Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10886, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10886
EGU General Assembly 2008

Long-term changes in aquatic environment, wetland dynamics and vegetation in Lake Kipojärvi area, Finnish Lapland

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In Finland, northern boreal landscape is patterned by small and shallow water bodies, peatlands and conifer-dominated forests. All these act as important storages of carbon. Changes in effective humidity have a significant effect on aquatic and wetland environments and vegetation and thus on carbon accumulation rates and patterns. A multi-proxy approach was applied to investigate long-term changes in humidity conditions and their effects on the surrounding environment in Lake Kipojärvi area (69˚18'N, 27˚32'), northeastern Finnish Lapland. The lake is located on a glasifluvial area prone to marked changes in ground water level. A sediment core of 329 cm was derived and analysed for plant macrofossils, pollen, diatoms, loss-on-ignition and C/N. The chronology is based on eight AMS radiocarbon dates.

Two major changes are evident in the sediment record: at ca. 7000 (cal. BP) recorded in plant macrofossil and diatom assemblages and at ca. 5000 cal. BP recorded in plant macrofossil, diatom, pollen and LOI records. The ca. 7000 cal BP event was probably caused by local factors (e.g. changes in the catchment area, groundwater level), whereas the ca. 5000 cal BP event by a regional one (climate).

The palaeoenvironmental reconstructions show that regional hydrological dynamics

around Lake Kipojärvi follow the generally accepted Holocene trend: a humid early Holocene, dry mid- Holocene and humid late Holocene. After the mid-Holocene dry period, a change towards cold and humid climate conditions around 5000 years ago accelerated wetland formation again. An increase of carbon accumulation in peat is clearly linked to climate phases with effective humidity and expansion of mires.

The results presented here are part of a larger combination of research activities that utilise a multidisciplinary approach, and which aim to reconstruct past changes in carbon dynamics related to Holocene development of a lake-mire continuum. The main goal is eventually to combine carbon gas measurement data with modern ecological and palaeoecological data, and to create a comprehensive landscape-scale overview of carbon pathways during the Holocene.