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# Winter nitrogen dynamics in forest soils of the Russian Southern Taiga (Central Forest State Nature Biosphere Reserve)

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Nitrogen transformations in soil will depend mainly on the vegetation cover, that controls the organic matter quality, and on environmental factors such as precipitation and temperature. In high latitude areas, during winter, a consistent snow cover can insulate the soil from extreme air temperatures providing therefore a favorable environment for microbially-related processes.
This work aims to describe seasonal patterns of soil temperature and N dynamics at three sites differing in the vegetation cover in the Russian southern Taiga.
Sites were located in the Central Forest Reserve, 250 Km north-northwest of Moscow (56°26'-56°31 N, 32°29'-33°01'E), and were choosen according to to the different degree of strong wind disturbance allowing a different vegetation cover in three sites dominated by Norway Spruce: 1) Pure stands not disturbed by wind; 2) Stands highly disturbed by wind so that large gaps in the spruce canopy has been colonized by pioneer species and other broadleaves; 3) Stands where the disturbance occurred in smaller surfaces than (2), and where only pioneer species were present.
At each site, topsoil (0-10 cm) was incubated in buried bags during winter 2003-2004. In each sample, ammonium, nitrate, dissolved organic nitrogen (DON) and biomass nitrogen (Nmicr) were determined before and after the over-winter incubation. Topsoil temperature was monitored with dataloggers UTL-1.
At all sites, the insulating effect of the snow cover determined the decoupling between air and soil temperature, the latter remaining close to 0°C throughout the winter season and allowing therefore biological processes to be active. This resulted in a positive net ammonification, a negative net nitrification and in an increase in the DON content at all sites.
These results suggest that in these forested soils nitrate could be immobilized as DON, that in turn may substitute nitrate as labile nitrogen pool. This DON pool may be the main N form available for plant uptake at the starting of the growing season.