



Seasonal and interannual Variability of the net Ecosystem Exchange of CO₂ of a Grassland Area

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There is great international concern over the increase of atmospheric carbon dioxide and its effect on vegetation and climate, and vice versa. Many studies on this issue are only based on climate model calculations or indirect satellite observations. In contrast we present a 12-year study (1994 – 2005) on the net ecosystem exchange of carbon dioxide (*NEE*) of a grassland area in the centre of The Netherlands, on the basis of direct flux observations during 4 years (2002 – 2005) and an *insitu* process model evaluated with the data applied to 8 years (1994 – 2001). The net carbon dioxide fluxes consist of two opposite components; the uptake via assimilation and release via soil and plant respiration. It appears that nearly year-round the assimilation term dominates, which indicates an accumulation of carbon dioxide. The mean value for the 12 year period is a net carbon uptake of about 3 tonnes per hectare, but with a strong seasonal and interannual variability depending on weather and precipitation. This variability can severely hamper the quantification and projection of carbon storage or release in present and future climates.

The present study is part of the national Dutch Bsik-programme which started in 2005. The aim of the Bsik-programme is to study the Dutch *Climate* Changes and its Effects on Spatial Planning.