



Spatial distribution of temperature extremes changes in Poland in 21st century

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There is a general agreement that changes in the frequency or intensity of extreme weather and climate events have profound impacts on both human society and the economy. In the recent years a numerous weather events have affected human health and caused enormous economic losses. A long-lasting heat waves influence society far more than rare occurred extreme high temperature. On the other hand a winter warming and frequent exceedance of 0°C during winter will be disruptive i.e. for the wheel transport and roads condition in Poland.

This work is focused on the study of the spatial diversity of minimum and maximum temperature in 21st century in Poland. Firstly the shift in distribution (PDF) and cumulative distribution (CDF) of the daily maximum temperature in summer and minimum temperature in winter between control and scenario periods was compared among different part of the country. Secondly the changes in the characteristic percentiles of the temperature extremes were analyzed. Furthermore the spatial changes in the duration and frequency of the heat waves in Poland were studied. Moreover the future prediction of changes in characteristic days as hot days ($T_{\text{max}} \geq 30^{\circ}\text{C}$), summer days ($T_{\text{max}} \geq 25^{\circ}\text{C}$), tropical nights ($T_{\text{min}} \geq 20^{\circ}\text{C}$), frost days ($T_{\text{min}} < 0^{\circ}\text{C}$), etc. were spatially compared. The diurnal temperature range (DTR) is expected to change remarkably in 21st century depending on the area of Poland.

The daily minimum and maximum 2-meter temperature date have been obtained from seven different regional climate models and corrected by quintile mapping method afterwards. The Polish station data for the control period have been gained from the Institute of Meteorology and Water Management, National Research Institute.