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# Simulation of the 2006 West African Monsoon with the WRF model: comparison with AMMA database and sensitivity to the surface albedo.

E. Flaounas (1), S. Bastin (1), Serge Janicot (2), Christophe Lavaysse (1), Olivier Bock (1), Franck Chopin (3)

1. CNRS/IPSL/SA, UPMC, Paris, France
2. IRD/IPSL/LOCEAN, UPMC, Paris, France
3. CNRS/IPSL/LMD, Ecole polytechnique, Palaiseau, France

(flaounas@aero.jussieu.fr / Fax: +33 (0)144273776)

This study is part of the WP1.1.1 of the AMMA project whose aim is to examine the causes of variability and trends of the West African Monsoon (WAM). The method is to use numerical models and perform sensitivity experiments to improve our understanding on the role of the different forcings (oceans, continental surface, large scale activity). In this study, we use regional simulations to investigate the relative importance of the numerous involved mechanisms on the contrasted annual cycles of 2005 and 2006 and we first focus on the role of the continental surface. For this purpose, the Weather Research and Forecasting model (WRF) is used to represent the atmospheric circulation over western Africa –with a resolution of 40km, a domain that covers the West and North Africa, the Guinean Gulf, part of the Atlantic ocean (western limit is located at 28.3˚W) and of the Mediterranean sea (up to 39˚N), for a period of seven months (from March to September). We first simulate year 2006 so that we can evaluate the model's performance by comparison with the wide range of observations collected during the Special Observing period (SOP). In particular we bear our attention on the different characteristic aspects of the dynamics of the WAM such as the Intertropical Discontinuity (ITD), the sahelian heat low dynamics and the WAM onset and the evaluation of the volume and the location of precipitations.

In the work presented here, we performed two simulations with a similar configuration of the WRF model but with different albedo values to investigate the impact of the surface albedo representation in the model: in the first simulation, we used the default configuration of WRF in which the variability of albedo throughout the domain is very poor (with ground values ranging from 0.1 to 0.2) and in bad agreement with satellite observations. In the second simulation, the variability is more important, in particular the south-north gradient and the values are more realistic according to satellite observations (reaching a maximum of 0.45 for the Saharan area). From the simulations' outputs, we are in place to determine whether the spatial distribution of albedo is a key element in the monsoon jump mechanism, as suggested by Ramel et al. (1992).