MIF from an ecological point of view: Insights on the synergy between nitrogen deposition and past land-use in mountainous basins

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Increasing rates of atmospheric nitrogen deposition on subalpine watersheds is a recently observed and documented reality (Burns *et al* 2003, Preunkert *et al* 2003, Kirchner *et al* 2014) leading to a change of nitrogen (N) availability with consequences on critical ecosystems services (Aber *et al*, 1998, Baron *et al*, 2000, Voss *et al* 2006). Changes in land managements have also been shown to alter N biogeochemical cycle as well as composition and functioning of upland vegetation (Robson *et al* 2010, McGovern *et al* 2013, Gill *et al* 2014) but the potential synergetic effect between both phenomena is poorly understood.

Here we compare soils from three subalpine meadows with known past and current land-use, located at the Lautaret pass in the French Alps. The meadows underwent either "mown + fertilized", "mown + grazed" or "abandoned" treatment. $\Delta^{17}O$, $\delta^{15}N$, $\delta^{18}N$ of NO_3^- as well as $[NO_3^-]$, $[NH_4^+]$ and TDN were measured in several soils leachates and extracts collected from early summer 2015 throughout the end of Autumn 2015, coupled to aerosols and streams samples. We particularly focused our research on the changes in the fate of atmospheric NO_3^- that deposited based on its $\Delta^{17}O$ value. Preliminary results show less NO_3^- atm. in soils with fertilization history (ca 4% of the total N budget) compared to non-fertilized soils (ca 12% of the total N budget), highlighting different responses to N deposition and pointing out that to use MIF in an ecological perspective makes it a unique tool to further investigate transformations affecting remote ecosystems in conjunction with human activities.