



The summer 2012 Saharan dust season in the western Mediterranean with focus on the intense event of late June during the Pre-ChArMEx campaign

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Saharan dust is an usual aerosol over the Mediterranean basin that contributes to the high average aerosol load during summer in the western Mediterranean marine environment. Satellite monitoring shows that dust events were numerous during summer 2012. Even though most of the transport of dust particles occurs in altitude, as shown by surface lidars and airborne data, dust events significantly impact surface PM₁₀ concentrations even in urban traffic type of air quality monitoring stations, and background stations are needed to assess the contribution of desert dust.

During the pre-ChArMEx field campaign and associated field campaigns TRAQA and VESSAER in the north-western Mediterranean, a large scale African dust event occurred in late June-early July with optical depth levels in the visible up to 0.5-0.7 rather unusual in that area according to long time remote sensing AERONET or satellite series. We have performed measurements in the dust plume for several days with a particularly large variety of both ground-based and airborne (from sounding balloons, an aircraft and an ultra-light aircraft) remote sensing and in situ instruments. In addition to satellite aerosol products including MSG/SEVIRI, which provides the spatial distribution of the aerosol optical depth over the basin up to 4 times per hour, POLDER and CALIOP, this yields a complete set of unusual quantitative constraints for model simulations of this event, combining data on aerosol optical depth, vertical distribution, particle size distribution, chemical, optical and microphysical properties. We shall provide an overview of the data set that includes original measurements of the vertical profile of the aerosol size distribution with a new small balloon borne OPC called LOAC (Light Optical Aerosol Counter) showing large dust particles (up to 30 μm in diameter) within a thick dust layer between 1 and 5 km above south-eastern France, and original network measurement of weekly dust deposition with a new autonomous deposition sampler called CARAGA (Collecteur Automatique de Retombées Atmosphériques à Grande Autonomie). We shall also present preliminary comparisons of observations with a set of 3D RCM and transport model simulations of dust transport with ALADIN, Meso NH, RegCM, CHIMERE and MOCAGE, and first estimates of the regional and local dust direct SW and LW radiative forcing.

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