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A 911 year chronology from earlywood vessels of European oak in NE-Germany and its use for climate reconstructions

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Tree-ring based temperature reconstructions form a substantial part of the international proxy data base used to examine and model global climate variations of the last Millennium. However, most tree-ring based reconstructions are derived from study sites in the high latitudes or high altitudes paying little attention to the temperate lowlands worldwide. Thus, a large gap in the geographical coverage of climate reconstructions, in particular temperature reconstructions, from temperate low elevation sites in central Europe still exists. This motivated us to concentrate our efforts on the European oak (Quercus robur) in Northeastern Germany, combining core samples from living trees with archaeological wood. We developed a new wood anatomical chronology focusing on the earlywood vessels of Q. robur for the period 1100 to 2011. As far as we know it is by far the longest chronology based on wood anatomical parameters.
First climate growth analyses demonstrated that earlywood vessel parameters, especially average vessel area, contained climate signals which were different and more significant than those found in tree-ring widths. The strongest correlation was found with winter temperatures. This relationship was then used for a reconstruction for the period 1100 to 2011. By using only raw values, low-frequency signals could be sustained. This new reconstruction was compared with already existing temperature reconstructions and spatial field correlations were calculated. Results will be presented and discussed at EGU for the first time.