

论文

1951—2007年华北地区夏季气温变化特征

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摘要 利用1951—2007年月平均气温资料和NCEP/NCAR1951年1月—2007年12月500 hPa高度场再分析资料, 统计近57 a华北地区29个台站逐年夏季气温值, 运用EOF、REOF、趋势分析、Morlet小波分析、M-K突变检验及相关分析等对华北夏季气温的时空分布及其成因进行分析。结果表明: 近57 a华北地区29站平均气温的空间差异较大; 一致性特征是华北地区夏季气温的最主要的空间模式, 在此基础上, 第2种空间模式还显示出了华北地区夏季气温的南北差异; 华北地区夏季气温可分为环渤海型、南方型、东北型及西部型4个主要的空间分型; 近57 a来华北地区夏季气温各分区的周期振荡不完全一致, 但都存在着一个准18 a的周期; 20世纪90年代前中期, 华北地区除Ⅱ区外, 其他三区都存在着一个突变点, 在突变点之后, 出现了5个气温大值年, 即酷暑年。我国华北地区夏季酷暑成因: 从500hPa环流场来看, 在欧亚中高纬地区, 存在显著的正负距平相间的波列, 其中最大正距平中心位于蒙古地区, 说明东亚中纬度地区西风带位势高度场异常偏高, 有利于引导西太平洋副热带高压北上, 造成华北夏季气温升高; 从我国华北地区汛期降水距平场来看, 汛期降水偏少, 也会导致华北夏季的酷暑天气。

关键词 [华北](#) [夏季气温](#) [空间分型](#) [酷暑年](#)

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Summer air temperature variation from 1951 to 2007 in North China

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Abstract Based on the monthly mean air temperature data in China from 29 weather stations during 1951-2007 and NCEP/NCAR reanalysis data from January 1951 to December 2007, summer air temperature was analyzed in North China. The temporal-spatial distributions of summer air temperature and its forming reasons were discussed by EOF, REOF, Morlet wavelet analysis, Mann-Kendall mutation testing, tendency analysis and correlation analysis. The results show that the spatial distributions of mean air temperature in North China display obvious differences in the recent 57 years. The consistency characteristic becomes the main spatial distribution mode of summer air temperature, and the second spatial mode also displays the difference of summer air temperature between the south and the north areas in North China. Summer air temperature in North China is divided into four spatial distribution types, i.e. circum-Bohai Sea type, the southern type, the northeastern type and the western type. The periodic oscillations of summer air temperature are not well consistent in every division in the recent 57 years, while each one exists a period of quasi-18 years. Except that area II, the other three divisions all exist an abrupt change from 1990 to 1995. There are five hot summer years after the abrupt change. The reasons are as follows: based on general atmospheric circulation of 500 hPa in hot summer year, there is the most positive advection in Mongolia areas, which indicates that the height fields in mid latitude areas of East Asia is abnormally high, in favor of making subtropical high in west Pacific moving to the north and making summer air temperature higher in North China. On the other hand, based on the precipitation anomaly field in flood season of North China, less precipitation also can lead the hot summer.

Key words [North China](#) [Summer air temperature](#) [Spatial classification](#) [Hot summer year](#)

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