



Experimental soil warming in a mountain forest ecosystem

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Global Warming is predicted to increase soil respiration and may thereby lead to positive feedback effects through additional CO₂ emissions from soils. Experimental soil warming is an approach to investigate whether the respiration increase lasts only short term or causes long term changes in soil CO₂ emissions. For this purpose we installed a fully automated soil warming (+ 3°C topsoil) and CO₂ flux measuring system in a mixed forest stand in the Austrian limestone Alps. In addition, soil respiration is measured with manually operated closed dynamic chambers every 2nd week throughout the snow free season. In winter, CO₂ emissions are measured on the snow surface. In several subplots the trenching of tree roots enables us to separate between the respiration of soil organisms (heterotrophic respiration) and root respiration (autotrophic respiration).

Here we present a description of the experimental set-up and first results. The preliminary results show the temporal trend of CO₂ emissions during the growing season of 2005 and first results from winter 2005/2006. The soil respiration strongly responded to the warming treatment and the net mineralisation is elevated by approximately 30%. Trenched plots showed a weaker response, indicating a prominent role of root respiration. In winter, considerable CO₂ emissions were observed even through snow packs of more than one meter thickness.