Geophysical Research Abstracts,
Vol. 10, EGU2008-A-07649, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-07649
EGU General Assembly 2008

Calipso observations and mesoscale modelling on dust emissions and transport over the Sahel associated with the West African Monsoon Inter Tropical Discontinuity

D. BOU KARAM (1), J. CUESTA (2), C. FLAMANT (1,2), J. PELON (1,3), P. TULET (3), J.-P. CHABOUREAU (4)

(1) Universite Pierre et Marie Curie, Service d'Aeronomie, Institut Pierre-Simon Laplace, CNRS, Paris, France, (2) Ecole Polytechnique, Laboratoire de Meteorologie Dynamique, Institut Pierre-Simon Laplace, CNRS, Palaiseau, France, (3) Centre National de Recherches Meteorologiques (Meteo-France/CNRS), Toulouse, France, (4) Universite de Toulouse, Laboratoire d'Aerologie, Toulouse, France, (diana@aero.jussieu.fr, Fax: 0033 1 44 27 37 76, Phone: 0033 1 44 27 48 72)

Over West Africa, the convergence line between monsoon and harmattan flows is called Intertropical Discontinuity (ITD). The annual northward displacements of the ITD over the West African dust hot-spots, associated to pressure changes in the harmattan and the monsoon air masses on both sides of it, is correlated with the peak of dust emissions in this region.

In this study, dust emissions and transport associated with the ITD, are investigated using the space borne Could-Aerosol LIdar Orthogonal Polarization (CALIOP) on board the Cloud-Aerosol and Infrared Pathfinder Satellite Observations (CALIPSO) satellite, the Ozone Monitoring Instrument (OMI) on board the Aura as well as the Meteosat Second Generation (MSG) Spinning Enhanced Visible and Infra-Red Imager (SEVIRI) images produced from a combination of three infrared channels, namely channel 10 (12μm), channel 9 (10.8 μm) and channel 7 (8.7μm) and are analysed by mean of numerical simulations using the non hydrostatic mesoscale model MesoNH.

Large dust uptakes were observed to be associated with the newly identified mechanism of dust emissions over the Sahel detailed in Bou Karam et al., (submitted to

QJRMS) in which high wind speed and turbulence at the leading edge of the monsoon flow are involved in dust emissions in this area during nighttimes. These dust plumes are seen to be transported at high altitudes southward above the monsoon flow. The position and the vertical structure of dust plumes illustrated by the CALIPSO vertical profiles are well reproduced by the model.

The simulated Aerosol Optical Depth and dust concentration fields are in good agreement with the SEVIRI observations that allowed the following of the spatio-temporal evolution of these dust plumes.