



Role of teleconnections in establishing European drought variability patterns

Jiri Miksovsky (1,2), Miroslav Trnka (3,2), Rudolf Brazdil (4,2), and Michal Belda (1)

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

Local incidence and magnitude of droughts are governed by a complex interaction of various factors, with key role generally belonging to precipitation sums, combined with influences from other climate variables such as temperature. Even though impacts of external forcings and local conditions can play a significant role, most of the drought variability typically stems from internal climate dynamics, responsible not just for short-term variations in the occurrence of dry/wet conditions, but also governing much of the mid-to-long-term changes. In this analysis, intensity of meteorological droughts across a wider European area is investigated with regard to the influences of teleconnections associated with selected prominent global climate oscillations. Gridded monthly values of Standardized Precipitation Evapotranspiration Index (SPEI) over the 20th and early 21st centuries are employed as a drought quantifier. Using regression analysis, components in spatiotemporal SPEI variability are attributed to activity of prominent large-scale internal climate variability modes, ranging from systems dominated by shorter-term variations (such as North Atlantic Oscillation) or inter-annual changes (El Niño – Southern Oscillation), to variations at decadal time scales (Pacific Decadal Oscillation). Geographical patterns associated with individual variability modes are assessed in terms of their magnitude, stability and statistical significance. Trans-European links in drought occurrence and intensity are evaluated with regard to similarities and contrasts in local drought responses.