EMS Annual Meeting Abstracts
Vol. 14, EMS2017-253-1, 2017

Weather extremes associated with atmospheric blockings from reanalyses and model simulations

Aleksandr Timazhev and Igor Mokhov
A.M. Obukhov Institute of Atmospheric Physics RAS, Moscow, Russian Federation (timazhev@ifaran.ru)

Atmospheric blockings are important factors for formation of weather anomalies (including extreme events). Estimates of trends and climate projections for the blockings depend on detection methods, datasets and climate scenarios, but the trend of the extreme weather events shows that their number and intensity are increasing.
The estimation on the trends of the blocking-assosiated weather anomalies and an assessment of intensity and duration of the extreme events depending on the characteristics of the concrete blocking has been carried out.
The NCEP and ERA reanalyses data and CMIP5 ensemble simulations with RCP-scenarios for the 21st century were used for detection of atmospheric blockings and associated weather anomalies.
Three different objective methods of blocking detection (geopotential gradient index, potential temperature gradient index and tracking of each blocking) were used to estimate the level of uncertainty. We also used the archive of blockings, composed basing on synoptic maps for 1949-2010. The following weather anomalies were analyzed: heat waves, severe frosts and also extreme precipitation at the periphery of blocking.
The main feature of this work is the usage of the detailed characteristics of the blockings and the related weather anomalies for the entire period of observations. It allows to estimate the level of influence of the blockings on the associated weather anomalies for each separate blocking event, and also at scales of decadal variability.
Climate simulations for the 21st century allow to estimate the sensitivity of influence of the blockings on weather anomalies to different scenarios of climate change.
Anticipated results would enable us to estimate the characteristics of the anomalies (including extreme ones) caused both by a specific episode of blocking and total blocking for the fixed period that can improve both short-term and long-term forecasting of extreme weather events that is an actual problem under modern conditions of the increase in their frequency.