High resolution climatology
- towards climate change services

What climate changes could be observed by two generations of Poles?

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For many years, numerous scientific papers in different disciplines have been published on different aspects of the global warming. The issue of climate change and its impacts has become certainly a "fashionable" research area. In Poland, for example, the issue was tackled by one of the greatest hydro-climatological research projects, namely: "Extreme meteorological and hydrological events in Poland (the evaluation of forecasting events and their effects on human environment)".

However, for several years, and certainly since 2007, when Al Gore, former U.S. vice-president, and the Intergovernmental Panel on Climate Change (IPCC) won the Nobel Peace Prize, this topic has started to be increasingly more frequently raised by the Polish media. The average Polish citizen increasingly more often learns from the press, radio and television about the global warming. There are also those skeptical of the climate change who loudly express their opinions in the media. Can the average Pole not get lost in the thicket of information? Can they refer to their own memory or the memory of their parents or grandparents on issues of climate change? How is the typical summer or winter perceived the previous generations? Is it possible to observe such changes without reference to extreme events?

This article is to try to answer the question whether the average Pole could see climate change, most simply understood as changes in the thermal conditions and precipitations. If yes, then what seasons or months see the biggest changes. Which parts of the country witness the biggest changes?

The starting point of the analysis are the 58-years time series of real monthly temperature and precipitation in the period of 1951-2008 for 20 stations across Poland. However, they will not be analyzed in more detail. In order to smooth the data sequences and thus to reject the short-term fluctuations, the long-term moving averages in different sequences (individual months, seasons and years) will be analyzed. The analysis of moving averages will help to find potential longer-term trends or cycles in the test time series. Trends will be detected based on parametric and nonparametric tests, such as linear regression and Mann-Kendall test.

Finally, the current temperature and precipitation will be compared to the climate projections at the end of the 21st century. To this end, the climate models from the ENSEMBLES research project will be used. In the case of temperature, these will be C41RCA3 from Rossby Centre (Norrköping, Sweden); CLM from ETH (Zurich, Switzerland), KNMI-RACMO2 from the Royal National Meteorological Institute (De Bilt, the Netherlands), MPI-M-REMO from the Max Planck Institute (Hamburg, Germany); METO-HC from the Met Office's Hadley Centre (Exeter, UK), and RCA from the SMHI Swedish Meteorological and Hydrological Institute (Norrköping, Sweden). In the case of precipitation, only the MPI-M-REMO model will be used. The reason is the outcome of the validation of models for the territory of Poland (previously made by the author) which indicated that this model was the best fit for the Polish precipitation conditions.