NG33A-3814 Reanalysis Data Evaluation to Study Temperature Extremes in Siberia

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Ongoing global climate changes are strongly pronounced in Siberia by significant warming in the 2nd half of 20th century and recent extreme events such as 2010 heat wave and 2013 flood in Russia's Far East. To improve our understanding of observed climate extremes and to provide to regional decision makers the reliable scientifically based information with high special and temporal resolution on climate state, we need to operate with accurate meteorological data in our study. However, from available 231 stations across Siberia only 130 of them present the homogeneous daily temperature time series. Sparse, station network, especially in high latitudes, force us to use simulated reanalysis data. However those might differ from observations.
To obtain reliable information on temperature extreme "hot spots" in Siberia we have compared daily temperatures form ERA-40, ERA Interim, JRA-25, JRA-55, NCEP/DOE, MERRA Reanalysis, HadEX2 and GHCNDEX gridded datasets with observations from RIHMI-WDC/CDIAC dataset for overlap period 1981-2000. Data agreement was estimated at station coordinates to which reanalysis data were interpolated using modified Shepard method. Comparison of averaged over 20 year annual mean temperatures shows general agreement for Siberia excepting Baikal region, where reanalyses significantly underestimate observed temperature behavior. The annual temperatures closest to observed one were obtained from ERA-40 and ERA Interim. Furthermore, t-test results show homogeneity of these datasets, which allows one to combine them for long term time series analysis. In particular, we compared the combined data with observations for percentile-based extreme indices. In Western Siberia reanalysis and gridded data accurately reproduce observed daily max/min temperatures. For East Siberia, Lake Baikal area, ERA Interim data slightly underestimates TN90p and TX90p values. Results obtained allows regional decision-makers to get required high spatial resolution (0,25°×0,25°) climatic information products from the combined ERA data.
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Authors

Tamara Shulgina
Tomsk State University
SCERT

Evgeny Gordov
SCERT
Tomsk State University

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