



Droughts in the Czech Lands: historical variability and its drivers

Jiri Miksovsky (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

Droughts represent one of the prominent natural hazards in central Europe, with substantial impacts on both natural ecosystems and various sectors of the economy. While the existing records show a complex pattern of temporal variations of drought occurrence and intensity, the knowledge of the factors responsible for this behavior is still incomplete, especially regarding the changes at decadal and multidecadal time scales. In this presentation, we show outcomes of a quantitative statistical drought attribution analysis, utilizing multivariable regression and aimed at identification of links between time series of selected drought descriptors (embodied by three different drought indices, derived from Czech temperature and precipitation data) and activity of external climate forcings (including the variations of solar and volcanic activity or anthropogenic effects) or internal climate variability modes (El Niño - Southern Oscillation, Atlantic Multidecadal Oscillation, Pacific Decadal Oscillation). Aside from the drought data for the instrumental period, we also employ their documentary and proxy-based extensions, expanding the analysis period to more than five centuries of data within the 1501-2006 AD interval. Our results point to existence of some nontrivial relationships, including a link between the central European drought characteristics and the temperature variations in the northern Pacific region, and a possible imprint of volcanic activity in the drought index series. However, further verification of these findings is still needed, particularly with regard to the uncertainties in the pre-instrumental data sources, and to identification of the exact physical mechanisms behind the links indicated by our statistical analysis.

This work was supported by Czech Science Foundation, project no. 17-10026S “Drought events in the Czech Republic and their causes”.