the relationship between the Euroasian circulation index and temperature change in the studied area. The results are as

，得到5点统计结论：（1）区域平均温度序列对该区的冷暖变化具有较好的代表性；（2）区域平均温度序列具有各自不同的冷暖阶段及变化周期，其中年温与冬温具有显著的变暖趋势，且变暖的幅度冬季约为年的3倍；（3）与周围山区站的相关性，以托云同步较好；（4）与相邻地区温度变化的相关性，以甘肃为最好；（5）年温变化与欧亚年平均经向环流指数具有显著的负相关性，其秋季温度与10－11月份的纬向环流指数具有显著的正相关性。

关键词：塔克拉玛干地区
现代冷暖变化 相邻地区 比较

follows: (1) The annual and seasonal mean temperature sequences of this area reflect the warm-cold changes in the area. (2) The annual and seasonal temperature changes have different warm-cold stages and change periods. The temperature changes annually and in winter shows a significant warming trend, and the changing range in winter is about three times as much as that of the annual range. (3) The correlation of the temperature change in the Taklimakan area with that from the surrounding mountains and adjacent area is better at the Toyun station. (4) The correlation of the temperature change in the Taklimakan area with that of the adjacent area is best at Gansu Province. (5) There is a significant negative correlation between annual temperature change in the Taklimakan area and the Euroasian annual mean longitudinal circulation index, and significant positive correlation between autumn temperature change and latitudinal circulation index from October to November.

Keywords: Taklimakan area, modern warm-cold change, adjacent areas, comparision

*阎满存*等，1998，腾格里沙漠东南缘沙漠演化的初步研究，中国沙漠，18（2）：111-117

根据不同地貌单元地层沉积相组合、典型剖面热释光和^{14}C测年以及粒度、孢粉和化学元素等资料的分析，重建了腾格里沙漠东南缘沙漠演化的过程。进而讨论了沙漠演化与冰期气候波动和东亚季风环流盛衰变化的耦合关系。

关键词：腾格里沙漠 地层沉积相
沙漠演化模式

Yan Mancun et al. 1998. A preliminary study on the evolution of the southeastern margin in the Tengger Desert. Journal of Desert Research 18(2):111-117.

The desert evolution in the southeast margin of the Tengger Desert was reconstructed. The reconstruction shows the southeastern margin of shifting sand, the spread or fixation, semi-fixation and reduction of the desert to grassland as well as weak pedogenic processes since the middle Pleistoncene. Simultaneously, the bioclimatic zones in the area underwent alternations from dry, cold and windy desert, and desert steppe to semi-arid steppe, semi-arid or semi-humid sparsely wooded steppe. The processes of evolution are controlled by the coupling between the glacial and interglacial climate fluctuation and the prosperity and decline of the eastern Asian monsoon.

Keywords: Tengger Desert, sedimentary facies, desert evolution model

陆日宇，黄荣辉，1998，东亚一太平洋遥相关型波列对夏季东北亚阻塞高压年际变化的影响，大气科学，22（5）：727-734

利用1980一1988年9年的观测资料，分析了夏季东北亚阻塞高压的年际变化及其与江淮地区夏季降水之间的关系，指出夏季东北亚阻塞高压具有十分明显的年际变化，同时它与江淮地区夏季降水之间存在着较密切的关系：当夏季东北亚阻塞高压频发时，江淮地区降水偏多；而当夏季东北亚阻塞高压维持日数少时，江淮地区降水偏少。为考察产生上述结果的原因，我们分析了全球海温异常，并利用合成的热带西太平洋海温异常每年研究了热带西太平洋海温异常对东北亚阻塞高压形成和维持的影响。最后指出热带西太平洋海温异常引起的东亚一太平洋型遥相关波列是产生夏季东北亚阻塞高压的年际变化加强及其与江淮地区夏季降水之间关系的一个重要原因。

关键词：东亚一太平洋遥相关型　东北亚　阻塞高压　海温异常

Lu Riyu and Huang Ronghui. 1998. Influence of East Asia/Pacific teleconnection pattern on the interannual variations of the blocking highs over northeastern Asia in the summer. Scientia Atmospherica Sinica 22(5):727-734.

The interannual variations of the blocking highs over northeastern Asia in summer and their relationship to precipitation over the Yangtze River and Huaihe River basin in summer are analyzed with the 1980-1988 European Centre for Medium-Range Forecast (ECMRF) data. The results show that the blocking highs over northeastern Asia in summer have obvious interannual variations. The results also show that there is a close relationship between blocking highs over the northeastern Asia and the precipitation over the Yangtze River and Huaihe River basin. When blocking highs occur frequently over northeastern Asia in summer, the precipitation over the Yangtze River and Huaihe River basin is higher than normal. And when blocking highs seldom occur, the precipitation is less than normal. To investigate the causes of these results, we analyzed the sea surface temperature (SST) anomalies and simulated the influence of the SST anomalies in the tropical western Pacific on the blocking highs over the northeastern Asia, using the composite SST anomalies. Results show that the East Asia/Pacific teleconnection pattern, which is caused by the SST anomalies in the tropical western Pacific, is one of the important causes of the interannual variations of the blocking highs over northeastern Asia in summer and is related to summer precipitation over the Yangtze River and Huaihe River basin.

Keywords: East Asia/Pacific teleconnection pattern, blocking highs over northeastern Asia, sea surface temperature anomalies

*钱云*等，1998，末次冰期东亚区域气候变化的情境和机制研究，大气科学，22（3）：283-293

用一嵌套在全球大气环流模式中的区域气候模式，通过熟知试验和对内外因作用的机制分析，探讨了一

Qian Yun et al. Study on scenarios and mechanism of the regional climate change of East Asia in the Last Ice Age. Scientia Atmospherica Sinica 22(3):283-293.

The scenarios and mechanism of regional climate change over East Asia in the Last Ice Age, which are affected by large-scale circulation background and local mesoscale forcings, are discussed by

末次冰期为背景的大尺度强迫引起的大气环流和区域内下垫面条件异常等中尺度强迫影响区域气候变化的过程很好机制。大尺度强迫和区域内局地的中尺度强迫通过不同的热力和动力学过程影响大气运动状况和区域气候的变化。末次冰期大尺度强迫引起的全球大气环流背景的变化是形成冰期和现代区域气候差异的主要原因。

关键词：末次冰期 区域气候 大尺度环流背景 中尺度局地强迫

dynamic analysis and numerical simulations using a regional climate model and a general circulation model (GCM). The comparison between the simulated and the observed shows that results simulated by the regional model indicate more details and are closer to the evidences of geological data than results simulated by a GCM. The effects of large-scale forcing on regional climate change are mainly through the propagation of stationary wave trains and teleconnection, whereas the mesoscale forcing in the domain is mainly through local thermal and dynamic processes of the atmosphere. In the climate system, changes of one of the independent factors may touch off a positive or negative feedback process and influence other climate variables to various degrees.

Keywords: Last Ice Age, regional climate, general circulation background, local mesoscale forcing

辛国君，梁福明，1998，太阳常数的微小变化在气候变化中的作用，大气科学，22（3）：318-325

将复杂的气候系统抽象为含有云辐射动态反馈过程的高度非线性气候模型，利用分岔理论，分析了该模型的平衡态及其稳定性。计算结果表明，云反照率反馈、地表反照率反馈和水汽反馈是气候系统呈现多平衡态结构的主要因素，是气候变化复杂性的根源，而云放射率反馈对系统结构的影响，只有在强烈的水汽放射率反馈条件下才表现明显。较强的地表反照率反馈和水汽放射率反馈，均可在太阳常数仅有微小变化时就能导致全球气候变化。

关键词：平衡态 稳定性 气候反馈 气候突变 太阳常数

Xin Guojun et al. 1998. Effect of slight change in the solar constant on the climate. Scientia Atmospherica Sinica 22(3):318-325.

