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Soil moisture variability and the impact of soil moisture on the energy balance and PBL structure

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Soil moisture is one of the key parameters which control the transformation of net radiation into turbulent heat and moisture fluxes. The turbulent fluxes influence the moisture and heat supply of the boundary layer, which in turn are important parameters for dry and moist convection. In the Sudanian zone convective precipitation contributes dominantly to the annual precipitation. However, the prediction of convection is still a great challenge for weather forecast models.

During SOP 1 (pre-onset of monsoon) and 2 (monsoon phase) of the AMMA campaign in summer 2006 soil moisture measurements (GPR, TDR, FDR) were performed at different depths and different sites along a line of 1 km. Additionally, the energy balance and precipitation were measured. The observations are used to determine the spatial variability of soil moisture, which proves to be quite significant, and to estimate the moisture budget. The data also served for the initialisation of SVAT models. Results from the measurements and modelling of SOP 1 and 2 are presented which include soil moisture balance, the energy balance, related PBL conditions from several periods with passages of MCS with heavy precipitation.