Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10987, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10987
EGU General Assembly 2008

Carbon and water exchange measurements from leaf to canopy scale in a semi-arid ecosystem (Mali)

V. Le Dantec (1) C. Damesin (2) J. Bennie (3) D. Epron (4) L. Mercado (3) J. Seghieri (5) F. Baup (1) P. Hiernaux (1) L. Kergoat (1) F. Timouk (1) E. Mougin (1)

(1) Centre d'Etudes Spatiales de la Biosphère, Toulouse, France, (2) Ecologie Systématique et Evolution, Orsay, France, (3) Centre for Ecology and Hydrology, Wallingford, U.K., (4) Ecologie et Ecophysiologie forestières, Nancy, France, (5) HydroSciences, IRD, Montpellier and Bamako, France and Mali

An improved understanding of plant and soil processes is critical to predict land surface-atmosphere water exchanges, especially in semi-arid environments, where knowledge is still severely lacking. For this purpose, studies of plant and soil functioning have been conducted in coordinating and in co-localising instruments and experimentations in the Agoufou site, which is located in a semi-arid region (Gourma, Mali). Intensives field campaigns have been conducted in the context of the Enhanced Observing period of AMMA. They are part of a complete land surface processes observing system. The objectives were i) to improve understanding and modelling of mechanisms and ii) to collect data to parameterise and to validate SVAT models at the local scale.

Vegetation in this area is sparse and mainly composed of different functional types of annual species. Thus, to collect data covering this large spectrum of process diversity in space (species composition) and in time (seasonal variability), we used a multi-scale approach. During maximal plant growing period (July-August), intensive gas exchange measurements (CO_2, H_2O) have been performed from leaf level (light response curves of photosynthesis, comparison of maximal assimilation among species, daily courses of stomatal conductance) to canopy scale (net CO_2 exchange using canopy chamber, soil respiration related to soil temperature, soil moisture and eddy covariance data).

We will discuss the effects of plant diversity on carbon and water fluxes at the footprint scale, the seasonal variability of net C exchanges due to plant phenology and "short-time" pulses of CO_2 from after rain events.

These datasets from field campaigns were used either for parameterisation, either for validation of the plant-soil model STEP (Sahelian and Transpiration Evaporation and Production Model), developed by Mougin et al (1995).