Geophysical Research Abstracts
Vol. 20, EGU2018-2686, 2018
EGU General Assembly 2018

A 1286-year hydro-climate reconstruction for the Balkan Peninsula

Lara Klippel (1), Paul J. Krusic (2), Robert Brandes (3), Claudia Hartl (1), Soumaya Belmecheri (4), Manuel Dienst (1), and Jan Esper (1)

(1) Department of Geography, Johannes Gutenberg University, Mainz, (2) Department of Geography, University of Cambridge, Cambridge, (3) Department of Geography, Friedrich-Alexander University Nürnberg-Erlangen, Erlangen, (4) Laborartory of Tree-Ring Research, University of Arizona, Tucson

Along the Balkan Peninsula, including the Pindus Mountain range in Greece, we find very old Pinus heldreichii (PIHE) stands with several individuals reaching millennial age that exhibit a strong precipitation signal in tree-ring width (TRW). For the north-eastern Mediterranean region, this work aims to develop for the first time a PIHE TRW based precipitation reconstruction extending back to the first millennium.
We present a June-July drought reconstruction based on the Standardized Precipitation Index (SPI) for the Balkan Peninsula over the period 730-2015. The reconstruction is developed from a composite TRW chronology, from a high-elevation network of 8 sites in the Pindus Mountains in northwest Greece, composed of living trees and remnant wood, and exhibiting a distinct and temporally robust precipitation response during June and July (2-month SPI r= 0.68). The spatial coverage of the reconstruction is improved by using an averaged gridded SPI data target derived from a response field that is located north of the study region. Justification for this approach includes the remoteness of instrumental data, the spatial variability of precipitation and synoptic scale circulation patterns. The driest year during the 1286 year-long period was 1660 and the wettest year was 1482. Comparison with shorter reconstructions and documentary evidence validates the new reconstruction, and provides additional insight into socioeconomic impacts and spatial patterns of extreme events. The new reconstruction reveals long-term changes in the number of extremes, including substantially less drought and pluvial events in the 20th century. Additional tests on the long-term effects of age-structure, replication and covariance changes support the heteroscedastic nature of the reconstruction.