A new three-component time-dependent climate model is established. The model consists of three equations that respectively govern the change of annual mean global surface temperature, atmospheric temperature, and cloud amount. The steady states and stability of the climate model with change in the solar constant are investigated using the bifurcation theory. The model results show that the cloud and snow-ice albedo feedbacks and the water vapor emissivity feedback may lead to multiple stable climate states, and thus show the complexity of climatic variation. Only under the condition of a strong water vapor emissivity feedback, can the cloud emissivity feedback change the structure of the climate system noticeably. The strong snow-ice feedback and water vapor emissivity feedback can lead to sudden global climate change, although the solar constant has slight changes within the 1% range.

Keywords: steady state, stability, climate feedback, climate jump change, solar constant

任福民，翟盘茂，1998，1951～1990年中国极端气温变化分析，大气科学，22（2）：217-227

利用中国1951－1990年极端温度资料，在消除台站迁移和城市热岛效应的影响，并经过资料质量控制的基础上，对我国极端温度的变率和变化趋势的区域分布以及季节变化特征进行了分析研究。结果发现，近40年中国季极端最低温度的变率以春、秋两季为最大，大变率区域主要集中在北方；夏季是极端最低温度变率最小的季节。

关键词：中国 极端温度 变化

Ren Fuming, Zhai Panmao, et al. 1998. Study on changes of China's extreme temperatures during 1951-1990. Scientia Atmospherica Sinica 22(2):217-227.

This paper mainly studies the spatial and temporal distribution of variability and trends for extreme temperatures based on China's extreme temperature data during 1951-1990. Efforts are made to minimize the possible biases caused by changed locations of stations and the urban heat island effect, and to perform quality control procedures. The results show that the variability of extreme minimum temperature in most parts of China in spring and autumn is greater than those in other seasons, especially in northern China.

Keywords: China, extreme temperatures, change

高登义，武炳义，1998，北半球海－冰－气系统的10年振荡及其振源初探，大气科学，22（2）：137-144

采用最大熵谱方法分析了1953－1990年间冬季喀拉海、巴伦支海海冰面积指数、西伯利亚高压强度指数、东亚冬季风强度指数的变化周期，并把冬季喀拉海、巴伦支海海冰面积变化与翌年春夏各季节副热带高压的特征量指数（包括面积指数、强度指数）变化进行了比较。研究发现在海冰－大气系统中，明显存在10年尺度周期性变化；冬季喀拉海、巴伦支海海冰面积变化与西伯利亚高压强度指数、东亚冬季风强度指数均呈现相反的变化趋势，海冰偏多（少）则西伯利亚高压偏弱（强）；冬季海冰面积变化与来年的春夏各季节副热带高压的范围、强度均呈现相同的变化趋势，

Gao Dengyi and Wu Bingyi. 1998. Preliminary study on decadal oscillation and the oscillation source of the sea-ice-air system in the Northern Hemisphere. Scientia Atmospherica Sinica 22(2):137-144.

The variation periods of the sea-ice area index in the Kara/Barents Seas, the intensity index of the Siberian High and the winter monsoon over East Asia during the winters of 1953-1990 were analyzed using maximum entropy and band-pass filter methods. The sea-ice area variation in winter in the Kara/Barents Seas was compared with the area and intensity indices of the subtropical high in the following spring and summer. These analyses show that there is an obvious decadal variation in the sea-ice-air system in the Northern Hemisphere. And the variations of intensity index of the winter Siberian High and winter monsoon over East Asia are out of phase with that of sea-ice area in winter in the Kara/Barents Seas. The more (less) sea ice there is, the weaker (stronger) the winter Siberian High and winter monsoon are; the variation trend of sea-ice area is similar to that of the area and the intensity of the subtropical high in the coming spring and summer with a lag period of 0~1 year for the latter. The decadal oscillation sources in the atmosphere are closely linked to some sea regions. The center of the strongest

并且海冰变化要超前0～1年；复经验正交分析表明大气10年尺度周期性变化的振荡源分布均与某海区（洋区）有关，大气10年尺度变化是对海洋（海冰）变化的响应。
关键词：海冰 10年振荡 振源 副热带高压

oscillation source excited by winter sea ice in the Kara/Barents Seas is near 70° E, 60° N.

Keywords: sea ice, decadal oscillation, oscillation source, subtropical high

*李金龙*等，1998，北半球夏季环流持续性异常及其发展特征，大气科学，22（1）：57-65

利用美国国家气象中心（NMC）的1957－1979年夏季500hpa位势高度场，分析了热带外地区环流持续性异常。夏季持续性环流相当活跃，但异常（≥40m）的持续时间小于一个月。不同地区的持续异常极少能同时存在，主要表现为单独发生。持续异常具有遥相关结果，它们在相当尺度上同冬季遥相关型相似。持续异常建立过程中主要中心强度增长相当快，振幅加倍时间约为2天。持续异常的建立，对最优扰动的发展具有重要作用。
关键词：夏季环流 持续异常 发展过程

Li Jinlong et al. 1998. Persistent anomalies in the Northern Hemisphere during summer time and characteristics of their development. Scientia Atmospherica Sinica 22(1):57-65.

An analysis of persistent anomalies in the extra-tropical areas is presented based on the data of 500 hPa potential height of 23 years from 1957 to 1979 from the American National Meteorological Center. Persistent anomalies are considerably active in summer, but the duration of the anomalies larger than 40 m is less than one month. Persistent anomalies in different geographical regions are unlikely to coexist, and their structures are characterized by teleconnection patterns, which resemble those in winter. In the formation process of persistent anomalies, the intensity of main centers of perturbation increases with large growth rates in which the time of doubling intensity is about 2 days. This suggests that optimal perturbations play a crucial role in the development of persistent anomalies.

Keywords: summer current, persistent anomaly, developing process

吴尚森，梁建茵，1998，南海西沙地区季风季节变化的气候特征，大气科学，22（5）：771-778

利用位于南海中北部的西沙观测站1959－1988年30年常规地面观测资

Wu Shangsen and Liang Jianyin. 1998. Seasonal evolution of climatic characteristics of summer monsoon over the Xisha area. Scientia Atmospherica Sinica 22(5):771-778.

In this study, the 30-year (1959-1989) conventional surface observations and the 9-year (1980-1988) radiosonde data at Xisha station

料和1980－1988年9年探空资料，分析了西沙地区季风季节变化气候特征。30年的地面观测资料平均结果表明，西沙地区5月中旬西南（或南）风建立，对流突然加强，云量陡增，6月上旬降水量剧增。利用本文定义的季风指数，可以将西沙夏季风季节变化过程分为3个阶段：东南夏季风阶段（4月初至五月初）、西南夏季风阶段（5月中至9月初）和夏季风结束阶段（9月中至10月初）。这种阶段的划分不但与广东省汛期降水有较好的对应关系，而且与南海大气环流的季节演变也有很好的联系。

关键词 西沙地区 季风 季节变化 气候特征

located in the mid-northern part of the South China Sea were used to analyze the annual evolution of the summer monsoon at Xisha. The analyzed results show that the southwest wind (or south wind) at Xisha prevails in the middle of May, the convection and cloud amount increase suddenly at the same moment, and rainfall increases greatly in early June. Using the monsoon indices 1 and 2 proposed by us, the annual evolution of the summer monsoon can be divided into three phases: The southeast monsoon phase (from early April to early May), the southwest monsoon prevailing phase (from mid-May to early September), and the ending phase (from mid-September to early October). These phases are associated with both the seasonal precipitation variations in Guangdong and the annual evolution of atmospheric circulation over the South China Sea.

