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Length and terms of occurrence of thermal seasons in Poland - are any changes observed?

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While thinking of seasons, one mostly has in mind astronomical seasons which are very often mentioned by media. These are set using Sun's position above the equator and the tropics. Seasons defined by these manners very frequently do not match with prevailing climatic conditions in Poland. Therefore, especially in scientific research, different ways of setting the beginning and ending of seasons in Poland are employed. Climatic seasons are used very broadly. They divide the year into four parts of almost equal duration. Nevertheless, for Poland, this method is also not fully representative, because it does not take into account regional differentiation of climatic conditions. More objective criteria are used in phenological seasons, where their duration is set by, for example the terms of florescence and maturation of plants. In this research, thermal criterion is applied for setting the duration of seasons – terms of persistent exceedances of characteristic thresholds of mean daily air temperature (5 degrees C for autumn and spring, 0 degrees C for winter and 15 degrees C for summer).

The climate of Poland is characterised by large long-term variability of thermal conditions. It results in the possibility of evident differences in the length and terms of seasons beginning and ending between years. The winter season 2012/2013 in Poland was exceptionally long, and very low temperatures occurred during the whole March, even in the first decade of April in some parts of the country. At the same year at the end of April temperatures exceeded 20 degrees C (summer conditions). It resulted in another wide discussion on evident changes of length or even fading of some seasons in the media.

Based on meteorological data from 10 Polish meteorological stations, that represent different regions of the country, authors are researching how the length of thermal seasons changed between years 1951 and 2013 in Poland. The length of seasons in three multiannual periods (1951-1980; 1961-1990; 1991-2013) will be compared. Terms of beginning and ending of the seasons will be analysed in a similar way. In order to assess whether there exists a significant trend in changes of the seasons' length and terms of their occurrence, the data will be analysed by 2 statistical tests (Mann-Kendall 's test and linear regression).

Moreover, for the meteorological stations, for the period 1951-2013, "thermal outsider" years, with thermal seasons considerably different from typical ones will be identified. Also the frequency of "outsider" occurrence in the subperiod of analysis will be researched.