



Changes of extreme precipitation in northern Eurasia from observations, reanalysis and model simulations

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Different characteristics of regional precipitation (total precipitation, rain intensity, wet day probability and heavy precipitation) in Northern Eurasia are investigated. Daily station data from the Russian Institute of Hydrometeorological Information, gridded observational data from the Climate Research Unit, results of the European Centre for Medium-Range Weather Forecasts reanalysis (ERA-40) and simulations with two generations of the global climate models (ECHAM4/OPYC3 and ECHAM5/MPI-OM1) with anthropogenic IPCC scenarios are analyzed. Estimates of the regional extreme precipitation changes have been made for basins of major Eurasian rivers, such as Volga, Ob, Yenisei and Lena rivers, in particular. A general increase of precipitation intensity for the analyzed rivers basins is found from observations and model simulations for the 20th century. At the same time, there are significant differences in tendencies of change of daily precipitation characteristics for different seasons. According to observations the increase of precipitation intensity is the most significant for the Siberian rivers basins during wintertime for the 20th century. Model results show significant enhancement of precipitation intensity and heavy precipitation (exceeding the 90% quantile) for the rivers basins during the 21st century with the most significant increase for the Siberian rivers basins in winter. There are remarkable differences in tendencies of change for wet day probability over the rivers basins during the 21st century: with a general increase in winter and a decrease in summer. Estimates of change of the extreme daily precipitation in Caucasian region from model simulations are quite contradictory for summer season. For winter season model simulations show an increase of precipitation intensity and a decrease of wet day probability for Caucasian region during the 21st century.