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# PROGRAM AND ABSTRACTS



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## MULTI ISOTOPE (Pb, Cu AND Zn) ANALYSIS AND SOURCE APPORTIONMENT IN URBAN AEROSOL FROM SÃO PAULO CITY, BRAZIL.

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Multi-isotope approach (Pb, Zn, Cu, Sr, C, Hg, Nd) has been used as a powerful tool to assess environmental systems and identify pollutant sources. Urban aerosol pollution is an important health public problem in megacities and recent studies have applied Pb and Zn isotopes to identify aerosol sources. Up to date, no Cu isotope measurements in urban aerosol have been published, however some studies, using elemental concentrations and receptor modeling, have associated Cu as indicator of vehicular emission. In order to analyze Pb, Cu and Zn isotopes in a single aerosol membrane sample, a new combined separation procedure was developed. Aerosol membrane was digested with a mixture of $HF/HNO_3$ 2:1, the solution is then dried and redissolved in 7M HCl. This solution was passed through AG-MP1 resin to separate Cu and Zn from the matrix containing Pb. Lead was purified with AG1-X8 resin while Cu was submitted to a second purification using AG-MP1 resin. Cu and Zn isotopic compositions were determined by a Neptune MC-ICP-MS, while Pb isotopes were measured by ID-TIMS. A set of fourteen aerosol samples, containing fine and coarse particles in each sample were analyzed. The results showed $^{206}Pb/^{207}Pb$ between 1.166 and 1.245, while $\delta^{66}Zn_{IRMM}$ values range from -0.99 to +0.14 ‰. The Cu isotopic composition $\delta^{65}Cu_{NIST}$ varied from +0.01 to +0.21 ‰. In order to evaluate contributions of urban anthropogenic sources to aerosol samples, Pb and Zn isotopic composition of the main sources were compared with our results. Most of the samples showed $^{206}Pb/^{207}Pb$ (1.166 to 1.195) and $\delta^{66}Zn_{IRMM}$ (-0.46 to +0.21‰) similar to isotopic sources associated with vehicular traffic, represented by vehicular emissions ($^{206}Pb/^{207}Pb$ = 1.157 to 1.189), gasoline ($^{206}Pb/^{207}Pb$ = 1.147 to 1.192; $\delta^{66}Zn_{IRMM}$ = -0.77 to +0.44‰), road dust ($^{206}Pb/^{207}Pb$ = 1.137 to 1.177) and tyres ($\delta^{66}Zn_{IRMM}$ = -0.02‰). Only four samples presented more radiogenic signatures in $^{206}Pb/^{207}Pb$ (1.199 – 1.246) related to those of aerosol from industrial areas ($^{206}Pb/^{207}Pb$ > 1.22), and which are characterized by light Zn isotope signatures ($\delta^{66}Zn_{IRMM}$ < -0.98‰). Therefore, our data suggest that vehicular traffic represent the major contribution for urban aerosol in São Paulo city with minor contribution from the industrial areas.