Geophysical Research Abstracts,
Vol. 11, EGU2009-10363, 2009
EGU General Assembly 2009

Evaluation of the impact of surface albedo, sea surface temperature and orography in the simulation of the monsoon onset in 2006

E. FLAOUNAS (1), S. BASTIN (1), and S. JANICOT (2)

(1) IPSL, Service d'aeronomie, PARIS, France (flaounas@aero.jussieu.fr), (2) IPSL, LOCEAN, PARIS, France

The aim of this study is to improve our understanding on the role of the different forcings (oceans, continental surface, large scale activity) on the West African Monsoon (WAM) onset. We thus use a regional model to simulate the WAM circulation of year 2006 so that we can evaluate the model's performance by comparison with observations collected during the Special Observation Period of the AMMA experiment. In particular we bear our attention on the timing of the WAM onset (abrupt displacement of the ITCZ from 5°N to 10°N approximately) and the evaluation of the volume and the location of precipitations. The criterium used to detect the onset is the date when a significant decrease of convection lasting a few days is observed, followed by a northerly displacement of the ITCZ and the associated precipitations. 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).
In the work presented here, we performed four simulations with a similar configuration of the WRF model but with different albedo, SST and orography values in order to investigate the impact of these elements in the model. Results show that although, the changes done for the sensitivity tests have a striking impact on the WAM dynamics, such as the depth and the seasonal cycle of the Sahelian Heat Low and the Intertropical Discontinuity, the onset date is not subject to any change. The precipitation regime and the ITCZ location are different from one simulation to another but the phase of decreased convection show no temporal flexibility. So, according to this study, albedo and orography are not proved to be key elements to the onset mechanisms. Effects of high SST values in the Guinean Gulf are more important by deranging the ITCZ localization and intensity and furthermore showing a constant rain band over the coastal area at 5°N.