Project acronym: SAFE

Project title: Evaluation of Soil Activity, Functioning and green-house gas Emissions in different subarctic ecosystems

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Discipline: Earth Sciences & Environment

Station(s): Kevo Subarctic Research Station (Finland)

Changes in organic matter decomposition in C-rich ecosystems of subarctic soils may have feedback on green-house gas emissions and climate warming globally . Dynamics of C and N transformations among different land uses can be early indicators for changes in soil activity and functioning, which in turn can predict soil ability to sustain changes in plant communities and potential feedback on climate.

The present project will focus on five different ecosystems of Fennoscandian landscape (Kevo, Finland), covering the main vegetation types, land use and soil characteristics: pine stands (PS), mountain birch forests (BF), low alpine tundra (AT), mires (MI), reindeer grazing land (GL). Main objectives include i) to increase the spatial coverage of empirical data on SOM pool and GHG emissions (CO_2, CH_4, N_2O); ii) to estimate the global warming potential of different land uses; iii) evaluate biochemical processes and early indicators of soil quality and functioning.

Soil chemical and biochemical characterization will include total and dissolved organic C and N (TOC, DOC, TN, DON, respectively), inorganic N (ammonium and nitrate) microbial biomass C and N (MBC, MBN), C and N mineralization potential and enzyme activities related to the cycling of C, N, P and S. Gas sampling for CO_2, CH_4 and N_2O determination will be performed using static chambers.

 These measurements will i) provide data on CO_2, CH_4 and N_2O emissions from different land uses, identifying the prevalent processes ii) allow to evaluate the global warming potential of the different ecosystems; iv) assess the possible feedbacks for climate change.