INFLUENCE OF GROUND WATER TABLE DEPTH ON METHANE EMISSIONS FROM TREE STEMS IN A FORESTRY-DRAINED FEN

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MOTIVATION

Upland forest are a sink of CH₄ (methanotrophs) Despite this, above canopy fluxes show CH₄ emissions. **Can trees be the missing source?**



Among the natural sources, the contribution of vegetation to the global CH_4 budget is the least well understood (Carmischael et al., 2014).



CAN PINE TREES BE THE MISSING SOURCE OF CH₄?



HIGH STEM CH_4 EMISSIONS FROM BIRCH IN WET CONDITIONS



Pangala et al. (2013): similar flux rates from wetland trees in Southeast Asia

FIELD EXPERIMENT: THE EFFECT OF GROUND WATER TABLE ON TREE AND SOIL CH₄ EXCHANGE





CH₄ FLUX MEASUREMENTS

June-August 2016

Manual stem chambers (UGGA, ultraportable greenhouse gas analyzer, LGR) - 5 chambers / tree species / site Automatic soil chambers (Picarro G1130)

- 6 automatic chambers / site

Stem chamber profiles3 chamber heights / tree(birch)



SIGNIFICANT SOIL UPTAKE FROM THE CONTROL AREA



SMALL STEM EMISSIONS BIRCH FROM PARTIALLY CUT FOREST





BIRCH AND SPRUCE STEM FLUXES DIFFER IN HEIGHT



Haikarainen et al., in preparation



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TAKE HOME AND FUTURE PLANS

We are not talking about tera grams of CH₄ from boreal trees, but about a significantly decreased CH₄ sink => global importance!

More measurements are needed to understand the mechanisms and drivers of CH_4 emissions from trees => for modelling

Our measurements continue including seach for methanogens and methanotrophs, and study of tree anatomical differences







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THANK YOU!



ILMATIETEEN LAITOS Meteorologiska institutet Finnish meteorological institute



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