Snow Cover Monitoring in Northern Eurasia

*Olga Bulygina[1,2], V. Razuvaev[1], P. Groisman[2,3]

1.All-Russian Research Institute of Hydrometeorological Information–World Data Centre, 6 Koroleva St., Obninsk, Kaluga Oblast', 249035, The Russian Federation , 2.P.P. Shirshov Institute of Oceanology, 36 Nakhimovsky Ave., Moscow, 117997, The Russian Federation , 3.UCAR at NOAA National Centers for Environmental Information, 151 Patton Avenue, Asheville, North Carolina 28801, USA

Snow covers through its unique physical properties (high reflectivity and low thermal conductivity) and water storage, plays critical roles in energy and water exchanges, hydrology and the ground thermal regime. The main objective of this research is to monitoring snow cover change in Northern Eurasia. The annual surface air temperature in Northern Eurasia is increasing by 2.1 C/ 10 years during the period of 1936 to 2015. Close to the north in the Arctic Ocean, the late summer sea ice extent is decreasing providing a near-infinite source of water vapor for the dry Arctic atmosphere in the early cold season months. There is also evidence of more frequent thaw days over western Eurasia. All these factors affect the state of snow cover.
Changes of snow cover duration, snow depth and snow water equivalent are described.
Snow cover duration (SCD) decrease over several regions of European Russia, Western Siberia and the Atlantic and Siberia Arctic, while positive values of SCD trends are infrequent and randomly scattered. The maximum winter snow depth increases in the Atlantic Arctic, southern part of the forest zone of Western Siberia, central part of Eastern Siberia and Russian Far East. At the same time, the maximum winter snow depth decreases in southern European Russia, Altai and Sayany Mountains and Piedmont and Trans-Baikal regions. The largest change was documented for Trans-Baikal region, the decrease is 13 percent per decade. The increase of maximum winter snow water equivalent in the field is observed in Western Siberia, Sakhalin and eastern European Russia. In the south of the forest zone of Western Siberia, the water equivalent increase is 5 % in ten years. According to course observations in the forest, the decrease in maximum snow water equivalent for the winter is recorded over most of European Russia.
The work was supported by the Ministry of Education and Science of the Russian Federation (grant 14.B25.31.0026).

Keywords: Snow cover, snow cover duration, snow water equivalen, climate monitoring

