



Evaluation and improvement of the representation of sahelian savannah in the vegetation model ORCHIDEE

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The objective of the work that we conduct consists in the improvement of the quantification of surface processes that impact on carbon, sensible and latent heat fluxes over sahelian savannah and steppes landscapes. An approach using the process-based vegetation model ORCHIDEE and site level measurements build up a preliminary for a spatialised analysis of CO₂, H₂O and energy fluxes at different scales. After having improved the description of the phenology of the grasses and of physical processes such as aerodynamical conductance, we have conducted a calibration of key physiological parameters at Agoufou, Mali, a site established in the framework of the African Monsoon Multidisciplinary Analyses project. A preliminary validation has been conducted on a contrasted fallow site in Wankama, Niger. At both sites, leaf area index assessments, biomass samplings, energy fluxes, soil water and temperature profiles are available over multiple years. One notable achievement of this study is that it gives us the opportunity to validate for the first time a new physically-based distributed soil hydrology scheme whilst the dynamic phenology module of ORCHIDEE is activated. It also enables us to identify some of the way to address the deficiencies inherent to a modeling approach which is not individual-based and doesn't take into account all aspects of the competition between the grass and shrub layers. The impact of the modifications introduced in the model are eventually analysed at larger scale over the Sahel.