



## **Mesoscale modelling of dust emissions over the Sahel associated with the West African Monsoon intertropical discontinuity**

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The night time dust emission in the intertropical discontinuity region associated with the turbulence at the leading edge of the monsoon flow is a newly identified mechanism for dust production over West Africa (Bou Karam et al., submitted to QJRMS). We present regional model simulations of dust emission event by this mechanism. We use, for validation, observations data carried out during July 2006 in the framework of the Special Observing Period of the African Monsoon Multidisciplinary Analysis project. A dust emission and transport module embedded in the non hydrostatic mesoscale model (MesoNH) is used in this study. Ground based measurements for meteorological parameters and aerosol optical properties at several locations over West Africa are used to validate the simulations.

By comparing the model to airborne lidars observations during the 7 July 2006 mission day, the vertical structure of dust plumes as well as the position of the intertropical front and the thermodynamic characteristics of the monsoon flow is well captured by the model. An estimation of the mass flux as well as the radiative forcing of dust lifted by this mechanism is also given.

The simulated diurnal cycle for dust emissions associated with the Inter Tropical Discontinuity (ITD) dynamics over Niger shows that during nighttime dust lofting is gen-

erated by the northward displacement of the front crossing over the dust hot spots, while during daytime, dust emissions take place mainly to the north of the ITD. In both cases dust lifted is mixed during the day within the planetary boundary layer and be transported southward above the monsoon layer.