



## **Overwinter nitrogen dynamics in a subalpine seasonally snow-covered minerotrophic peatland (Vallée d'Aoste – Italy)**

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N dynamics in minerotrophic peatlands are closely tied to soil moisture, soil temperature and the organic matter (OM) quality. During winter, subalpine minerotrophic peatlands are covered by snow, that insulates the soil from harsh environmental conditions and determines therefore a favorable ambient for biological processes. Moreover, in winter the water supply is much lower than in the snow free period, resulting in an oxidative environment at the peat surface. At the snowmelt, environmental conditions in the peatland change completely in a very short time, with potential effects on N dynamics. However, biological processes occurring in peatland soils under the snow cover are little studied.

This work aims to identify the main processes involving N in a subalpine minerotrophic peatland during the snow-covered period.

Three intact soil cores were sampled from a 63-ha minerotrophic peatland in the NW Italian Alps (1650 m ASL, Val Ferret). One core was sampled prior to the snowmelt, one during the snowmelt and one at the end of the snowmelt. Ammonium, nitrate, dissolved organic nitrogen and microbial N were determined every 5 cm along the peat profiles. Ammonium and nitrate contents were quantified in the snowpack and in the surface incoming and outflowing water during the snowmelt.

The results show that the over-winter biological activity was maximum at the surface oxidative layer and resulted in a significant production of ammonium and DON within the peatland. In turn, DON and ammonium were largely lost through surface waters during the snowmelt period. In contrast, the peatland was an effective sink for the nitrate released during the snowmelt, that undergoes fast transformations in the soil.

Our results suggest that relevant biological activity occurs in peatland soils during winter, and such activity may result in large N loss through leaching.