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# Analysis of the integrated and angular aerosol scattering coefficients at Valencia (Spain)

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Atmospheric aerosols are an essential climate forcing agent and play a critical role in global climate change. Its effect on Earth's radiative budget is determined by their optical properties, it is, the scattering and absorption coefficients. The ability of the aerosol to interact with solar radiation is dependent upon particle size and composition, both related to variation in sources. By scattering the solar radiation, the aerosols contribute to the cooling of the underlying atmosphere and the surface; by absorbing the solar radiation, they contribute to the heating of the atmosphere. Different techniques have been developed to measure and characterize different properties of the aerosols in the column and at surface level. At surface level, nephelometers have predominantly been used to measure light scattering properties.

In 2017, two nephelometers Aurora 3000, manufactured by Ecotech Company, where deployed at the Burjassot campus from the University of Valencia, for the determination of the total scattering coefficients in wet and dry conditions. In 2019, an Ecotech Aurora 4000 polar nephelometer was added in the Burjassot site for the determination of the scattering coefficients at different angle intervals. The Aurora 4000 model has been specifically designed with a backscatter shutter that can be set any angle between 10º and 90º at up to 17 different positions. It then has the ability to improve the determination of the aerosol asymmetry parameter. Measurements of the total scattering coefficient at ambient conditions, performed with a TSI 3563 nephelometer without sample conditioning, are also available since 2006.

The Burjassot measurement site is located in the suburbs of Valencia city, with a total population of about 1 million inhabitants in its metropolitan area, and it is representative of urban conditions. It is mainly affected by anthropogenic aerosols originated by traffic, and sporadically regional agricultural or forest fires, but also by natural aerosols of marine (Mediterranean Sea) and desert (Saharan) origin.

In this work, we analyze the total and angular measurements of the scattering coefficient obtained with the total and polar Aurora nephelometers at Burjassot site, including its temporal variability and trends. Specific scenarios characterized by different atmospheric conditions are also studied in order to relate in situ measurements with the composition of atmospheric aerosols from

different sources (Saharan dust, forest fires, traffic, etc).

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