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Water table fluctuations and the carbon accumulation in two fens and two bogs of the James Bay lowlands in Québec, Canada

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An important work regarding northern hemisphere peatland modeling is currently being processed. One of the first steps of this work is to understand the relationship between different components of the peatland system and to analyse the way unspecific peatland systems react to water table fluctuations in terms of accumulation and decomposition that we present in this article.

We chose distinct sampling sites within a large region including boreal and subarctic ecosystems in the Bay James lowlands, northern Québec, Canada. Two fens were selected in the subarctic region and two bogs in the boreal region. These sites have different geographical, climatological and ecological features (ex. pH, nutrient availability and species compositions). Fens and bogs behaviours in matter of decomposition and accumulation thus follow different patterns. The analyses of cores for these sites allow the comparison and the quantification of the differences between subarctic and boreal sites.

Five cores were analysed against Testate amoebae every 2cm for the short cores and every 4cm for the long core. These cores are also dated with 210 Pb and 14C. Loss on ignition analysis was performed with the resolution of 1cm for each core.

The use of a transfer function with the results of the Testate amoebae analysis allowed

reconstruction of water table fluctuations from 7500 years BP to the present. This reconstruction gives us an insight into the humidity regime of the system. This information is compared to the carbon accumulation sequences to evaluate the response of the system to changes in water table position. This research shows response range between sites and quantifies the range of the water table fluctuation inducing an imbalance of the system.

This information will be of significant importance for the development of the peatland dynamics modeling.