

Quantitative reconstruction of hydroclimatic conditions between 12700 and 6200 cal yr BP in NW Romania: a multi-proxy approach

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In this study, we applied a multi-proxy approach (testate amoebae, pollen, loss on ignition, magnetic susceptibility, radiocarbon dating) on an ombrotrophic peat sequence from NW Romania to quantitatively reconstruct the hydroclimatic changes between 12700 and 6200 cal yr BP.

The sequence started to accumulate at ca. 12700 cal yr BP in lacustrine conditions marked by sandy clay and clayey layers, followed by a Sphagnum peat interval until about 6200 cal yr BP. A hiatus, marked by a clayey layer, occurs between ca. 6200 and 440 cal yr BP, when the peat started to accumulate again. The evolution stages of the basin are also confirmed by the results of both loss on ignition and magnetic susceptibility. In order to quantitatively reconstruct the fluctuations of the depths to water table and to distinguish wetter and drier periods, we used a testate amoebae-based transfer function and the ecological preferences of the taxa communities. Between 12700 and 8900 cal yr BP, the most abundant taxa were *Cryptodifflugia oviformis* and *Difflugia pulex*, indicating relatively dry peat conditions. Vegetation dynamics during this interval were mainly characterized by the gradual expansion of dense forests dominated by *Picea abies* and thermophilous mixed oaks (*Ulmus*, *Corylus avellana*, *Quercus*, *Tilia*). Compared to the previous phase, we identified a wetter one between 8900 and 6200 cal yr BP, dominated by *Archerella flavum* and *Hyalosphenia papilio*. A progressive decline of deciduous tree taxa and dominance of *Picea abies* in the forest canopy were the significant characteristics of the regional vegetation during this wet phase. During the recent period (from about 440 cal yr BP to present), the peat started to accumulate again in dry mire conditions, characterized by the abundance of *Difflugia pulex* and *Alabasta (Nebela) militaris*. Over the past 440 years, forest distribution and composition in the area changed abruptly, mainly due to woodland harvesting and plantations.

Our quantitative reconstruction, among the few ones in Romania, is in good agreement with other palaeoenvironmental studies from NW Romania, and provides new significant information about the palaeohydrological conditions in an understudied region.

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