Keywords: Xisha area, monsoon, seasonal evolution, climatic characteristics

Historical Climate

陈家其，姜彤，许朋柱，1998，江苏省近两千年气候变化研究，地理科学，18(3)：219-226

本文建立了长度在600~1800a间的一个温度指数序列和苏南、苏北两个旱涝等级序列。分别对历史气候时期(近2000a)和实测资料时期(近百年)的温度和降水变化规律做研究，提出宏观趋势。

关键词：江苏省 最近2000年 气候变化

Chen Jiaqi, Jiang Tong, and Xu Pengzhu. 1998. Climatic change during the last 2000 years in Jiangsu Province. Scientia Geographica Sinica 18(3):219-226.

One series of temperature indexes and two series of flood/drought data in the north and south of Jiangsu Province are available for the period 600 to 1,800 a. The authors studied the variation of temperature and precipitation during the last 2000 years and the most recent hundred years, respectively. The general tendency is presented.

Keywords: Jiangsu Province, last 2000 years, climatic change

张德二，陈永林，1998，由我国历史飞蝗北界记录得到的古气候推断，第四纪研究，1998(1)：12-19

本文利用我国古代有关飞蝗的文献记录，研究了我国古气候特征。推断出飞蝗发生在我国北纬41° 以北地区的年份的气温条件，指出1162～1177年、1265～1280年和1763~1773年是我国东北地区气候温暖的时段。

关键词：飞蝗 历史气候记录 古气候推断

Zhang De'er and Chen Yonglin. 1998. Paleoclimate inferred from the Chinese historical records of the northern boundary of the migratory locust. Quaternary Sciences 1998(1):12-19.

Based on data of historical records about insects, characteristics of historical climate are researched by the authors. The research points out the temperature condition of the locust generated at the north of 41° N. And it is also concludes that the periods of 1162-1177, 1265-1280, and 1763-1773 were warm periods in northeastern China.

Keywords: *Locusta migratoria*, historical climate record, paleoclimate inference

满志敏，1998，关于唐代气候冷暖问题的讨论，第四纪研究，(1): 20-30

本文根据历史资料讨论了唐代气候冷暖两方面的证据。从资料看来，唐代气候温暖的证据难以确定相应的气候因子。但其冷期可分为两大阶段，8世纪50年代以前大体与现代相差不大，8世纪60年代以后气候变冷，某些时段寒冷的特征可与明清小冰期相似。

关键词：历史气候 气候变化 隋唐气候

Man Zhimin. 1998. Climate in the Tang Dynasty of China: Discussion of its evidence. Quaternary Sciences (1):20-30.

Based on data from the historical record, the author discusses evidence of warm and cold periods during the Tang Dynasty. According to records, there is no firm evidence of a warm period. The cold period can be divided into two parts: the climate before the middle of the 8th century is not markedly different from now, and in the period of the Tang Dynasty after the middle of the 8th century, the climate was cold.

Keywords: historical climate, climate change, climate in Sui-Tang period

吴宏歧，党安荣，1998，隋唐时期气候冷暖特征与气候波动，第四纪研究，(1): 31-38

本文根据物候、动物分布、孢粉、雪线和海平面等相关资料，对隋唐

Wu Hongqi and Dang Anrong. 1998. Fluctuation and characteristics of climate change in temperature of the Sui-Tang times in China. Quaternary Sciences (1):31-38.

Based on relevant materials, such as phonological phenomena, distribution of animals, spore and pollen, snow line, and sea level, the authors

时期气候冷暖特征进行了深入研究，重新肯定了竺可桢关于中国近五千年来气候变迁研究的基本结论。同时对隋唐温暖期的起始年代作了修正，并对该时期气候波动作出探讨。

关键词：隋唐时期 气候变化特征 气候波动

studied warm and cold characteristics of climate in the Sui-Tang period. Professor Zhu Kezhen's results for the recent 5,000 years of climate changes in China is confirmed. Furthermore, the beginning time of a warm period in Sui-Tang times is revised, and the fluctuation of climate change in this period is also discussed in detail.

Keywords: Sui-Tang times, characteristics of climate change, fluctuation of climate

蓝勇，1998，近2000年来长江上游荔枝分布北界的推移与气温波动，第四纪研究，(1): 39-45

本文通过对近2000年来长江上游荔枝分布北界变化的讨论，证明近2000年来荔枝种植的北界是逐渐向南退缩的。这说明12世纪的寒冷气候是长江上游近2000年来最寒冷的时期；在12世纪中长江上游又以70年代最为寒冷。

关键词：长江上游 荔枝 分布北界

Lan Yong. 1998. The movements of the northern boundary of litchi distribution and fluctuations of temperature in the upper reaches of the Yangtze River in the past 2000 years. Quaternary Sciences (1):39-45.

Through the discussion of the changes of litchi distribution in the upper reaches of the Yangtze River, the author concludes that the northern boundary of litchi distribution has been moving slowly to the south of China. This indicates that the cold weather of the 12th century was the coldest period during the recent 2,000 years. The 1170s were the coldest period of these times in the upper reaches of Yangtze River.

Keywords: upper reaches of the Yangtze River, litchi, northern boundary of litchi growing

邓辉，1998，论燕北地区辽代的气候特点，第四纪研究，(1): 46-53

本文根据《辽史》中有关旱、涝、冻记录，分析了辽代燕北地区的气候特征。结果表明，辽代燕北地区的干湿变化过程中，早期以干为主，中、晚期以湿为主，1080年前后为气温下降时期，比黄淮海地区的同期变化要早约30年。

关键词：辽代 燕北地区 气候变化

Deng Hui. 1998. Reconstruction of climatic series of the North Yanshan Mountain Region in Liao Dynasty. Quaternary Sciences (1):46-53.

According to analysis of the records of drought, flood, and the extreme low temperature in the Liao Historical Book, the author studied the climatic characteristics in the North Yanshan Mountain Region in the Liao Dynasty. The results show that in the earlier periods of that time the climate was drier and in the middle and late periods of that time, the climate was mainly wet.

Keywords: Liao Dynasty, North Yanshan Mountain Region, climatic series

*王绍武*等，1998，中国小冰期的气候，第四纪研究，(1): 54-63

本文在建立了近百年中国10个区的年平均气温序列的基础上，利用史料、冰芯记录及树木年轮，重建了各区近400~1000年的10年平均气温序列。分析表明，近千年来中国可能有5次冷期分别出现于1100s－1150s, 1300s－1390s, 1450s－1510s, 1560s－1690s及1790s－1890s。
关键词：小冰期 气候变化

Wang Shaowu et al. 1998. Climate in China during the Little Ice Age. Quaternary Sciences (1):54-63.

Based on the construction of an annual temperature series of the past 100 years for each of 10 regions of China, a mean temperature series of 400-1000 years for each region is reconstructed using data of historical records, ice-core records, and tree-ring records. Results of analysis show that there are five cold periods for the recent 1000 years. They are 1100s-1150s, 1300s-1390s, 1450s-1510s, 1560s-1690s and 1790s-1890s.

Keywords: Little Ice Age, climate change

李平日，曾昭璇，1998，珠江三角洲五百年来的气候与环境变化，第四纪研究，(1): 65-70

本文根据史籍资料和香港近五百年的气温记录，探讨了珠江三角洲1488－1893年的小冰期和其后进入现代暖期的气候变化。作者认为珠江三角洲的小冰期开始于1488年，结束于1893年。另外，作者还预测了下世纪全球变暖、海平面上升对珠江三角洲的可能影响。
关键词：珠江三角洲
气候与环境变化

Li Pingri and Zeng Zhaoxuan. 1998. On the climatic and environmental changes in the Pearl River Delta during the last 500 years. Quaternary Sciences (1):65-70.

The characteristics of climatic changes of the Little Ice Age in 1488-1893 and recent warm period are discussed in the paper based on the historical data of occurences of frosty weather in the Pearl River Delta during the last 500 years. The authors recognize that the Little Ice Age began in 1488 and ended in 1893 in the Pearl River Delta. The authors also forecast the possible effects on Pearl River Delta caused by global warming and a rise in sea level.

