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Two different hydrological proxies – replicate reconstructions?

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Bog plants and testate amoebae are perhaps the most commonly used proxies to reconstruct past changes in mire surface moisture conditions. In bog environment, distribution and occurrence of these organisms is known to be mainly regulated by water table depth - in minerotrophic fens this relationship is more complex. Establishment of modern testate amoebae training sets has enabled quantitative water table (WT) reconstructions whereas plant macrofossil records have traditionally only provided qualitative information of past changes in hydrological regimes. Recent study from one Finnish bog, however, suggests that, by utilising modern calibration data set, fossil plant communities can be equally well applied for quantitative WT reconstructions. Very seldom plant macrofossil and testate amoebae data are available from the same study site and no previous evaluations exist where quantitatively reconstructed local hydrological signals are produced and compared with each other. The persisting question in palaeoecological studies is whether any reconstruction based on one single proxy will/can result in an unambiguous picture of the changes in past conditions. Here we set against two late-Holocene quantitative hydrological reconstructions, one based on variations in mire plants and the other changes in testate amoebae assemblages. By using WA-PLS- technique, we transformed species data to quantitative measures (cm) of water table and then calculated the historical WT changes as deviations of the mean value. Same procedure was applied for two different boreal bog peat sections: Kontolanrahka in Finland and Männikjärve in Estonia (only ombrotrophic part of the peat column was included).
The reconstructed WT variations during the last ca. 5000 years seem to be replicated by both proxies nearly identical. However, both study sites also include mismatching periods during which proxies suggest deviating moisture conditions when compared to mean WT value.