



Preliminary analysis of columnar aerosol properties in relation to surface PM measurements in the DAMOCLES 2006 field campaign (Spain)

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The DAMOCLES network is a Spanish thematic network, started in 2004, whose main objective is the establishment of a link among the different groups that perform research on atmospheric aerosols in Spain. Under the DAMOCLES coordination, a field campaign was held in summer 2006 at the INTA installations (El Arenosillo, Huelva) for the intercomparison of different kind of instruments devoted to in-situ and columnar aerosol measurement.

During this field campaign, two daily meteorological soundings were carried out at noon and midnight for characterization of the atmospheric condition. A plane was also flown by the National Institute of Aerospace Technology (INTA) to carry airborne sensors for measuring different atmospheric factors: meteorological parameters, ozone with a 2BTech analyzer, and aerosol particle size distributions in the range (0.01-2) microns, by using a PCASP probe.

The columnar aerosol properties were measured by seven CIMEL CE318 sun photometers. For in situ aerosol characterization, high volume collectors (DIGITEL and MCV) with DIGITEL for PM10, PM2.5 and PM1 measurement were used, with two cascade impactors for particulate matter measurement in 7-8 granulometric fractions. For the PM10, PM2.5 and PM1 measurement, quartz fibre filters of 150 mm diameter were adapted. Other in situ deployed instruments were a Scanning Mobility Particle Sizer (SMPS, Model 3936), two Aerodynamic Particle Sizer (APS Model 3321) and one Grimm Spectrometer (Model #190). For characterization of the aerosol scattering at ground level, three integrating nephelometers TSI-3563 were used. For the columnar profiling we deployed five LIDAR instruments.

In this study we have related the columnar aerosol measurements retrieved with one CE318 sun photometer to the surface PM measurements, mainly in some interesting situations where nearby pollution sources were influencing the local atmosphere. For the sun photometric analysis, we have applied the EuroSkyRad package (ESR.pack) to the data from the CE318 serial number #430, from the University of Valencia at Burjassot (Spain). This package is a quite new open source package composed of scripts and inversion algorithms for the processing of both Prede POM and Cimel CE318 instruments.

The chemical analysis and source apportionment of the PM data was previously presented. Mean levels recorded during the campaign reached 23, 15 and 12 $\mu\text{g m}^{-3}$ for PM10, PM2.5 and PM1, respectively. These values fell in the usual range of rural background sites of Southern Spain. Two kind of PM episodes were detected: short episodes recorded at midnight to early morning or at midday, coinciding with transitory hours when the land-sea breeze changed and stagnation conditions occurred, with pollution coming from the Huelva area; and a longer PM episode starting on 30th June 2006 and ending at the end of 1st July 2006, probably associated with the mid to long range transport of polluted air masses from Western Iberia and the Gulf of Cadiz.