

Multi-instrumental approach to aerosol size distribution characterization

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This study compares aerosol size distributions obtained using different in-situ techniques supported by advanced numerical procedures. Size distribution is an aerosol property that influences light scattering by aerosols, and in that way aerosols' climate effect, as well as the extent of aerosol penetration into the respiratory tract and thus the health effects of aerosols. Moreover, in-situ retrieval will be compared with the lowermost part of an aerosol properties profile.

A tandem of instruments containing an Aerodynamic Particle Sizer and Scanning Mobility Particle Sizer spectrometers will be used to characterize aerosol size distribution from 10 nm to 20 μm . Measurements taken at the suburban measurement site of Raciborz in the highly industrialized region of Silesia will be used. These measurements will be used as a benchmark for GRASP retrievals based on data from a collocated nephelometer. Measurements of aerosol scattering integrated with 18 different angular ranges are obtained with Aurora 4000 polar nephelometer and processed by GRASP software package.

Mentioned in-situ measurements will be compared to the lowermost point of the aerosol profile obtained by the synergy of the photometer and ceilometer. Data collected by collocated CIMEL Sun-photometer and Lufht's CHM-15k Nimbus ceilometer were previously successfully processed by GRASP algorithm [1] to obtain profiles of fine and coarse aerosols. This comparison is starting point of a new holistic approach to the characterization of aerosol profile by in-situ, remote sensing, and UAV (Unmanned Aerial Vehicle) measurements.

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Keywords: retrieval algorithm, aerosol, clouds, global circulation model

References

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