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Main results on aerosol-radiation interactions from ChArMEx and ADRIMED projects.

Marc Mallet (1), François Dulac (2), and the ChArMEx/ADRIMED team

(1) CNRS CNRM-Meteo France, Toulouse, France (marc.mallet@meteo.fr), (2) Laboratoire des Sciences du Climat et de l'Environnement (LSCE), UMR 8212 CEA-CNRS-UVSQ, Institut Pierre-Simon Laplace, Gif-sur-Yvette, 91190, France

The Chemistry-Aerosol Mediterranean Experiment (ChArMEx; http://charmex.lsce.ipsl.fr) is a collaborative research program federating international activities to investigate Mediterranean regional chemistry-climate interactions. A special observing period (SOP-1a) including intensive airborne measurements was performed in the framework of the Aerosol Direct Radiative Impact on the regional climate in the MEDiterranean region (ADRIMED) project during the Mediterranean dry season over the western and central Mediterranean basins, with a focus on aerosol-radiation measurements and their modeling. The SOP-1a took place from 11 June to 5 July 2013. Airborne measurements were made by both the ATR-42 and F-20 French research aircraft operated from Sardinia (Italy) and instrumented for in situ and remote-sensing measurements, respectively, and by sounding and drifting balloons, launched in Minorca. The experimental setup also involved several ground-based measurement sites on islands including two ground-based reference stations in Corsica and Lampedusa and secondary monitoring sites in Minorca and Sicily. Additional measurements including lidar profiling were also performed on alert during aircraft operations at EARLINET/ACTRIS stations at Granada and Barcelona in Spain, and in southern Italy. Remote-sensing aerosol products from satellites (MSG/SEVIRI, MODIS) and from the AERONET/PHOTONS network were also used. Dedicated meso-scale and regional modeling experiments were performed in relation to this observational effort.

We provide here an overview of the different surface and aircraft observations deployed during the ChArMEx/ADRIMED period and of associated modeling studies together with an analysis of the synoptic conditions that determined the aerosol emission and transport.