

The reconstruction of climate and hydrological changes during the last 6-7 ka in Polish territory at high time resolution is the objective of the project. The research will be based on the dendrochronological analysis (measurements of tree-ring widths) of trees buried in peat bog sediments and the complex studies of the peat depositional sequences, in which these trunks were found. The principal research hypothesis postulates the close connection of the tree dying off phases with periodical climate cooling and humidity growth during the Holocene as well as the connection of the tree encroachment (germination) over the peatlands with climate warming and drying periods. The dendrochronological analysis makes possible the reconstruction of climate changes in super-regional scale in the past, similarly to the comprehensive studies of the peat bog depositional sequences. The dendrochronological method enables the dating of the changes at yearly accuracy, however, the breaks in the recording of these changes, constrained by the accessibility of samples (subfossil trees) that are related to the periodical peatland deforestation or random tree findings (mainly due to peat extraction) are the significant disadvantages of this method. In turn, the complex studies of peat depositional sequences that include lithological analysis (loss on ignition, peat analysis, sedimentological analysis), analysis of geochemical changes, successions of pollen associations and non pollen palynomorphs (NPP) associations, assemblages of Cladocera, Diatoms, Chironomidae and plant macrofossils, as well as radiocarbon datings, which are the second element of the planned research, make possible comprehensive and continuous climate reconstruction, however, much less accurately fitted with the time, than the dendrochronological method. Therefore the use of both methods should enable the comprehensive and accurate reconstruction of climatic changes in high time accuracy. The research will include 5-6 selected peat bogs distributed along the north-south transect crossing the Polish territory, in which numerous tree (mainly pine, occasionally oak) trunks are often found. The obtained results will be correlated with the data from similar studies performed in the peatlands of Europe (Edvardsson et al., 2016b). The construction of local chronologies of the Middle and Late Holocene for pine on the basis of radiocarbon dating and correlation (tele-connection) with north-German dendrochronological standards based on the studies of peatland subfossil tree trunks (Leuschner et al., 2007), will be important aim of the project.

Up to now, such reconstructions (based on both the dendrochronological analysis and depositional sequence studies) have not been conducted in Poland, whereas similar studies were performed in Lithuania, Scandinavia, northern Germany, Great Britain and Ireland (Edvardsson et al., 2016b). In Poland similar study have been performed only for the Puścizna Wielka peat bog in the Kotlina Orawsko-Nowotarska (Orawa-Nowy Targ Basin) by the main authors of this project (Krąpiec, Margielewski et al., 2016). The results of this study motivate the realisation of similar and even more comprehensive research for the whole Polish territory. The obtained results of this research, of high accuracy should provide the data on synchronicity of climate changes (or their time shifts) along the west-east European transect, which is suggested by various depositional sequences studied in the Polish territory up to now (Starkel et al. 2013).