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The FLUXPAT experiment: Integrative characterization of patterns in the atmospheric boundary layer

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We describe the FLUXPAT experiments conducted within the SFB/TR 32 "Pattern in Soil-Vegetation-Atmosphere Systems: Monitoring, Modelling, and Data Assimilation". The goal of this research collaborative is to characterize the role of patterns within the soil-vegetation-atmosphere-system from the very small scales of pores in the order of 1E-6 m in the soil to the meso-scale of atmospheric circulation in the order of 1E5 m. The FLUXPAT experiments investigate the role of patterns between soil, vegetation and the atmospheric boundary layer. The basic idea is to characterize the scales and magnitudes of patterns at the surface and observe how they propagate as internal boundary layers into the atmosphere. Fields with two main crops of the region are investigated for the fluxes of CO2 and H2O at different levels of the system. Soil respiration is measured at many points in two respective fields to get an idea about temporal and spatial variability. The crops are characterized for their plant structural but also spatio-temporal variations of physiological parameters and fluxes are derived at the leaf and at the canopy level. Micrometeorological measurements add turbulent fluxes at the canopy level and meteorological controlling parameters. An airplane flying at low levels above the measuring site measures concentrations and fluxes in the atmosphere. We present some exemplary first results from measurements at different levels of the system and give an outlook about the further investigation of the data.