EMS Annual Meeting Abstracts
Vol. 14, EMS2017-327, 2017


# Meteorological droughts in central Europe and their drivers

Jiří Mikšovský (1,4), Miroslav Trnka (2,4), Rudolf Brázdil (3,4)

(1) Department of Atmospheric Physics, Charles University, Prague, Czech Republic (jiri@miksovsky.info), (2) Department of Agrosystems and Bioclimatology, Mendel University, Brno, Czech Republic, (3) Institute of Geography, Masaryk University, Brno, Czech Republic, (4) Global Change Research Institute, Czech Academy of Sciences, Brno, Czech Republic

Due to their impacts on the hydrological cycle, natural ecosystems and numerous sectors of the economy, an important place among the problems addressed by contemporary climatology belongs to the study of droughts. The long weather observation records, available from various weather stations in central Europe, provide a convenient basis for study of temporal variations in the drought characteristics. In this analysis, we focused our attention on the manifestations of meteorological droughts in the Czech Republic, and their links to various external and internal climate forcings. Monthly, seasonal and annual series of several established drought descriptors (Standardized Precipitation Index, Standardized Precipitation Evapotranspiration Index, Palmer's Z-index, Palmer's Drought Severity Index) were subjected to regression analysis aimed at identification of the most influential factors shaping the drought variability over the 19th, 20th and early 21st centuries. Aside from mild effects of the natural forcings (especially volcanic activity) and a long-term trend formally attributable to the anthropogenic forcing, some links of droughts to large-scale climate internal climate variability modes have been identified. In addition to the strong effects of the North Atlantic Oscillation – the dominant oscillatory mode in the Euro-Atlantic area – manifestations of teleconnections originating from the Pacific region were detected. In particular, phase of the Pacific Decadal Oscillation was found to leave a significant imprint in the drought index series at many locations under investigation. Finally, possible nonlinearities in the responses of the drought descriptors to climate forcings were investigated – it is shown that while many of the drought responses can be captured quite well by the purely linear analysis techniques, transition to their nonlinear counterparts may be needed to achieve a more complete understanding of some of the relevant links.