



Spatial differentiation of temperature extremes trends in Poland

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Extreme meteorological phenomena have been recently an important topic of discussion among both scientists and people in general. More and more often people are asking themselves what is going to happen in the nearest future and how the life is going to change due to the climate change and extreme weather phenomena that are taking place.

The main objective of the research is to present the tendencies in air temperature extremes variability in Poland during the latest decades. Existing research on meteorological extremes occurrence proved that the country is characterized by the considerable spatial differentiation of extremes. Therefore the important scope of the study is also to analyze the spatial differentiation of tendencies in extreme values variability.

The basic research material, maximum and minimum air temperature values, was based on the data from 54 meteorological stations relatively regular distributed all over the country. The data covers the period of 58 years from 1951 to 2008. Extremes evaluation required the source material to be thoroughly checked regarding homogeneity. Daily maximum and minimum temperature values were checked many times and in some cases data series were abandoned while the fully evaluation was not possible. The extremes were identified by the probability approach. To differentiate the extremes of the interest the following thresholds were applied: 10%, 5% and very rigorous criteria of 1% that is the 10th and 90th, 5th and 95th as well as 1st and 99th percentiles respectively.

The data were analyzed regarding the long term variability of extreme values: minimum and maximum air temperature and the frequency of their occurrence within the period under examination. The analysis of particular extreme phenomena showed that they occurred at various moments from 1951 to 2008. Although many extremes were recorded in the latest two decades (since 1990), a considerable number of them have also been observed in the 1950s and 1960s. The obtained results show spatial differentiation of both extreme air temperature values and their long-term tendency.

For "mild" extremes (distinguished with the mild criteria of 10th and 90th percentiles) winter minima showed the slight decreasing tendency over most of the area of Poland except for the North-East (approximately 1.2 day/10 years). Summer maxima demonstrated statistically significant positive trends in western Poland (the increase reaches about 1.5 day/10 years) whereas eastern part of the country is not characterized by any visible tendency in temperature extremes variability. In case of "sharp" extremes ($p=1\%$) none statistically significant tendencies are observed.

The analyses proved important local differences even in the scale of particular regions. It absolutely certifies that detailed and thorough data examination is necessary. The obtained results confirm also the local differentiation of climate conditions and subsequently the problem of representative character of the stations, especially those used in extreme meteorological phenomena research.