Keywords: the Pearl River Delta, climatic and environmental change

王守春，1998，塔里木盆地三大遗址群的兴衰与环境变化，第四纪研究，(1): 71-79

本文研究了塔里木盆地中的三大遗址群的兴起、兴盛和发展，以及废弃。作者认为，气候变化是导致它

Wang Shouchun. 1998. The abandonment of three major ancient ruins groups and environmental change in the Tarim Basin. Quaternary Sciences (1):71-79.

The occurrence, development, flourishing, and abandonment of three ruins groups in the Tarim Basin are studied in the paper. The author believes that climatic changes caused the abandonment of

们灭亡的共同原因。因此，导致水资源条件变化的原因是气候变化，而不是人为因素。
关键词：楼兰遗址 尼雅遗址 克里雅遗址 环境变化

the ruins groups. Therefore, global change of climate induced the variation of water sources, with little connection to the human factors.

Keywords: Loulan Ruins, Niya Ruins, Keria Ruins, environmental change

*刘嘉麒*等，1998，人类生存与环境演变，第四纪研究，(1): 80-85

人类起源和生存与全球环境演变密切相关，人类在自然环境中诞生并适应环境变化而生存。但过度的开发环境会造成环境恶化，进而给人类带来种种灾难，促使人类迁移，引起民族战争和社会动荡。人类只有协调好与环境的相互关系才能得以生存。
关键词：人类 环境

Liu Jiaqi et al. 1998. Existence of human and environmental changes. Quaternary Sciences (1):80-85.

The evolution and existence of human beings are closely related to global environmental change. Human beings evolved from nature and continue to exist by adapting to it. But excessive consumption of the environment can cause serious environmental problems and lead to disasters for mankind, such as migration, war, and social upheaval. Modern humans should enter a new stage: humans in harmony with the nature.

Keywords: mankind, environment

Impact

*张寅生*等，1998，我国大陆型山地冰川对气候变化的响应，冰川冻土，20(1)：3-8

本文探讨了青藏高原冰川变化的能量机制，发现物质平衡线高程（ELA）与气候波动呈线性相关。作者还建立了研究和预测ELA的模型，得到了在不同气候变化情况下，冰川平衡线对气候因子波动的响应值，并预测了未来气候变化对青藏高原冰川物质平衡过程的影响。
关键词：冰川变化 气候波动 响应

Zhang Yinsheng et al. 1998. The response of continental-type glacier to climate change in China. Journal of Glaciology and Geocryology 20(1):3-8.

The energy mechanisms for glacier fluctuation in the Qilian Mountains are discussed. It is found that the mass equilibrium line altitude (ELA) has linear correlation with climate change. A model is developed to study and forecast the ELA. From this model, the ELA response to climatic factors under different future climatic scenarios can be obtained. The future effects of climate change on mass balance are also forecasted.

Keywords: glacier variation, climate change, response

*刘时银*等，1998，天山乌鲁木齐河源1号冰川物质平衡对气候变化的敏感性研究，冰川冻土，20(1): 9-13

本文应用度日物质平衡模式对天山乌鲁木齐河源1号冰川物质平衡对气候变化的敏感性进行了研究。结果表明，乌鲁木齐河源1号冰川物质平衡对气候变化的敏感性要小于海洋冰川。此外，气温与降水在物质平衡形成过程中的作用是不同的，气温引起物质平衡剖面以旋转方式变化，而降水可导致其平移方式的响应。

关键词：1号冰川 物质平衡 平衡线高度 敏感性

Liu Shiyin et al. 1998. Mass balance sensitivity to climate change of Glacier No. 1 at the Urumqi River Head, Tianshan Mountains. Journal of Glaciology and Geocryology 20(1):9-13.

A degree-day mass balance model is applied to the sensitivity test of mass balance/equilibrium line altitude (ELA) to detect climate change of Glacier No. 1 at the Urumqi River Head, Tianshan Mountains. Results demonstrate that the mass balance of Glacier No. 1 is less sensitive than that of a maritime type glacier. In addition, air temperature and precipitation play different roles in mass balance (i.e., elevation-dependent mass balance follows the temperature variation by means of rotation against the elevation axis and it shifts parallel to precipitation change).

Keywords: Glacier No. 1 at the Urumqi River Head, mass balance, equilibrium line altitude (ELA), sensitivity

*王宁练*等，1998，近1500年来古里雅冰芯中NO_3^-浓度变化及其环境意义，冰川冻土，20(1)：14-20

本文研究了近1500年来古里雅冰芯中浓度变化及其环境意义。作者认为太阳活动、平流层N_2O氧化和陆源气团是NO_3^-的主要来源。其中太阳活动是古里雅冰芯中NO_3^-浓度变化的主要控制因子，两者的长期变化趋势呈现明显的正相关关系。

关键词：古里雅冰芯 NO_3^-浓度 太阳活动

Wang Ninglian et al. 1998. Variation and environmental implication of nitrate concentration in the Guliya ice core in the recent 1,500 years. Journal of Glaciology and Geocryology 20(1):14-20.

The variation and environmental implications of nitrate concentration in the Guliya ice core in the recent 1,500 years are studied in the paper. Solar-induced oxidation of nitrous oxide in the stratosphere and continental air mass is found to be the major source of NO_3^- in the Guliya ice core. And solar activity is a major factor in controlling the variation of NO_3^- concentration in the ice core. The secular variation of solar activity and NO_3^- concentration show a remarkable positive correlation.

Keywords: Guliya ice core, NO_3^- concentration, solar activity

*刘光秀*等，1998，西昆仑山甜水海24万年以来生态环境演化的孢粉学证据，冰川冻土，20(1)：21-24

本文研究了西昆仑山甜水海24万年以来生态环境演化的孢粉学证据。分析结果认为，本地区240KaBP以来，高寒荒漠植被一直占主导地位，但其间有草原成分蒿增加的若干波动，它反映了寒冷干旱气候背景下的湿润温和波动和生态环境的脆弱性。依据钻孔孢粉组合特征及蒿藜比值划分出的10个带，代表了气候环境的10次波动。

关键词：生态环境 孢粉纪录 甜水海 西昆仑山

Liu Guangxiu et al. 1998. Palynological evidence of ecological environmental change since 240 ka BP for Tianshuihai Lake, West Kunlun Mountains. Journal of Glaciology and Geocryology 20(1):21-24.

Palynological evidence of ecological environmental change since 240 ka BP for Tianshuihai Lake in the West Kunlun Mountains is discussed. Analysis indicates that alpine desert vegetation has been dominant since 240 ka BP in this region, but there have been several fluctuations of *Artemisia,* the main component of the steppe environment, reflecting that there have been several warmer and wetter intervals under the cold and dry climate background. According to the changes of pollen type and the ratio of *Artemisia* and Chenopodiaceae (A/C), the pollen record can be divided into 10 zones, showing 10 climatic fluctuations and an ecological environmental fragility in this area.

Keywords: ecological environment, pollen record, Tianshuihai Lake, West Kunlun Mountains

*任贾文*等，1998，气候变暖使珠穆朗玛峰地区冰川处于退缩状态，冰川冻土，20(2)：184-185

采用GPS技术对冰川末端位置进行了测量，并将1996年和1997年的结果对比，发现过去30年间该冰川末端后退了170－270m，平均年退缩量为5.5－8.7m。由于目前气候仍在变暖，该冰川将继续保持退缩状态。

关键词：冰川后退 气候变暖 珠穆朗玛峰

Ren Jiawen et al. 1998. Climatic warming causes the glacier retreat in Mt. Qomolangma. Journal of Glaciology and Geocryology 20(2):184-185.

The Rongbuk Glacier was investigated and its terminus location was measured by means of global positioning system (GPS) techniques. Comparison of the 1997 and 1996 measurements shows that in the past 30 years the glacier has retreated 170-270 m, equivalent to a retreat speed of 5.5 to 8.7 m/a. This suggests that the climate in the region has mainly been warming since the early part of this century and that the glacier will continue retreating.

