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Implications of tree species for gross soil nitrate dynamics in forests

Anna-Karin Björsne (1), Per Gundersen (2), and Tobias Rütting (1)

(1) Department of Earth Sciences, University of Gothenburg, Sweden (anna-karin.bjorsne@gu.se), (2) Department of Geosciences and Natural Resource Management, University of Copenhagen, Denmark

Tree species have an impact on soil properties and nutrient cycling in forest ecosystems (Legout et al., 2016; Staelens et al., 2012). Several studies have investigated the nitrate (NO_3) dynamics in soil and compared tree species (Lovett et al., 2004; Andrianarisoa et al., 2010). However, most studies investigate only potential net nitrification (PNN), which does not show the real dynamics in the soil. In this study we have investigated gross N dynamics in a common garden experiment in Denmark. The aim of the study was to understand how gross dynamics of NO_3 processes differ in soil with different tree species. Soil from plots with Norway spruce (*Picea abies*) and beech (*Fagus sylvatica*) was sampled. ^{15}N isotopes were used to trace the activities in the soil and numerical modelling to calculate gross rates. Nitrous oxide (N_2O) losses from the incubated soils were also measured.

The preliminary results show low NO_3 concentration in *Picea* soil, while a steady nitrification and consumption of NO_3, which indicates a small NO_3 pool with fast turnover. In *Fagus* soil the NO_3 concentration is much higher, which could be explained by the low NO_3 consumption rates, leading to a build-up of NO_3 in the soil. The N_2O fluxes from *Fagus* soil are also higher, indicating larger N losses. These results show the significance of tree species and suggest what long-term effects it could have on the soil N retention.

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