The FLUXPAT experimental campaign:

An integrative approach to characterize patterns in the atmospheric boundary layer

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Abstract

The increasing resolution of regional atmospheric models requires not only a more detailed knowledge of the spatial distribution of e.g. water vapor sources at the earth surface, but also necessitates a deeper knowledge on how non-homogeneous source distributions at the surface influence the fluxes between the atmosphere and the terrestrial bio-geosphere. The focus of the Transregional Collaborative Research Center TR32 is to characterize such inhomogeneities or patterns in the soil-vegetation-atmosphere system over a wide range of scales. The FLUXPAT campaigns within the TR32 investigates experimentally how fluxes from the soil and from crop plants develop into turbulent fluxes in the surface layer and further in the atmospheric boundary layer.

Several campaigns were carried out in the '*Jülicher Börde*', an agricultural intensively used region in West Germany close to Aachen. Fluxes of water vapor and CO_2 were measured at different levels of the system. Flux chambers were used to determine soil respiration and its variability within single crop fields and between different fields. Plant activity was measured with different methods (gas exchange, fluorescence etc.) to investigate its variability between different plants within one crop and between different crops. Turbulent fluxes of momentum, water vapor and CO_2 were determined with the eddy covariance technique above two representative crops and analyzed for differences between them. Airborne measurements of turbulent fluxes and concentrations were performed at different heights between 80m and 400m above the measuring site. This data will be used to identify and characterize organized structures in the boundary layer and to identify the mechanistic connection to the observed patterns at the ground. This contribution provides an overview over the different measurements and first results.