Poster Exhibition Monday

113 - What is the potential for CO2 mitigation of forest soils?

KG II - HS 2121 (Uni Freiburg)

IUFRO17-1547 **Consequence of clear-cutting and drought on deep soil CO2 and N2O profile concentrations and surface fluxes in Brazilian eucalypt plantations.**

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Abstract: The major factors driving greenhouse gas effluxes from forest soils (substrate supply, temperature, water content) vary with soil depth. Our study aimed to assess the consequences of drought on the temporal variability of CO2 and N2O fluxes throughout very deep soil profiles in Eucalyptus grandis plantations at the end of the rotation and the first 16 months after clear-cut, in coppice. Two treatments were compared: one with 37% of throughfall excluded by plastic sheets (TE), and one without rain exclusion (WE). Every two weeks for 19 months, soil CO2 and N2O surface fluxes were measured using the closed-chamber method and the profile concentrations were measured at 7 depths in the soil down to 15.5m from in each treatment. CO2 and N2O concentrations measured in treatment TE were on average 17.3 and 5.8% lower than in treatment WE, respectively, throughout the soil profile. Across the two treatments, CO2 concentrations increased from 4102 ±2310 ppm at 10cm deep to 14480±2854 ppm at 15.5m and N2O concentrations remained roughly constant down to 15.5m. Improving our understanding of the spatiotemporal dynamics of gas concentrations in deep soil layers is an important issue for the management of tropical planted forests in the context of climate change.

greenhouse gases throughfall exclusion coppice

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IUFRO17-2641 **Effects of forest management practices on carbon stocks and carbon stock changes: Results from Germany's National Forest Soil Inventory**

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Abstract: To fulfill commitments under Article 3.4 of the Kyoto Protocol, the carbon (C) sequestration in soils can be used to offset greenhouse gas emissions. The amount of C stored in forest soils however, is dependent on soil properties, climate and anthropogenic activities. Effects of site quality (texture, pH, and cation exchange capacity), forest stand structure (tree species, forest stand type, forest stand age), management (liming), and input of N-depositions on C stocks and annual C sequestration rates were studied by structural equation modelling on National Forest Soil Inventory (NFSI) data. Beside the influence of tree species, parent material and texture on C stocks and C stock changes also we found evidence of increasing carbon stocks affected by high N depositions. Moreover, it could be shown that liming reduced C stocks in the organic layer while C was increased in the mineral soil. The results of the NFSI show that the data can serve as a tool for managing soil C in respect to differing site conditions.

C-Sequestration, Management, Liming, N-Deposition

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IUFRO17-3901 **Vulnerability of carbon storage potential with regard to tree species composition**

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Abstract: Forest ecosystems and forest cover are already affected by climate change in Hungary. Several forest types are at their lower (xeric) distribution limit, where the damages are already visible. The more sensitive beech, but even sessile oak is expected to be replaced with the less sensitive, more drought tolerant Turkey oak.
The carbon stock of soils was compared in 10 stands of sessile oak and beech. Altogether, 110 soil samples were investigated and litter samples were evaluated based on Directive of 2009/28/EC.
Soil organic carbon (SOC) and litter properties of forest stands on the same homogenous loess bedrock have shown significant differences within 1-2 km distance. The SOC values decreased in the following order by tree species: sessile oak (mixed with hornbeam) > beech > Turkey oak. Different forest tending measures and species mixture changes affected soil carbon and litter as well. The least carbon content was measured in soils of Turkey oak-sessile oak mixed stands (85.4 C t/ha on average). The highest SOC (118.3 C t/ha) was found in a highly mixed stand (silver lime-beech-red oak).
The research is supported by the "Agroclimate.2" (VKSZ_12-1-2013-0034) EU-national joint funded research project.

carbon storage, beech, sessile oak, litter, adapt

BOOK OF ABSTRACTS

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