Geophysical Research Abstracts
Vol. 13, EGU2011-10184, 2011
EGU General Assembly 2011
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# Surface recovering after a rain event: an AMMA inter-site study

Fabienne Lohou (1), Bernard Cappelaere (2), Jean-Martial Cohard (3), Jerome Demarty (1), Sylvie Galle (3), Françoise Guichard (4), Laurent Kergoat (5), David Ramier (2,6), Christopher Taylor (7), and Frank Timouk (5)

(1) Laboratoire d'Aérologie, Toulouse, France (lohf@aero.obs-mip.fr), (2) Laboratoire HydroSciences Montpellier, France, (3) Laboratoire d'étude des Transferts en Hydrologie et Environnement, Grenoble, France, (4) Centre National de Recherches Météorologiques/GAME, Toulouse, France, (5) Laboratoire des Mécanismes et Transferts en Géologie, Toulouse, France, (6) Center for Ecology and Hydrology, Wallingford, UK, (7) DREIF/Laboratoire Régional de l'Ouest Parisien, Trappes, France

The soil and the vegetation in west Africa go through very contrasted stages along the year: from dry and stressed during the dry season, to wet and well water-fed during the monsoon. The transition from one stage to another can be very different according to surface properties, vegetation type, rainfall amount and rain event frequency. The soil and vegetation capability to retain water or to evaporate after a rain event has a strong impact on atmospheric low-layer characteristics, either dynamic or thermodynamic. In fact, soil and vegetation state exert a strong control on the surface energy balance and the sensible and latent heat fluxes partitioning. The latter affects, among others, the moistening of the low layer and the vertical development of the planetary boundary layer. Beyond the importance of these low boundary conditions for the monsoon system, the results of this study provide diagnostics which are suitable for the evaluation of the GCM at these time scales.

With its 3 meso-sites (Mali, Niger, Benin) where the surface/atmosphere exchanges and the soil and vegetation characteristics have been measured during several years, the AMMA campaign allows a thorough study of the evolution of the surface fluxes response to the rain event along the seasonal cycle. In this study, fallow and forest sites in Benin, fallow and millet sites in Niger and a grass-land site in Mali, all implemented with rapid-measurements of humidity, temperature and wind components, are used to estimate the sensible and latent heat fluxes with the Eddy-covariance method. The amplitude of the surface response (in term of evaporative fraction) and surface recovering period, meaning the period after which the last rainfall does not affect the surface any more, are analyzed according to the rain fall, the soil moisture and the LAI along the year.