

论文

欧亚大陆冬季雪深的时空演变特征及其影响因子分析

陈海山^{1,2}, 许蓓^{1,2}

- 1. 南京信息工程大学气象灾害省部共建教育部重点实验室, 江苏 南京 210044;
- 2. 南京信息工程大学大气科学学院, 江苏 南京 210044

摘要: 利用美国冰雪资料中心(National Snow and Ice Data Center)提供的前苏联1948~1994年逐日积雪深度资料,定义了冬季雪深增量的概念,探讨了欧亚大陆秋末雪深、冬季雪深、冬季雪深增量的时空演变规律,通过比较分析三者的异常变化特征,揭示了三者之间可能存在的联系。经验正交函数分解(EOF)结果表明:欧亚大陆冬季雪深、冬季雪深增量的第一模态的空间分布特征均为大致以50°N为界的南北反相变化,欧亚大陆北部的积雪深度和冬季雪深增量都呈现出一致性的变化趋势;两者对应的时间序列均反映了显著的年代际变化特征,且年代际转变均发生在20世纪70年代中期前后。第二模态则呈现出欧亚大陆东、西部反相的偶极型空间分布特征。进一步分析表明,欧亚大陆秋末雪深无论从空间分布还是时间演变来看与冬季雪深几乎不存在相关性。欧亚大陆冬季雪深变化主要是冬季雪深增量影响所致,与秋末雪深无关。

关键词: 欧亚大陆 冬季雪深 时空变化 影响因子

Spatial and Temporal Features of Snow Depth in Winter over Eurasian Continent and Its Impacting Factors

CHEN Hai-shan^{1,2}, XU Bei^{1,2}

- 1. Key Laboratory of Meteorological Disaster of Ministry of Education, Nanjing University of Information Science and Technology, Nanjing, Jiangsu 210044, China;
- 2. College of Atmospheric Science, Nanjing University of Information Science and Technology, Nanjing, Jiangsu 210044, China

Abstract: Using the former Soviet Union daily snow depth data during 1948-1994 provided by the National Snow and Ice Data Center,USA,an index used to reflect the winter fresh snow depth was defined,the basic features of the variation of snow depth in both late Autumn and Winter as well as the winter fresh snow depth over Eurasian Continent are investigated.The possible linkages among them are disclosed by comparing the variabilities of them.Results from Empirical orthogonal function (EOF) analysis suggest that the leading EOF modes of both the winter fresh snow depth and winter snow depth show a coherent negative anomaly in the Eurasia Continent north to 50° and positive anomaly in the south part.The winter fresh snow depth and winter snow depth show a consistent trend in the northern Eurasia Continent.Both of the EOF time series display a significant decadal fluctuation and the transition of interdecadal changes happened in the middle of 1970s.The second modes of EOF reflect a east-west diople pattern over the whole Eurasian Continent.Further analysis suggest that there is no correlation between late autumn snow depth anomaly and winter snow depth anomaly in aspects of both their spatial pattern and temporal evolution.The varibility of winter snow depth over Eurasian Continent are mainly decided by the variability of winter fresh snow depth but not that of the snow depth in late autumn.

Keywords: Eurasian Continent winter snow depth spatial and temporal wariation impacting factors

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