SEtHyS_Savannah : a three source land surface model applied to sahelian landscape

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The AMMA international program aims to improve our knowledge and understanding of the West African Monsoon (WAM) and its variability with an emphasis on timescales from daily to interannual. For this purpose, modelling and instrumental activities are carried out at different scales over West Africa since 2005. The work presented here, was done in the framework of this program. In order to better understand the land surface processes over the sahelian region and their coupling with the atmosphere, a Soil-Vegetation-Atmosphere-Transfer (SVAT) model was developed with the aim to spatialise it at regional scale using remote sensing data. Based on the SEtHyS SVAT model (Coudert et al., 2006), the SEtHyS_Savannah model was developed to model heat and water fluxes over semi-arid landscapes. The model handle 2 vegetation layers (low and high covers) standing above the soil. The soil water transfers were revised in order to better simulate sahelians covers and semi-arid climate hydrology. Therefore a mulch representation included in a three-layers soil stratification was chosen. The model has been applied at local scale on the 2 instrumented sites of the AMMA Niger supersite : a fallow and a millet fields equipped with surface fluxes and soil moisture measurements. Remote sensing derived LAI were used as input variables. The validation has been done on a yearly basis. The results in terms of surface fluxes and surface parameters (soil moisture and surface temperature) are presented.