EMS Annual Meeting Abstracts
Vol. 15, EMS2018-144, 2018

Creation of high-resolution regional climate archive for Russian Arctic: strategy and methodology

Vladimir Platonov (1) and Mikhail Varentsov (2)

(1) Moscow State University, Faculty of Geography, Department of Meteorology and Climatology, Moscow, Russian Federation (vplatonov86@gmail.com), (2) Moscow State University, Research Computer Center, Moscow, Russian Federation

The Arctic is the region most sensitive to climate change on the globe, it concerns both physical feedbacks in the climate system and ecological systems. However, the spatial distribution of the climate changes in the region is ambiguous, there are various estimates of the trends of certain meteorological parameters in different water areas and coastal zones of the Russian and other Arctic regions. Taking into account the increasing number of dangerous phenomena and outlooks for the Arctic coast, the task of providing the region detailed hydrometeorological and climatic information with a horizontal resolution of at least a few kilometers becomes particularly topical. We will use well-known regional climate model COSMO-CLM v5.0 to implement this.

An integrated archive of hydrometeorological parameters with a spatial resolution of less than 5 km, will be obtained for the first time after long-term simulation experiments. Detailed hydrometeorological fields in the Arctic over a long period (1980 - 2016) will will cover most of Russian Artic It will be derived by the two-step downscaling technology with $\sim$13 km and $\sim$4 km domains starting from global reanalysis as driving conditions (ERA-Interim/NCEP-CFSR/ERA5). This will provide new, more thorough and justified estimates of the current regional climate changes, as well as extreme weather events.

The regional reanalysis output is possible to use as inputs to modelling the ocean′s characteristics (wind waves and dynamics), coastal ecosystems (turbulent heat fluxes, greenhouse gases), more detailed research of individual phenomena on nested domains (extreme situations, hazardous weather events), analysis of trends in the frequency of occurrence of extreme events and features of their spatial distribution, the hydrometeorological regime of coastal areas studies, climatology and tracking of polar mesocyclones, etc.

The reported study was funded by RFBR according to the research project № 18-35-00604.