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A 430 year record of hydroclimate variability for NE-Germany based on stable carbon and oxygen isotopes from pine and oak tree rings

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European lowlands experience many direct and indirect influences of global warming, particularly related to the hydrological cycle which lately faces increasing flood and drought events. Although important for humans and the ecosystems in which they live, little is known about the long-term spatiotemporal hydrological changes in various European regions. Here we present the first 430-year stable carbon and oxygen chronologies from tree ring cellulose in lowland oak and pine trees (P. sylvestris, Q. petraea) for the region of NE-Germany and provide annually resolved high quality hydroclimatic reconstructions. When compared to ring width data isotope data can be used with only minor adjustments to their means (besides correction of short juvenile trends) and sample depths of 4-5 trees are normally enough for a significant expressed population signal being representative for a site. For this study more than 20 individual tree ring sub-samples for isotopic analyses were obtained from well replicated tree ring chronologies built using living trees as well as historical timber originating from four different lowland sites (50-90m asl.). By a calibration and verification approach we have evaluated the response to instrumental climate and trends of atmospheric partial pressure of CO_2 (13C, only) data. While ring widths shows strong correlation to winter temperature, highly significant correlations with summer (JJA) hydroclimate conditions were found for both tree ring 13C and 18O. Strongest relationships were found with summer water vapour pressure deficit (13C and 18O) and Tmax (JJA). Although significant, relationships between 13C and climate data were found considerably weaker than climate/18O relations. On the other hand, the 13C record reveals high similarity with solar irradiance, whereas 18O does not. Based on this profound calibration the presentation will show and discuss annually resolved hydroclimatic variability of the region from our multi-centennial isotope records in comparison with the recently published “Old World Drought Atlas” derived from tree-ring width and density.