EMS Annual Meeting Abstracts
Vol. 13, EMS2016-14, 2016
16th EMS / 11th ECAC

Siberian High Anomalies and Their Precursors

Yuliya Martynova (1,2), Vladimir Krupchatnikov (1,2), and Elena Kharyutkina (2)

(1) Siberian Regional Hydrometeorological Research Institute, Novosibirsk, Russian Federation (foxyj13@gmail.com), (2) Institute of Monitoring of Climatic and Ecological Systems SB RAS, Tomsk, Russian Federation

The Siberian High (SH) is the most intensive pressure system which is formed over Eurasia during wintertime. Particularly, SH regulates an intensity and duration of frosts in Siberia. SH has a significant impact on a winter weather conditions not only in Asia but also in the whole Northern Hemisphere. This pressure system has a strong connection with another atmospheric centers of action of the Northern Hemisphere such as Arctic High, Icelandic Low, the Azores High.

Anomalous intensity of SH can be caused by different atmospheric conditions. From the one hand, it can be the effect of anomalous conditions in stratosphere. The anomalously weakened polar vortex and higher than normal stratospheric temperature cause the propagation of geopotential and wind anomalies from the stratosphere through the troposphere down to the surface. As a result, strong negative AO mode appears near the surface and can affect SH. From the other hand, anomalous intensity of SH can be caused by tropospheric circulation anomaly (e.g., by anomalous intensity of some of the atmospheric centers of action or by blocking events). Moreover, both these atmospheric conditions can affect SH jointly.

This study is devoted to a determination of precursors of the anomaly SH behavior and estimation of changes of the determined connection in the climate change conditions. Estimation of influence of both presented tropospheric and stratospheric conditions on the SH anomalous intensity are presented. This research was conducted using climate system model INMCM (4.0 and 5.0) and the NCEP Climate Forecast System Reanalysis (CFSR) data.

Acknowledgements. This work is partially supported by RFBR grants 16-35-00301, 16-05-00558, 14-05-00502; SB RAS project VIII.80.2.1.