

Analysis of Particle Size Distribution in The City of Cali Colombia, Using ELPI+ and LIDAR

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Abstract

In this work, we are investigating the characteristics of the particle size distribution in the ambient air for several of Colombia's major cities. Lidar at 532 nm was used to measure the optical variable AOD (aerosol optical depth) and the ELPI+ low pressure electric impactor to measure the concentration and distribution of particle number, with measurements of column aerosol concentration used as a final step to assess the accuracy of PM_{2.5} estimation. According to the ELPI+ results, nanoparticles (6–27 nm) made up the majority of the particulate matter, accounting for an average of 78.95% of the particle number distribution. According to statistical analysis, the mean PM₁ and PM_{2.5} concentrations were 3163.22 cm³ and 2588.30 cm³, respectively, with no significant percentage of coarse particulate matter (PM₁₀ to PM_{2.5}). The LIDAR results showed maximum values of 0.653, 0.828, 0.858, and 0.891 AOD for the days evaluated. An analysis of the accuracy of PM_{2.5} estimation by LIDAR is expected to be carried out, as is the multi-technique characterization of particulate matter in the study cities.

Early Career Scientist

YES, I am an early career scientist.

IGAC Activities

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