

TRACE ELEMENTS AND OXY-PAH IN SOUTH AMERICAN URBAN SITES: SÃO PAULO, LIMA E MEDELLIN

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Objectives: The South American Emissions Megacities and Climate (SAEMC) project focused on the investigation of air composition and its impact on climate over South American cities; among them: São Paulo (SPA, Brazil), Lima (LIM, Peru) and Medellin (MED, Colombia). São Paulo site is the largest South American city, with 19 million inhabitants, Lima is a coastal city that counts with 8 million inhabitants and Medellin is a 2.5 million inhabitants city, located in a valley. **Methodology:** Particulate matter (PM₁₀) was collected in quartz fiber filters with a high volume sampler, the intensive sampling was carried out in June, 2010. Oxy-PAHs were determined by gas chromatography and trace elements were determined by inductively coupled plasma mass spectrometry.

Results: The quinone fraction of PAHs have been attributed to toxic effects to health; 9,10-anthraquinone (AQ) is classified as possibly carcinogenic to humans (2B)^{1,2}. 9,10-Anthraquinone (AQ) and 9-fluorenone (FO) can originate from both primary and secondary sources³. AQ had higher concentrations in MED, while FO had higher concentrations in LIM. Benz[a]anthracene-7,12-dione (BaAQ) concentrations were higher in SPA; BaAQ is attributed to the ozonation of precursor PAH⁴. Concentrations of potassium were higher in SPA and MED (805, 873 and 402 ng m⁻³, for SPA, MED and LIM, respectively); suggesting higher biomass burning sources. Zinc, often associated with industrial emissions and traffic (tyre abrasion), was higher in SPA and lower in LIM (350, 205 and 164 ng m⁻³, for SPA, MED and LIM, respectively). Copper (wear emissions) was also higher in SPA (123, 42 and 17 ng m⁻³ for SPA, MED and LIM, respectively). Iron was higher in SPA and attributed to soil resuspension and road dust (1761, 632 and 740 ng m⁻³ for SPA, MED and LIM, respectively). **Conclusions:** Vehicular and biomass burning sources appeared to be more important for both SPA and MED sites.

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