



Size distribution of emitted dust in Morocco

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Atmospheric mineral dust constitutes one of the most important aerosols in terms of mass in the global atmosphere. Dust impacts on the Earth's climate are closely related to its physical and chemical properties, i.e. its particle size distribution (PSD), mineralogical composition, particle shape, and mixing state. Despite the knowledge acquired on dust properties over the last decades, understanding of dust particle size and composition at emission is still incomplete, partly due to the scarcity of coincident PSD measurements for emitted dust and the parent soil. In this context, the ERC project FRAGMENT (FRontiers in dust minerAloGical coMposition and its Effects upoN climaTe) conducts dust field campaigns in different regions of the world, obtaining a detailed characterization of the soil, airborne particles and meteorology. The first measurement campaign took place in September 2019 at "El Bour", a dry lake located in the Draa River Basin at the edge of the Sahara desert in Morocco.

Here, we provide an overview of the atmospheric conditions, the dynamical parameters characterizing the structure of the near-surface boundary layer and the wind erosion events of varying intensity that occurred during the measurement period. We explore the temporal variability of: (1) the size-resolved dust concentrations measured by two optical particle counters placed at 1.8 and 3.5 m height, (2) the associated diffusive dust flux calculated through the gradient method, (3) the measured saltation flux and (4) the sandblasting efficiency. We also evaluate the relationships of these variables with friction velocity and atmospheric stability. Finally, we analyse the PSDs of emitted dust concentrations and diffusive flux, and investigate their variability under different meteorological conditions.