Keywords: glacier retreat, climatic warming, Mt. Qomolangma

*肖扬*等，1998，气候变化对森林生态系统的影响及研究对策，中国农业气象，19（1）：20-25

在系统地分析和讨论全球气候变化背景的基础上，全面介绍了我国近年来气候变化研究方面的主要成果，探讨了我国未来气候变化的可能情景，重点分析了气候变化对森林生态系统初级生产力、地理分布格局、组成结构和生物多样性、以及生态脆弱带和特殊生态系统等几个方面的影响，讨论了各方面的研究现状、主要结论和发展趋势，指出了今后研究中需要重点解决的关键题，并提出了为解决这些问题应采取的研究对策和重点研究领域。

关键词：气候变化 森林生态系统 研究对策

Xiao Yang et al. 1998. Effects of climatic change on forest ecosystems and research strategy for the future. Agricultural Meteorology 19(1):20-25.

Based on a background of systematic analyses and discussions on global climatic changes, the major achievements in research on the climatic changes in China in recent decades, especially in recent years, are described comprehensively. The future probable changes of climate pattern in China are outlined according to general, scattered, and sometimes even contradictory, research information. The effects of climatic changes on forest ecosystems and on aspects of Net Primary Productivity (NPP), geographical distribution, systematic structure, biodiversity, ecotone, and special habitats of forest ecosystems are analyzed. At the same time, the present situation, main results, and future developmental tendency of the research field on the effects of climatic changes are discussed, and the key problems that should be emphasized are pointed out. Finally, research strategy and approaches to resolve the problems are proposed for future improvement of research on climatic changes and their effects on China.

Keywords: climatic change, forest ecosystem, research strategy

张宇，王馥棠，1998，气候变暖对中国水稻生产的可能影响的研究，气象学报，56（3）：369-376

利用随机天气模型，将大气环流模式预测的气候情景与水稻模式相连接，研究了气候变暖对中国水稻生产的可能影响。结果表明，大气中CO_2浓度加倍，中国水稻生产的日数将延长6-11天，积温增加2.20-3.30度·日，积温的相对增长率由南向北呈增长趋势。水稻产量形成期低温天气出现的频率将减少，而高温天气出现的频率将增加。若品种与播种、移栽期不变，水稻产量下

Zhang Yu and Wang Futang. 1998. On the possible impacts of climate warming on rice production in the China. Acta Meterologica Sinica 56(3):369-376.

The possible impacts of climate warming on rice production in China are studied using numerical experiments with the rice simulation model (ORYZA1) based on climate change scenarios projected from global climate models (GCMs) [Geophysical Fluid Dynamics Laboratory (GFDL), United Kingdom Meteorological Office (UKMO), and Max Planck Institute (MPI)]. A stochastic weather generator is used to make the projected climatic change scenarios suitable for input of ORYZA1. The results show that when CO_2 concentration in the atmosphere is doubled, the duration of the rice growing season would be lengthened for 6 to 11days and the accumulated temperature would increase by about 2.20 to

降；而若通过改变品种使作物生育期基本保持目前的状况，减产幅度不品质不变使明显偏小，部分地区还有可能增产。

关键词：作物模式，随机天气模型，全球环流，气候变暖，水稻生产

3.30°C. The possibility of cool injury in the rice yield forming period would decrease whereas that of heat stress would increase. Rice yield would decrease if cultivars and farming practices remain unchanged. However, if the date of rice development stages could be maintained unchanged through variety adjustment, the rice yield in most areas would decrease, and the decrements would be considerably less than if cultivars and farming practices were unchanged.

Keywords: crop model, stochastic weather generator, GCMs, climate warming, rice production

安刚，1998，近九十年吉林省松辽平原作物生长季气温变化的小波分析，气象学报，56（4）：458-466

利用功率谱、小波分析和突变分析方法分析了以长春站为代表的吉林省松辽平原作物生长季（5—9月）平均气温近90年的变化，结果表明其存在3年左右的甚低频振荡，15年和60年左右两个主要长周期振荡，从本世纪20年代初期到50年代初期处于暖阶段，从50年代初期到70年代末期为冷阶段，从70年代末期到90年代中期又处于暖阶段内。预计现在所处的暖阶段将持续到2010年左右。由突变分析结果表明，吉林省松辽平原作物生长季平均气温具有明显的阶段性变化，其各冷暖阶段同小波分析的结果具有很好的一致性，在作物生长季内月平均气温的变化有突变发生。在近期气温变化呈上升趋势。

关键词：松辽平原，作物生长季，气温变化，小波分析

An Gang. 1998. Wavelet analysis of temperature variations of the Song-Liao Plain in crop growth period. Acta Meteorologica Sinica 56(4):458-466.

The temperature variations during the crop growth period of the last 90 years at Changchun Station were analyzed by means of power spectrum, wavelets, and abrupt change methods. Results show that there are very low frequency of (VLF) oscillations about 3 years and, long periods of about 15 years and 60 years. In the Song-Liao Plain, from the early 1950s to the end of 1970s, was a cold period, then since the end of 1970s, is a warm period again. The warm period at present will persist to about 2010. The periodic variation of the temperature was discovered with the abrupt change method. The cold or warm periods are the same as those from the results of the wavelet analysis. In the crop growth period the abrupt changes took place. At present the temperature has a rising tendency.

Keywords: Song-Liao Plain, crop growth period, temperature variations, wavelet analysis

Modeling

秦伯强，于革，Sandy P. Harrison，湖泊水位资料与模型模拟恢复的6000年前全球湿润状况的对比研究，气象学报，56（3）：272-283

模型试验对象是6000a BP的全球湿润状况。模拟试验以检测太阳辐射变化对全球大尺度气候系统的影响为主要目的。观测资料是利用地质证据恢复的古湖泊水位变化，实际上是某地区的有效降水（降水减蒸发）的变化。通过两者的比较发现，所有模拟试验均能重现6000 a BP在亚洲南部与非洲北部的湿润环境，从而证实了因太阳辐射变化导致的亚洲与非洲季风的增强。但模拟的季风增强无论是强度还是范围均小于地质记录。

关键词：6000年前 全球湿润状况 模拟试验 湖泊水位变化 比较研究

Qin Boqiang, Yu Ge, and Sandy P. Harrison. 1998. A comparison of global moisture conditions at 6000 years BP between lake status records and palaeoclimate experiments. Acta Meteorologica Sinica 56(3):272-283.

The objective of this study is the simulated global moisture condition at 6000 years BP. The purpose of the simulation is to verify that changes in insolation influence large-scale climatic systems. The observations used are lake-status records reconstructed from the various geologic evidence. In fact, the lake-level change reflects the variations of moisture conditions, particularly the effective precipitation (precipitation minus evaporation) within the lake basin. The results show that all the experiments can reproduce the wetter conditions in African and Asian monsoon areas, thereby confirming the hypothesis that the enhancement of the Afro-Asian monsoon is induced by seasonal changes of solar radiation. But all experiments fail to produce a broader and more intense monsoon enhancement compared with geologic records.

Keywords: 6000 years BP, global moisture conditions, model experiments, lake status records, comparison study

沈长泗，张志华，1998，采用树木年轮资料重建山东沂山地区200多年来的湿润指数，地理研究，17（2）：150-156

通过运引ARSTAN程序，建立并研究了山东境内沂山地区的树木年轮主年表（1750－1992）。树轮和气候要素的响应面分析得出沂山地区的树轮生长和温度降水呈非线性相关。通过响应函数和回归分析，5月－8月份的湿润指数（P/T）被确定

Shen Changsi and Zhang Zhihua. 1998. Utilizing tree-ring chronologies to reconstruct a 200-year moisture index in Yishan, Shangdong Province. Geographical Research 17(2):150-156.

