



The full GHG balance over two crop rotations at an agricultural site near Gebesee, Thuringia, Germany

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Gebesee in Thuringia is the eldest cropland eddy covariance (EC) site in Europe. The site has been part of CarboEurope, NitroEurope and IMECC and has been selected to be one of the German Level 1 sites within the European research infrastructure ICOS. Continuous measurements of NEE by EC, NPP by regular harvesting, lateral in- and outputs of carbon and nitrogen as well as climatic parameters have been conducted since 2001. Automated chamber measurements of N₂O and CH₄ were conducted since 2007. Fluxes of these greenhouse gases (GHG) for the years 2001 – 2006 were calculated based on a Fuzzy Logic model calibrated by means of the chamber measurements.

In this study we present NEE, NBP and full GHG balances of over two rotation periods (2001 – 2004 and 2005 – 2009, respectively) comprising four times winter wheat, two times potatoes and one cropping period of oil seed rape, sugar beet and barley each.

The GHG balance is dominated by moderate losses of soil organic matter ($\sim 120 \pm 50$ g C m⁻² y⁻¹) and by N₂O emissions of about 0.17 g N₂O-N m⁻² y⁻¹ (50 g C-eq m⁻² y⁻¹). The on-site emissions of GHG balance about 43 % of the harvested carbon.