



Parametrization of Convective Processes in the Atmospheric Boundary Layer and Representation of the Diurnal Cycle of Clouds in Global Climate Models

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Some of the processes observed in the atmospheric convective boundary layer can not be represented by a traditional diffusivity model: high vertical speeds, mesoscale convective cells or upgradient turbulent fluxes. In this study a mass flux parametrization of the convective boundary layer, taking into account the existence of thermals [1], is used coupled with a cloud scheme [2].

In order to evaluate different versions of this parametrization, the Global Climate Model developed in the 'Laboratoire de Météorologie Dynamique', LMDZ, is used with a stretched grid around the SIRTa, a ground-based atmospheric observatory for cloud and aerosol research situated in the neighbourhood of Paris. Lidar and Radar observations give data such as boundary layer height, condensation level and cloud cover. Results are compared to observations on days with high convective activity, focusing on the representation of the diurnal cycle of boundary layer cumuli.

[1] Hourdin & al., J. Atmos. Sci., 59, 1105-1123, 2002

[2] Bony & al., J. Atmos. Sci., 58:3158-3183, 2001