



Seasonal Cycle of the mineral dust content over Western Africa simulated by Chimere Dust model

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Regarding the spatial and temporal variability of mineral dust emissions, modelling is a relevant method to quantify dust emissions and their evolution at different time scales, i.e. from an individual event to the interannual time scale. Specific parameterisations of the various terms of the mineral dust cycle have been implemented in the Chimere Dust model: emission fluxes, atmospheric transport, dry and wet deposition. In particular the mineral dust emission model developed in LISA allows the on-line simulations of the dust emissions fluxes and the associated size-distribution. The aerosol size distribution is represented by an up to 20 bins scheme, each size range being transported and deposited as an independent tracer. We present simulations of the mineral dust content over Western Africa during the year 2006. We used the ECMWF (European Center for Medium-Range Weather Forecasts) meteorological fields and several spatial resolutions from $1^\circ \times 1^\circ$ to $0.25^\circ \times 0.25^\circ$ on specific emissions area such as Bodélé depression.

We also choose to focus on the year 2006 as it was an intensive period of observation for AMMA international program (African monsoon multidisciplinary Analysis). We compare model fields obtained with Chimeredust and data of the Sahelian Dust transect stations: M'bour (sénégal), Cinzana (Mali), Banizoumbou (Niger). These stations are ground-based stations operating since 2005 along a zonal axis at 13°N , providing aerosol optical depth, PM10 surface mass concentration, Vertical profiles by a one-wavelength micro-lidar (coll. ISAC-CNR/ENEA, Italy), wet and dry deposition. Encouraging comparisons are also done with vertical profiles of the french ATR-42 plane passing over Banizoumbou.

Occurrences and intensity of dust events are quite well reproduced, even if some events are still missed. The model reproduces the seasonal cycle, with a maximum in the spring and a minimum at the end of the rainy season.