Temporal variability of mineral dust deposition flux over West Africa monitored by the AMMA Sahelian Dust Transect

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The "Sahelian belt" is known as a region where mineral dust content is among the highest in the world. In the framework of the AMMA international Program, a transect of 3 ground based stations, the "Sahelian Dust Transect", has been deployed in order to obtain quantitative information on the mineral dust content over the Sahel. The three stations : Banizoumbou (Niger), Cinzana (Mali) and M'Bour (Senegal) are aligned at 13.5°N along the east-west main pathway of the Saharan and Sahelian dust toward the Atlantic Ocean. The SDT provide a set of aerosol measurements for the determination of the mineral dust budget at the regional scale: column-integrated aerosol optical depth from ERONET, PM10 surface mass concentration and total and wet deposition.

The main characteristics of the deposition fluxes content over West Africa are investigated from January 2006 to December 2008. Average annual deposition flux is of the order of 100 g.m-2. It ranges from 87 g.m-2 to 127 g.m-2 from Senegal to Niger, consistently with the west to East gradient of atmospheric concentrations of mineral dust. The annual and seasonal variability of total deposition is controlled by the contribution of wet deposition during the rainy season. At time scales ranging from the annual to the event scale, the measured deposition fluxes are consistent with previous measurements available close to or downwind from the Sahara and Sahel.

This data set offers a unique opportunity to test how 3D dust model are able to reproduce the deposition fluxes close to source regions and in articular their spatial distribution and the relative weight of wet and dry deposition to the total flux.

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