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Optical characteristics of biomass burning and desert dust over the Western Mediterranean during summer: a case study

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The present contribution reports on the aerosol vertical distributions in Barcelona (Spain) which were obtained when very high aerosol concentrations were observed on summer 2012. An EARLINET lidar system and AERONET sunphotometer located in Barcelona performed intensive measurements in the framework of the ACTRIS (Aerosols, Clouds, and Trace gases Research InfraStructure Network) project. The data that were collected allow the characterization of the optical properties of the aerosols in this region, benefiting from the synergy of various remote sensing instruments.

Due to its location in the Mediterranean basin, Barcelona metropolitan area is influenced by two major aerosol source regions: Europe and the Western Mediterranean Basin, as a major source of anthropogenic pollutants, and North Africa, as a principal source of natural dust. As a result, the composition of atmospheric aerosols in Barcelona station is a mixing of aerosols.

During the period between 1 - 2 July, AOD reached high values ($\sim$ 0.5). In addition to anthropogenic local contributions, other aerosols long-range transported were also detected. Between 1 – 3 July, strong forest fires occurred in Alicante where advected to Barcelona area. On the other hand, between 28th June and 1st July, the northeastern Iberian Peninsula was affected by the intrusion of Saharan dust. The presence of Saharan dust was successfully forecasted by the BSC-DREAM8b dust regional model. MODIS and AERONET data, as well as air-mass backward trajectories confirmed the existence of biomass burning and desert dust in the case examined. Desert dust was detected between 2 and 4 km (above sea level, a.s.l) with maximum dust concentrations at $\sim$ 4 km a.s.l on 1st June. On the other hand, favourable meteorological conditions made possible that biomass burning from Alicante was southern advected to Barcelona during the study period.