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Changes in the duration and depth of snow cover in Xinjiang during 1956-2005 and their climatic causes

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Large areas in Xinjiang in NW China are covered by snow from December to April, especially around Mountains where snow accumulation controls several environmental processes and economic activities. In particular, the availability of water resources and the seasonality of flows have close correlation with the depth and depletion of the snow pack in such an arid region. In addition, as a result of simultaneous indirect or direct action of atmospheric circulation, solar radiation, air temperature etc., snow cover seems to be a major indicator for climate change. The aim of the study is to investigate snow cover trends in Xinjiang in the Second Half of the 20th and their relations to main climatic factors changes. Homogenised data on the duration and seasonal maximum depth of snow cover from 94 meteorological stations in Xinjiang for 50 winter seasons were analyzed. Winter seasons in 1956/57-2004/05 were selected as the basic study period. The dependence of snow cover on the three main climatic factors-circulation (indirect effect on the snow cover), temperature (direct effect) and precipitation (direct effect)-were examined. There was a slight positive tendency in the duration of the snow cover (to 3 days/10years) and its depth (to 2 cm/10 years) during the 50 investigated winter seasons in Xinjiang grid area. An increasing tendency in the variability of snow cover depth and duration were found in lowland areas and mountainous areas. The long-term variability of snow cover in Xinjiang is explained by the NAO changes, temperature and snow precipitation changes.