In this paper, the major tree-ring chronology (1750-1992) in Yishan, Shandong Province, was analyzed by running the program ARSTAN. The resulting analyses of tree-ring and climate data indicate that tree-ring growth in the Yishan Mountains is nonliner correlated with precipitation and temperature. It is unreasonable to reconstruct climatic variables separately using traditional methods. The reconstructed moisture index (P/T) during May to August, in which both temperature and precipitation influence the tree-

为重建对象，该湿润指数值代表了温度和降水对树轮生长的共同影响，且相关性很高，远超过信度检验。利用线性回归方法，获得重建湿润指数的预报方程，用树木年轮表重建了自1750年以来的沂山地区逐年5月-8月湿润指数变化。

关键词：沂山 树轮 湿润指数 气候重建

ring growth, was estimated from a response function and regression model. The relationship between tree-ring growth and moisture index (May to August) is obvious. The predictive equation was obtained from a linear regression model. As a result, the local moisture index (May to August) since 1750 AD at Yishan, Shandong Province, was reconstructed based on tree-ring chronologies.

Keywords: Yishan, tree ring chronologies, moisture index, climate reconstruction

*方之芳*等，1998，1966~1991年北极海冰模拟结果与观测的对比，大气科学，22（3）：305-317

利用宇如聪等1995年建立的北极区域冰洋耦合模式，以1966－1991年期间逐月的月平均实测海平面气温和气压场为强迫场，模拟了上述26年间北极海冰的时间演变和空间分布，着重分析了大西洋及欧洲沿岸一侧的巴伦支海状况，并与目前能够得到的北极海冰密集度观测资料做了对比，结果表明：（1）模式对巴伦支海海冰年际变化的模拟是比较成功的，（2）模式未能在格陵兰海模拟出观测一致的年际变化。（3）模拟和观测的巴伦支海和格陵兰海冰的季节循环均滞后于气温的季节循环，但模拟结果滞后的时间更长。

关键词：北冰洋 热力学海冰模式 巴伦支海 格陵兰海

Fang Zhifang et al. 1998. Comparison of Arctic sea ice variation during 1966-1991 between an ocean–sea-ice model and observation. Scientia Atmospherica Sinica 22(3):305-317.

The variations of sea ice in the Arctic Ocean from 1966 to 1991 are simulated using an Arctic Ocean circulation and thermodynamic sea ice model developed by Yu Rucong et al. in 1995. The model is run with boundary conditions from observed monthly sea surface temperature, air temperature, and pressure. Analyses focus on the simulation of sea ice in the Barents and Greenland seas where the fluctuations of sea ice are more significant than in other regions. The results indicate that (1) the simulation of sea ice in the Barents Sea is successful, reflecting not only the interannual variability during 1969 to 1987 but also two extreme events (i.e., sea ice is extremely heavy in 1979 and extremely light in 1984) which are in good agreement with observation; (2) the simulation of annual variability of sea ice in the Greenland Sea is not consistent with observation; (3) both the observed and simulated sea-ice seasonal cycle in the Barents and Greenland seas lag behind the seasonal cycle of surface air temperature, but the lag time of the latter is more significant.

Keywords: Arctic Ocean, thermodynamic sea-ice model, Barents Sea, Greenland Sea

Radiation and Trace-Gas Emission

*杨汉东*等，1998，江汉平原长湖近代沉积无磁性测量及其气候意义，地理科学，18(2): 135-138

本文根据长湖代表性的磁性测量结果数据，在化学分析和孢粉分析的基础上研究了长湖近代沉积物磁性参数变化与气候变化的关系。结果认为，该地区最近400年来气候变化总趋势是一个由冷变暖的过程。
关键词：湖泊沉积物 磁性测量 气候变化

Yang Handong et al. 1998. Magnetic measurements of recent sediments in Lake Changhu of the Jianghan Plain and their climatic implications. Scientia Geographica Sinica 18(2):135-138.

Using data of magnetic measurements of sediments from Lake Changhu, the authors studied the relationship between magnetic parameter changes and climatic changes in the Changhu area according to chemical analysis and spore-pollen analysis. The study shows that the tendency of the climatic changes is from cold to warm in the Jianghan Plain in recent 400 years.

Keywords: lake sediment, magnetic measurements, climatic change

*刘晓东*等，1998，青藏高原当代气候变化特征及其对温室效应的响应，地理科学，18(2)：113 –121

本文利用30年青藏高原地区的气温和降水资料，分析了高原地区当代气候变化的总体特征，同时结合GCM模拟结果，讨论了高原气候对全球变暖的响应。结果表明，高原气温上升和降水增加与大气CO_2含量增加有关。
关键词：青藏高原 气候变化 温室效应

Liu Xiaodong et al. 1998. Contemporary climatic change of the Qinghai-Xizang Plateau and its response to the greenhouse effect. Scientia Geographica Sinica 18(2):113-121.

The characteristics of contemporary climatic change over the Qinghai-Xizang Plateau are analyzed on the basis of monthly temperature and precipitation data for 30 years. The response of the plateau climate to the global warming is discussed in combination with global climate model (GCM)-simulated output. Results show that the plateau climate has been warming and precipitation change has been increasing in the recent 30 years and that these climatic trends seem to be related to the enhanced greenhouse effect induced by increasing CO_2 concentration in the atmosphere.

Keywords: Qinghai-Xizang Plateau, climatic change, greenhouse effect

方精云，位梦华，1998，北极陆地生态系统的碳循环与全球温暖化，环境科学学报，18(2): 113-121

本文分析了全球温暖化与北极陆地生态系统碳循环的关系，指出近代全球大气CO_2和CH_4显著增加，导致全球温暖化。分析表明，北极陆地生态系统是一个巨大的土壤碳库，该系统起着大气CO_2汇的作用，但大气CO_2浓度增加导致的气温上升将对北极土壤碳库和CO_2的源汇功能产生影响。

关键词：北极 陆地生态系统 碳循环 全球温暖化 CO_2 土壤碳库

Fang Jingyun and Wei Menghua. 1998. Carbon cycle in the Arctic terrestrial ecosystems in relation to global warming. Acta Scientiae Circumstantiae 18(2):113-121.

This paper analyzes the relationship between global warming and the carbon cycle in the Arctic terrestrial ecosystems. It points out that atmospheric carbon dioxide and methane concentrations increased markedly during the past few centuries and caused the global warming. Analyses show that the Arctic is a huge organic carbon pool and a sink of atmospheric carbon dioxide. The global rise of air-temperature resulting from an increase in atmospheric carbon dioxide would influence markedly Arctic soil carbon and the carbon dioxide source/sink relationship of the ecosystems.

Keywords: Arctic terrestrial ecosystem, carbon cycle, global warming, CO_2, soil carbon pool

*金会军*等，1998，青藏高原花石峡冻土站高寒湿地CH_4排放研究，冰川冻土，20(2): 172-174

作者调查了青藏高原花石峡冻土站高寒湿地CH_4排放。各个植物群落内部和不同群落之间CH_4的排放量变化都很大。花石峡地区高寒湿地基本可分为潮湿高寒草甸、沼泽化草甸、杉叶藻沼泽和毛柄水毛茛沼泽。青藏高原高寒湿地CH_4年排放量约为1 Tg • a^{-1}.

关键词：青藏高原 高寒湿地 CH_4排放 观测研究

Jin Huijun et al. 1998. Study on CH_4 fluxes from alpine wetlands at the Huashixia Permafrost Station, Tibetan Plateau. Journal of Glaciology and Geocryology 20(2):172-174.

The study of methane (CH_4) fluxes of Huashixia in the Tibetan Plateau indicates that intra-site and inter-ecosystem variations of the CH_4 fluxes were very strong. Ecosystems in the studied region can be roughly divided into four groups. The CH_4 fluxes from alpine wetlands on the Tibetan Plateau are 1 Tg/year.

