



## Aerosol particle properties in a South American megacity

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The subtropical city of Buenos Aires is located on the western shore of Río de la Plata, on the southeastern coast of Argentina. It is the second largest metropolitan area in South America, with a population density of around 14 thousand people per km<sup>2</sup>. When all 24 counties of the Great Buenos Aires Metropolitan Area are included it is the third-largest conurbation in Latin America, with a population of around fifteen million inhabitants. The generalized worldwide trend to concentrate human activities in urban regions that continue to expand in area, threatens the local and regional environment. Air pollution in the Buenos Aires airshed is due to local sources (mainly the mobile sources, followed by the electric power plants and some industries) and to distant sources (like biomass burning, dust, marine aerosols and occasionally volcanic ash) whose products arrive in the city area due to the regional transport patterns. Previous research suggests that ambient aerosol particle concentrations should be considered an air quality problem.

A field campaign was conducted in Buenos Aires in 2011 in order to characterize some aerosol particles properties measured for the first time in the city. Measurements began in mid- April and continued until December. The field observations were done in a collaborative effort between the Universities of Mexico (UNAM) and Buenos Aires (UBA). A suite of instruments was installed on the roof of an UBA laboratory and classroom buildings (34.54° S, 58.44° W) at an altitude of approximately 30 m above sea level. The measurements included the number concentration of condensation nuclei (CN) larger than approximately 50 nm, the mass concentration of particle-bound polycyclic aromatic hydrocarbons (PPAH), the scattering (Bscat) and absorption (Babs) coefficients at 550 nm and the vertical profiles of backscattered light from aerosols at a wavelength of 910 nm using a ceilometer. In addition, a weather station recorded the meteorological state of the atmosphere. During the campaign, the eruption of the Puyehue-Cordon Caulle complex in Southern Chile took place and the plume passed several times over the measurement site. Backward trajectories and the analysis of the prevailing synoptic environment was used in order to relate the measurements with the air mass history and to detect the regional contributions to the aerosol load in the city.

Strong correlations between the CN, PPAH and black carbon suggest that the majority of particles come from combustion (vehicular traffic and the nearby power plant). The higher values were observed during the cold season, with maximum CN number concentration reaching 55000 cm<sup>-3</sup>, and the most frequent concentrations varying from 800 cm<sup>-3</sup> to 11000 cm<sup>-3</sup>. The highest recorded concentrations of PPAH and BC were 500 ng m<sup>-3</sup> and 400 ng m<sup>-3</sup>, respectively.