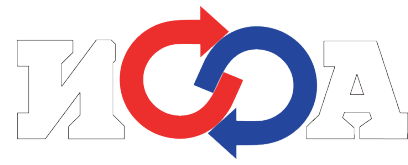


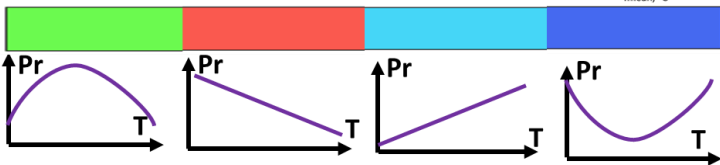
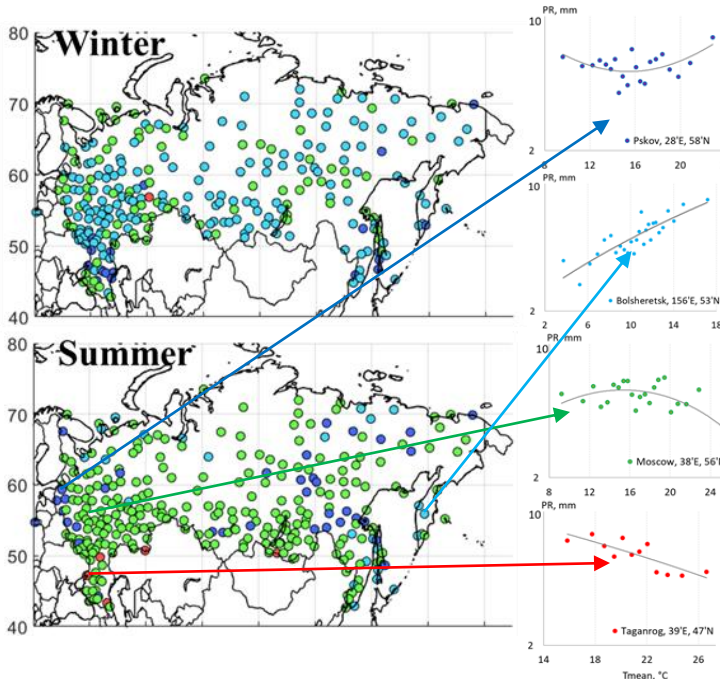
A relation between extreme precipitation and surface air temperature over Russia in the last four decades

Maria Aleshina, Vladimir Semenov, Alexander Chernokulsky

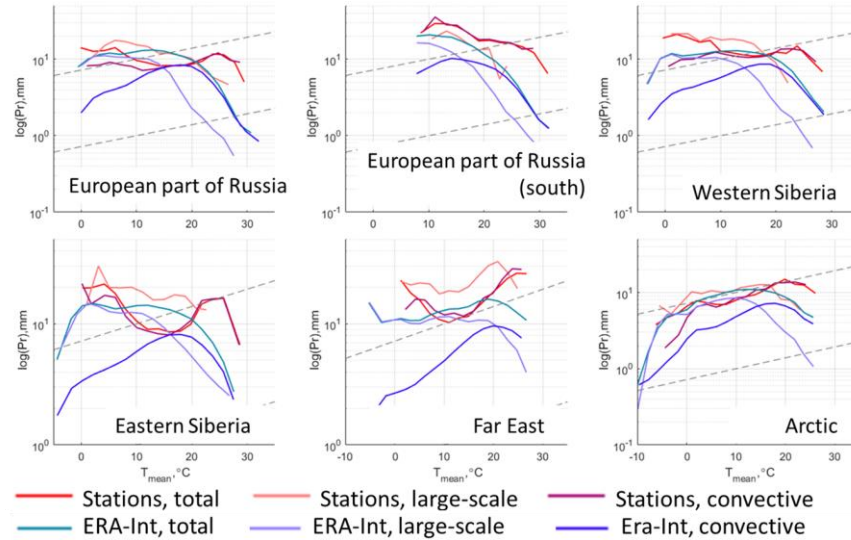


- The scaling between daily precipitation extremes and surface air temperature was examined over Russia for 1966–2017 using meteorological station data and for 1979–2017 using ERA-Interim reanalysis.
- The precipitation-temperature relation is analyzed for total precipitation and for convective and large-scale precipitation types.

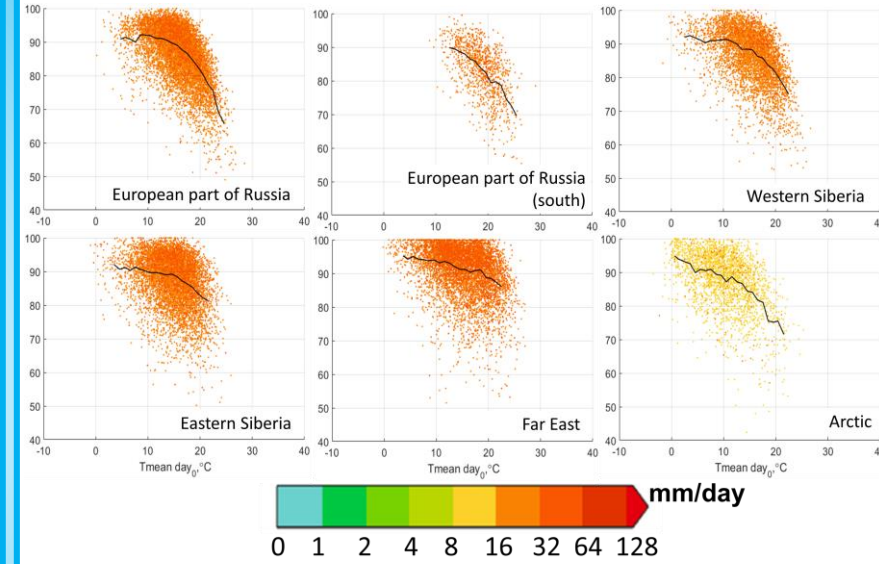
Scaling types between temperature and extreme precipitation on meteorological stations



Values of 95th percentile of precipitation as a function of the temperature based on meteorological stations and ERA-Interim reanalysis for regions of Russia. Summer



Near surface relative humidity during the extreme precipitation events as a function of temperature based on meteorological stations. Summer



Conclusions

- In winter, a general increase of extreme precipitation of all precipitation types according to Clausius-Clapeyron (C-C) relation is revealed. For the Russian Far East region, the stratiform precipitation extremes scale with surface air temperature following even super C-C rates, about two times as fast as C-C.
- In summer there is a peak-like structure of the precipitation-temperature scaling, especially for the convective precipitation in the southern regions of the country.
- Being consistent with the C-C relationship, extreme precipitation peaks at the temperature range between 15°C and 20°C in summer. For the higher temperatures, the negative scaling prevails.
- Also, there is a pronounced decrease in relative humidity with increasing surface temperatures beyond 15-20°C. It means that moisture availability is the major factor for the peak-shaped relationship between extreme precipitation and temperature.

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