Geophysical Research Abstracts
Vol. 19, EGU2017-19288, 2017
EGU General Assembly 2017

Drought multiproxy reconstruction in the Czech Lands from AD 1500

Petr Dobrovolný (1,2), Rudolf Brázdil (1,2), Martin Možný (3), Miroslav Trnka (2,4), Michal Rybníček (2,5), Tomáš Kolář (2,5)

(1) Masaryk University, Institute of Geography, Brno, Czech Republic (dobro@sci.muni.cz), (2) Global Change Research Institute, Czech Academy of Sciences, Brno, Czech Republic, (3) Czech Hydrometeorological Institute, Doksany Observatory, Doksany, Czech Republic, (4) Mendel University, Department of Agrosystems and Bioclimatology, Brno, Czech Republic, (5) Mendel University, Department of Wood Science, Brno, Czech Republic

Whereas the air temperature variability in the past and recent climate is well understood, our knowledge on hydroclimate (drought/precipitation) from various proxy archives and instrumental measurements are sketchy and sometimes even contradictory. This is related to huge spatial and temporal hydroclimate variability that underlines the importance of detailed local/regional studies on long-term hydroclimate variability.
We present main results of summer drought reconstruction for the territory of the Czech Republic (CR) spanning the last 500 years. Drought is represented by the Standardized Precipitation Evapotranspiration Index (SPEI). Summer (JJA) SPEI values calculated from various instrumental measurements from the CR and covering most of the 19th and 20th centuries represent the target data. Three different proxy archives were used for SPEI reconstruction: a) Central European monthly temperature and Czech seasonal precipitation index series derived from documentary evidence (1500–1854); b) grape harvest dates for the Czech Lands (1499−2012); c) oak (Quercus spp.) ring width chronologies from Bohemia (western part of the CR, 1500-2012). Linear regression with subsequent variance scaling were used for calibration in different time intervals covering mostly second part of the 19th and the first part of the 20th centuries. Response functions were further verified on independent proxy and target data.
The strongest hydroclimate signal was found for grape harvest dates (more that 70% of explained variance) while oak ring width series show relatively weak reconstruction skill (30% of common variance between proxy and target data). The three SPEI reconstructions show several common features in their long-term variability. Distinctly dry periods cover the first half of the 16th century, which included an extremely dry 1540, and the years since the late 1970s. Higher humidity was characteristic for the second part of the 16th century and also for the turn of the 19th and 20th centuries.