Keywords: Tibetan Plateau, alpine wetlands, methane emission, transect study

黄国宏，陈冠雄，张志明，吴杰，黄斌, 1998,
玉米田N_2O排放及减排措施研究，
环境科学学报，18（4）：344-349

用封闭式箱法对玉米田N_2O排放进行了全年、系统的原位观测，发现N_2O排放有明显的季节变化，主要排放期是在作物的生长季节。另外，玉米植株能通过其根系的作用增加土壤向大气排放N_2O。应用长效碳酸氢铵和缓释尿素于玉米田，在施入等量氮的情况下，定时监测N_2O的排放量，结果表明，上述二种长效肥料与普通尿素和碳酸氢铵相比，能明显减少土壤中N_2O排放，并能够提高玉米产量，此外还发现，在玉米生长的后期，它们在土壤中能保持较高含量的硝态氮和铵态氮，说明它们都能使肥料缓慢地释放到土壤中，供作物长期吸收利用，使作物吸收到足够的氮，同时它们的这一特殊作用也减少了土壤微生物的硝化和反硝化过程大量城市的N_2O。因此，它们具有经济呵呵环境双重效益并有着广阔的应用前景。
关键词: 玉米田 N_2O排放 减排措施

Huang Guohong, Chen Guanxiong, Zhang Zhiming, Wu Jie, and Huang Bin. 1998. N_2O emission in maize field and its mitigation. Acta Scientiae Circumstantiae 18(4):344-349.

Nitrous oxide (N_2O) fluxes from a maize field were measured systematically in situ for a whole year using a closed chamber technique. The results show that N_2O emission has significant seasonal variation and mainly occurs during the growing stage of the crop. In addition, the maize plant can stimulate N_2O production through the function of its root in soil. Compared with urea and ammonium bicarbonate, slow-releasing ammonium bicarbonate (ammonium bicarbonate +dicyandiamide) and slow-releasing urea (urea + hydroquinone + dicyandiamide) can not only reduce N_2O emission in a maize field but also cause an increase of maize yield of 14%.

Keywords: maize field, N_2O emission, mitigation measures

*郑循华*等，1998，农田NO排放的自动观测，中国环境科学，
18（2）：1-5

详细介绍农田NO排放自动观测的方法原理，系统整体构造及电路和气路配置，并讨论了观测结果的可靠性。同时，还就已取得的一些初步研究结果进行了分析。对华东秋冬季麦田的NO排放具有与温度几

Zheng Xunhua et al. 1998. Automatic measurement of NO emission from croplands. China Environmental Sciences 18(2):1-5.

The principle, structure and procedure of an automated system for the measurement of NO emission from croplands is described in detail. Some experimental results taken from wheat fields of Southeast China with this automated system are also discussed. In this study, the diurnal variation of NO emission from wheat fields that occurs in late autumn was found to be similar to the diurnal variation of temperature. Meanwhile, a seasonal

乎完全同步的日变化规律，NO排放的季节变化也十分明显，秋季的平均NO
排放通量约为冬季的6－15倍，且施氮肥114kg / hm^2纯氮的NO排放量要比对照处理高2－7倍，温度和施肥是影响华东秋冬季麦田NO排放的关键因子。

关键词：NO排放　自动观测　自动系统 农田 排放通量

variation of NO emission was observed, with the mean value of NO emission fluxes measured in late autumn about 6 to 15 times higher than that in winter. Additionally, the seasonal total amount of NO emission from a plot with N-fertilization at a rate of 114 kg/hm^2 was 2 to 7 times that from the plot without N-fertilization. Such results mean that temperature and application of N-fertilizer are two key factors that regulate the NO emission from wheat fields in late autumn and in winter.

Keywords: NO emission, automatic measurement, automated system, croplands, emission flux

岳明，王勋陵，1998， 紫外-B辐射增强对小麦和燕麦繁殖特性影响的研究，中国环境科学，18（1）：68-71

模拟15%臭氧层减薄水平，研究了紫外-B（UV-B）辐射增强对小麦的花粉活力及萌发特性以及粒籽产量与其萌发特性的影响。小麦和燕麦的繁殖特性对紫外辐射的敏感性差异很大。增强的紫外辐射显著抑制了燕麦的籽粒产量及萌发率，而对小麦的繁殖效率没有显著影响，小麦花粉活力及萌发率的降低可由穗数增加予以补偿。

关键词：紫外辐射　小麦　燕麦　花粉　种子萌发

Yue Ming and Wang Xunling. 1998. A preliminary study of the responses of wheat and oat reproductive characteristics to enhanced UV-B radiation. China Environmental Sciences 18(1):68-71.

The pollen vitality and germination and also seed yield and germination of wheat (*Triticum aestivum* CV, 80101) and oat (*Avena sativa* VC Bayaer –3) under supplementary UV-B radiation from an approximately 15% ozone layer depletion were researched. There are sensitivity differences of reproductive characteristics to UV-B radiation between wheat and oat. The seed yield of oat and its germination rate (25C, in dark) were inhibited significantly by UV-B radiation enhancement, whereas there was no effect of UV-B radiation on the seed yield and germination rate of wheat. The decrease of wheat pollen vitality and germination rate by UV-B radiation enhancement could be compensated for by increasing the numbers of ears per plant under supplementary UV-B radiation. The effects of UV-B radiation are related to metabolic changes of physiologically active compounds in pollen and seed that are connected with their germination.

Keywords: ultraviolet radiation, wheat, oat, pollen, seed germination

庄亚辉，曹美秋，王效科，冯宗炜，1998，中国地区生物质燃烧释放的含碳痕量气体，环境科学学报，18（4）：337-343

为了研究中国地区生物质燃烧不同阶段的各种痕量气体排放比与排放因子，建立了动态与静态燃烧室以及CH_4、COS、CO及CO_2的采样、富集、分析方法；然后对典型乔木、灌木与草的地上部分生物质进行规模不同的燃烧实验，测得痕量气体的排放比和排放因子，根据全国森林生态系统碳贮量的估计及火灾统计资料，初步测算了中国地区生物质向大气中释放含碳痕量气体量。

关键词：生物质燃烧　森林火灾　痕量气体　排放因子

Zhuang Yahui, Cao Meiqiu, Wang Xiaoke, and Feng Zongwei. 1998. Carbon-containing trace gases emitted during biomass burning in China. Acta Scientiae Circumstantiae 18(4):337-343.

Dynamic and static combustion systems, composed of combustion bed; ignition device; electronic balance; temperature- and flow-rate sensors; sampling device; nondispersive infrared (NDIR), flame ionization detection (FID)/DC, electron capture detection/gas chromatography (ECD/GC), and relative percent difference/gas chromatography (RPD/GC) analyzers; datalogger; and computer, were used for the study of biomass combustion emissions. Samples of the above-ground components of typical Chinese tree, shrub, grass, and crop species were collected and burned under flaming and smouldering stages as well as in flowing and closed systems. The emission factors of CO, CO_2, CH_4, COS and emission ratios of CO/CO_2 and CH_4/CO_2 were determined. Meanwhile, a comprehensive investigation on the carbon pool of vegetation in China was performed. The Chinese forest and crop biomass inventory has been established, including the components and layer biomass of 16 main forest types and 4 eco-climatic regions as well as the major crops in China. To reduce statistical uncertainty in biomass estimation, all forests were classified into young, middle-aged, premature, mature, and overmature categories. Based on the vegetation carbon pool inventory and our emission factors, we made a preliminary estimation of the spatial distribution of trace gas emisssions from fuelwood, crop residues, and forest fire.

Keywords: biomass burning, forest fire, trace gases, emission factor

*王明星*等，1998，稻田甲烷排放及产生、转化、输送机理，大气科学，22（4）：600-612

通过对中国五大水稻产区稻田甲烷排放的多年观测实验，描述了稻田甲烷排放的时空变化规律及特征并分析研究了其形成机理。稻田甲烷排放的日变化有四种类型，甲烷的

Wang Mingxing et al. 1998. Methane emissions and mechanisms of methane production, oxidation, and transportation in rice fields. Scientia Atmospherica Sinica 22(4):600-612.

