



Interdecadal changes in snow cover over Eurasia: 1967 to 2012

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In the present work, we investigated the inter-decadal variations in snow cover extent over Eurasia during the period 1967-2012. Satellite based observations show distinct changes in snow coverage on various temporal and spatial scales. Prior to 1990, there was a general decreasing trend in snow cover extent during the whole cold season (October-May). After 1990 the decreasing trend continued during spring (March-May), while an increasing trend was observed in autumn (October-November) and winter (December-February). Spatially, the reduction in snow cover before 1990 covered the whole of Eurasia. After 1990, the decrease continued over the western part, but an increase over the eastern part was observed. To understand these temporal and spatial changes, the variations of surface air temperature, snowfall and rainfall over Eurasia, and their potential relationship with recent changes in Arctic sea ice, were studied. We found that increased snowfall in autumn and winter, associated with the melting of Arctic sea ice, may partly be responsible for the snow cover increase over eastern Eurasia after 1990, while the decreasing snow cover over western Eurasia can be a result of the increased regional temperatures. During spring, the combined effects of temperature and snowfall could have led to the strong decrease in snow cover. Finally, a global climate model, forced by decreased Arctic sea ice, was used to investigate the suggested mechanisms.