



Characterization of Saharan dust ageing over the western Mediterranean Basin during a multi-intrusion event in June 2013 in the framework of the ADRIMED/ChArMEx campaign

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In the framework of the ChArMEx (Chemistry-Aerosol Mediterranean Experiment, <http://charmex.lsce.ipl.fr/>) initiative, a field campaign took place in the western Mediterranean Basin between 10 June and 5 July 2013 within the ADRIMED (Aerosol Direct Radiative Impact on the regional climate in the MEDiterranean region) project. The scientific objectives of the campaign were the characterization of the different aerosol types found over the Mediterranean Sea and the calculation of their direct radiative forcing (column closure and regional scale). Two super-sites (Ersa, Corsica Island, France, and Lampedusa Island, Italy) were equipped with a complete set of instruments to measure in-situ aerosol physical, chemical and optical properties, as well as aerosol mixing state and vertical distribution and radiative fluxes. Four secondary sites were operated in Granada (Spain), Menorca Island (Spain), Rome (Italy) and Lecce (Italy). All sites were equipped with AERONET sunphotometers. The ground observations were supported by airborne measurements including 2 SAFIRE aircraft (ATR-42 equipped with in situ measurements (10 June – 5 July) and Falcon-20 (17 June – 5 July) with the LNG aerosol lidar) and sounding and drifting balloons launched by CNES from Menorca Island and carrying the LOAC particle counter/sizer (16 June – 4 July). Satellite products from MODIS, MSG/SEVIRI and CALIOP provided additional observations.

In several occasions corresponding to aerosol loads of different types, the aircraft flew near EARLINET/ACTRIS (European Aerosol Research Lidar Network / Aerosols, Clouds, and Trace gases Research InfraStructure Network, <http://www.actris.net/>) lidar stations. This work is focused on a moderate multi-intrusion Saharan dust event occurred over the western Mediterranean Basin (WMB) during the period 14 – 27 June. The dust plumes were detected by the EARLINET stations of Granada, Barcelona, Naples, Potenza, Lecce and Serra la Nave (Sicily) and by the ChArMEx lidar stations of Menorca, Ersa and Lampedusa. The dust origin is chronologically identified from northern Morocco, center Algeria and center Tunisia. The multi-intrusion aspect of the event results in aerosol optical depth peaks higher in the eastern part of the WMB (maximum of 0.45 at 440 nm detected in Lecce) than in the western part of the WMB where the event starts (maximum of 0.29 at 440 nm detected in Granada). The spatio-temporal evolution of the plumes during their transport and the differences due to the different dust origins are investigated with multi-wavelength ground-based lidars, sun-photometers, the airborne lidar and balloon-borne aerosol counters.

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