Methane (CH_4) emission rates from Chinese rice fields have been measured in all the five major rice culture regions in China. Four types of diurnal variations of CH_4 emission rates have been found. Seasonal variation patterns of CH_4 emission differ slightly in different field locations, where climate system, cropping system, and other factors are

传输效率是日变化形成的主要因素。稻田甲烷土壤中排放率的季节变化形式在不同的地区是不同的，这取决于气温变化、水稻品种、施肥及水管理等不同因素。甲烷产生主要发生在稻田土壤耕作还原层（2～20cm），氧化主要发生在水土交界面的氧化层和根部氧化膜，并受多种因子的影响。土壤中的甲烷通过三个路径向大气排放，不同时期三个路径在甲烷传输中的相对重要性不同。施用化肥和沼渣肥可以降低土壤中甲烷的产生和排放，而有机肥会增加土壤中甲烷的产生和排放。中国的稻田每年向大气中排放9.67－12.66百万吨甲烷，全球稻田甲烷的总排放量约为35～56Tg/a。

关键词：甲烷排放　日变化　季节变化　氧化和传输　影响因子

different. CH_4 production mainly occurs in the reduced soil layer (2 to 20 cm). CH_4 is oxidized mainly in the thin surface layer of paddy soil and in the rhizosphere of rice plants. Production and oxidation rates are affected by many factors. CH_4 transport is through rice plant, gas bubble, and diffusion in flooded water. The relative importance of each route is different at different stages during rice growing. The effects of various mineral fertilizers on CH_4 emission were rather contradictory, but the amount and the type of organic manure are shown to enhance CH_4 emission from rice fields, which has been also indicated by CH_4 production rates. Application of fermented sludges from biogas generators and farmyard-stored manure instead of fresh organic manure seems to be promising. China's rice fields contribute about 9.67 to 12.66 Tg/year to the atmosphere. The total methane emission from global rice fields can be estimated as 35 to 56 Tg/year.

Keywords: methane emission, diurnal variation, seasonal variation, oxidation and transport, influence factors

白建辉，王庚辰，1998，1979~1996年期间北京地区太阳紫外总辐射的变化趋势, 大气科学, 2（5）：709-717

对实际天气条件下北京地区1990年1月至1992年8月太阳辐射观测资料进行了详细的分析，得到了实际天气条件下到达地面的太阳紫外总辐射的计算公式。结果表明，计算值与观测值吻合的比较好。最后，利用此公式计算了北京地区1979年1月～1996年6月的太阳紫外总辐射，并讨论了1979～1996年北京地区太阳紫外总辐射的变化趋势。

关键词：太阳紫外总辐射　大气臭氧总量　气溶胶

Bai Jianhui and Wang Gengchen. 1998. Variation trends of solar UV radiation in Beijing during 1979-1996. Scientia Atmospherica Sinica 22(5):709-717.

The formula for calculating solar UV radiation at the ground under actual sky conditions is given by using the observation data of solar radiation during the period from January 1990 to August 1992 in the Beijing area. The results show that the calculated values agree well with those observed. This formula is used to calculate the solar UV radiation and discuss its variation trends during 1979-1996 in Beijing.

Keywords: solar UV radiation, total ozone amount, aerosol

*杨理权*等，1998，火山气溶胶对北京大气臭氧总量变化趋势的影响，大气科学，22（5）：686-692

分析了1979－1995年北京地区臭氧总量的变化趋势。1980－1994年整层气溶胶光学厚度和1981－1985、1990－1994年平流层气溶胶光学厚度。分析依据的数据总量来自Dobson仪器所所观测的臭氧总量和太阳辐射表提供的气溶胶光学厚度总量，结果表明，1979－1995年期间北京地区臭氧总量年变化率为-0.269%，1982－1985、1991－1994年间臭氧总量年变化率分别高达-0.954和-1.439%。这说明厄尔奇琼火山和皮纳图博火山爆发对臭氧总量减少可能起到重要作用。

关键词 臭氧 气溶胶 北京

Yang Liquan et al. Effects of volcanic aerosol on ozone change trends over Beijing. Scientia Atmospherica Sinica 22(5):686-692.

Ozone change trends for the period 1979-1995, column aerosol optical depth for the period 1980-1994, and the stratospheric aerosol optical depth for the periods of 1981-1985 and 1990-1994 over Beijing are analyzed using ozone data measured with Dobson and aerosol optical depth data with a photometer. The results show that the ozone yearly change rate over Beijing is –0.269% from 1979-1995 and reaches up to -0.954% and -1.439% for the periods of 1982-1985 and 1991-1994 respectively, which means that the eruptions of El Chichon and Pinatubo volcanoes have important effects on decreases in total ozone amount.

Keywords: ozone, aerosol, Beijing

*白建辉*等，1998，森林排放非甲烷碳氢化合物的初步研究，大气科学，22（3）：247-251

1995年6月至1996年4月，在广东肇庆鼎湖自然保护区每两周采样一次，利用0.8L不锈钢采样和气相色谱法分析、研究森林排放的非甲烷碳氢化合物的浓度。结果表明，森林排放的异戊二烯有明显的季节变化，其浓度与温度有明显的正相关关系。

关键词：森林 非甲烷碳氢化合物 异戊二烯 气温

Bai Jianhui et al. 1998. Primary study on the concentrations of nonmethane hydrocarbon emitted from the forest. Scientia Atmospherica Sinica 22(3):247-251.

We used 0.8 L stainless steel flasks for air sampling twice weekly from June 1995 to April 1996 and gas chromatograph-flame ionization detector (GC-FID) to analyze the concentrations of nonmethane hydrocarbons (NMHC) in the Dinghushan Mountain biosphere protection zone, Zhaoqing City, Guangdong Province. The results show that the concentration of isoprene emission from the forest has an evident seasonal variation and a positive correlation with air temperature.

Keywords: forest, nonmethane hydrocarbon, isoprene, air temperature

*任福民*等，1992，近十五年全球臭氧变化，气象学报，
56（4）：485-492

利用卫星观测臭氧总含量TOMS资料，在剔除年变化后对全球60°S－60°N范围首先进行了沿纬度分布的线性趋势和周期分析。结果表明，自本世纪70年代末，各纬带上的臭氧总量都呈下降趋势，强度随纬度升高而加剧，并发现总体上北半球臭氧的下降趋势较南半球更加明显；同时证实了准两年振荡是臭氧变化中除年周期外最显著的周期。并对臭氧变化中的准两年振荡作了遥相关分析；发现准两年振荡在强度和位相上基本呈纬向分布并主要表现出赤道对称的特征。

关键词：全球臭氧，变化趋势，准两年振荡

Ren Fumin et al. 1998. Study on changes of ozone over the globe during the past 15 years. Acta Meteorologica Sinica 56(4):485-492.

This study examines the linear trend and the periodic variation of the zonal mean total ozone over 60°S-60°N, based on global TOMS (Total Ozone Mapping Spectrometer) data for the period Nov. 1978-April 1993 after correcting for the annual variation. The results show that since the end of the 1970s, total ozone decreased at all latitudes with larger trends at higher latitudes, whereas the trend of ozone change in the Northern Hemisphere is greater than that in the Southern Hemisphere of the same latitude. Meanwhile, it is discovered that quasi-biennial oscillation is the most significant factor in the changes of ozone correcting for the annual variation. Also teleconnection analysis for the quasi-biennial oscillation has been done, and the result shows that zonal distribution and equatorial symmetry in intensity and phase are the main characteristics of quasi-biennial oscillation in the changes of ozone.

Keywords: global ozone, trend of change, quasi-biennial oscillation

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