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ASSIMILATION OF VGT/SPOT NDVI DATA IN A SIMPLE LAND SURFACE MODEL TO MONITOR VEGETATION AND WATER FLUXES DYNAMICS OVER THE GOURMA REGION (MALI)

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Land surface processes over Sahel play a significant role in modulating the African Monsoon dynamics through water and energy fluxes between the surface and the atmosphere. Among surface characteristics, vegetation conditions are of prime importance for both local population that relies on subsistence agriculture and water fluxes monitoring. This paper presents an original method to control the trajectory of a simple land surface model devoted to Sahelian grasslands (the "STEP" model). The Normalised Difference Vegetation Index (NDVI) measured by the VEGETATION sensor on board SPOT 4 and 5 satellite proved its reliability with regards to previous available data sets (from AVHRR sensors series). The STEP model is coupled to the radiative transfer model SAIL allowing for a direct assimilation of the NDVI index. The simulated LAI is constrained thanks to a parameter identification method based on an evolution strategies algorithm. Simulated above-ground herbaceous mass after data assimilation are compared to ground measurements performed on 15 sites spread over the meso-scale window of the AMMA project (Gourma region, Mali) during the 1999-2004 period. Simulated water fluxes and soil moisture profile are analysed. Finally, an uncertainty analysis to climatic forcing variables is performed.