



## **Heat waves and cold waves in Poland - observations and projections.**

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The fourth report of the Intergovernmental Panel for Climate Change (2007) states that the frequency as well as severity of extreme weather events is increasing. A similar trend should be continued and even it may escalate in the future.

Last decades brought Poland clearly noticeable increase in appearance of extreme values of temperatures what is linked with growing number of heat waves occurrence. In the nineteen sixties, nineteen seventies and nineteen eighties days with maximum temperature above 30°C were definitely rare. Whereas from the beginning of nineteen nineties abnormal years are those where such temperatures do not appear. Moreover, rarity are years where those high temperatures are not linking into heat waves, longing for at least 5 days.

Slightly different situation takes place in case of cold wave. The number of frosty days significantly decreases. Apart very mild winters, regularly severe winters appear. These are bringing large difficulties in transport and public communication, furthermore they are causing many fatalities (according to press releases only in Poland almost 300 people suffered death due to cold and in the last decade about 2000). Some mass media during last winter as well as this years' winter were questioning the global warming, asking whether scientists were wrong.

Based on meteorological data (at least 55 years long time series) from eighteen Polish meteorological stations, authors are investigating how does the frequency of appearance and intensity of heat waves and cold waves have changed. Focus is on average number of days and the longest period for some threshold temperature values like for example: minimum temperature below -15°C and maximum temperature above 30°C. The occurrence of extremely rare temperatures (minimum temperature below -30°C and maximum temperature over 35°C) will be analyzed. The results will be tested with statistical parametric and non-parametric tests, e.g linear regression, Mann-Kendalls test.

Furthermore, a projection of occurrence such events in the future (years 2071 – 2100) will be presented. The research material are to be the results from regional climate models from ENSEMBLES family like SMHIRCA, MPI-M-REMO, C4IRCA3.