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Mobility and transformation of N under increasing N load in a northern peatland

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Long-term exposure to excess nitrogen (N) from atmospheric deposition and other human activities has had a range of impacts on natural ecosystems and particularly on carbon cycling in systems poor in N. Ombrotrophic, *Sphagnum*-dominated peatlands are fed by wet and dry atmospheric deposition and are very sensitive to increased atmospheric N input. However, little is currently known about the changes in the fate and mobility of N following chronic N pollution and the interactions with the carbon cycle. The launched investigation seeks to clarify the pathways of N transformations and N mobility in different pools under different long-term nutrient fertilization and plant in the Canadian bog Mer Bleue, near Ottawa. The preliminary result obtained in the summer of 2007 focused on three treatments with different N and phosphate (P) loads (0:0, 1.6:5 and 6.4: 5 g m^{-2} $yr^{-1}$for the N/P load, respectively). The dissolved inorganic N concentrations in all plots were variable and ranged from 0.02 to 266 μmol/L. Dissolved inorganic P concentrations ranged from 0.01 to 2370 μmol/L. For different N treatments, significant differences in inorganic N concentration concentrations only were observed between the control and highest N load. For whole plots, the highest inorganic N appeared around 5-10 cm below the moss surface and over the late summer, inorganic N concentrations declined. Different from nitrogen, inorganic P concentrations were significantly different among all treatments and sampling depths and sampling times. For the control plots, the highest P appeared in lower depth around 30-40cm, but for the fertilized plots, the highest values focused on the upper depth from 5-10 cm. There was no clear temporal variation in the inorganic P concentration with the sampling time. Additional ^{15}N isotopic data of plant and soil

material are in the process of being analyzed. The results obtained so far indicated that even the highest inorganic N load was assimilated by the peatland-plant system and that N was apparently still a limiting factor for primary production when P loading was high as well.