EMS Annual Meeting Abstracts
Vol. 14, EMS2017-528, 2017

Drivers of precipitation extremes in Poland in different spatial and temporal scales

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There is a consensus concerning global warming and the increase of temperature in the Central Europe and Poland (BACC II Author Team, 2015). However much less is known about the precipitation response to the warming trend. They can be influenced by warming in numerous ways:
• Higher water holding capacity of the air cause that more water is available for precipitation, so the extreme rain can be more intense (Allan 2012).
• Warmer air and higher water holding capacity can increase the amount of precipitable water in the atmosphere changing precipitation totals and extremes in different temporal scales (hourly, daily, monthly, seasonal) (Lenderink & van Mejigaard 2008).
• Warming is not uniform over the World. It can cause changes in atmospheric circulation modificating the transport of moisture.
• Warmer surface can enhance the instability increasing the percentage of convective precipitation.
• Warming enhances local evaporation changing the amount of water available for ptrecipitation (Held & Soden 2006).
The aim of the paper is to identify potentially important factors driving precipitation extremes in Poland.

To identify extreme precipitation drivers in short temporal scales hourly and daily precipitation totals and temperatures from several stations in Poland and methodology proposed by Lenderink & Mejigaard (2010) will be used. The precipitation data will be divided into subseries relative to temperature. Distributions to these binned datas will be fitted and compared, in particular their right tails.
To identify circulation influence on precipitation the water vapour fluxes and their trends will be analysed. The NCEP/NCAR reanalysis dataset will be used: wind components and specific humidity data from three geopotential levels: 850, 700 and 500 hPa from the period 1951-2015. Moisture transport will be assessed using the methodology proposed by Phillips & McGregor (2011) and its trend will be analysed and compared with precipitation totals in temporal scales ranging from days to seasons.
The vapour fluxes in days with extreme precipitation will be compared with the average ones separatelly for all seasons to check the impact of moisture transport on extreme precipitation.

The work is supported by grant 2012/05/B/ST10/00945 founded by Polish National Science Centre.