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Uncertainties in the terms of the greenhouse gas budget
of a hemiboreal forest on a drained peatland

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The complete greenhouse gas budget of a hemiboreal forest was estimated. The 60 year old forest is situated on a drained peat site in southwestern Sweden in a little valley and is dominated by spruce.

The net ecosystem flux (NEE) was measured during 2008 by the eddy covariance method. For that, a sonic anemometer and a CO₂ gas analyser were installed above the canopy at about 25 m. Soil respiration was measured by automatic chambers which were rotated between 3 plots around the eddy covariance tower. N₂O and CH₄ fluxes were analysed by static chambers which were sampled fortnightly. All chambers were situated in the footprint area of the eddy covariance tower. Standing biomass and the annual biomass increment of the forest was calculated by applying Marklund equations. In order to estimate the impact of foliage litter on soil respiration, also litter fall was determined.

The mean annual NEE of -2.7 t C ha⁻¹ yr⁻¹ showed that the drained peat acts as a minor C sink. N₂O fluxes of 0.76 t Cequ ha⁻¹ yr⁻¹ were low compared to the net C uptake and CH₄ fluxes were negligible. However the annual biomass increment exceeded the annual NEE and also the measured CO₂ effluxes from soil respiration were very high (ca 10 t C ha⁻¹ yr⁻¹). That indicates that high uncertainties underlie the applied methods, especially the determination of the NEE by the eddy covariance method. Uncertainties of the individual terms of the GHG budget will be discussed and possible corrections presented.