Geophysical Research Abstracts,
Vol. 11, EGU2009-12718, 2009
EGU General Assembly 2009

Diurnal cycle of precipitation at Dakar in the model LMDZ

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ABSTRACT

Most diurnal cycles of precipitation are not well represented in general circulation models (GCMs). It is a concern for climate modeling because of the key role of clouds in the radiative and water budgets. The diurnal phasing of deep convection is a challenge,
the pact of deep convection being generally simulated too early in the day (Guichard et
al., 2004). Thus a "thermal plume model" - a mass flux scheme combined with a classical
diffusive approach - originally developed to represent turbulent transport in the dry
convective boundary layer, is extented to the representation of cloud processes. The
modified parametrization was validated in a 1D configuration against results of large eddy simulations (Rio, 2008). It is here validated in a 3D configuration against in situ
precipitation measurements of the AMMA campaign. A data analysis of the diurnal cycle of precipitation as measured by the pluviometers net in the Dakar area is performed. The improvement of the diurnal cyle of convection in the GCM is demonstrated, and the involved processes are analysed.