



Representing agro-pastoral sahelian ecosystems in the global land surface model ORCHIDEE: in situ validation and comparison between croplands and grasslands.

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In an effort to improve the representation of tropical agro-ecosystems in the global terrestrial biosphere model ORCHIDEE, recent model developments have been made in order to better account for tropical croplands and savannahs.

Here we compare the simulations performed with these new versions with in situ data from the AMMA-Niger Wankama “local site”. Indeed, since 2005, soil moisture, vegetation (biomass, LAI) and eddy-covariance flux tower measurements have been conducted at Wankama over both a millet and a fallow site, resulting in a unique dataset of carbon and energy fluxes over two different agricultural land-cover types and for several climatically-contrasted years in the sahelian zone.

Thus, we performed on-site simulations with ORCHIDEE forced with local meteorological data over 2005-2007: we assess the ability of the two land-use specific versions of the model (croplands and grasslands) to capture the respective observed characteristics of vegetation, water balance and energy fluxes over time scales ranging from diurnal to inter-annual. We also discuss the ability of the model to account for the relative differences between crops and fallow in terms of land/atmosphere interactions - for on a large scale these differences may feed back on the atmosphere as grasslands are gradually converted to croplands. We finally attempt to discriminate between the validated features and deficiencies that are most likely to be site-specific and the ones that may impair the representation of the contrast between these two land cover types at larger scale.