

6.193 ELEMENTAL ANALYSIS OF FINE ATMOSPHERIC AEROSOLS FROM A SITE IN MEXICO CITY.

Early Career Scientist

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Abstract:

Atmospheric aerosols in the Metropolitan Area of Mexico City (MAMC) still represent a major problem for air quality. Although the Atmospheric Monitoring System (also known as RAMA) measures the mass concentration of fine aerosols, it is necessary to obtain more information regarding the composition and the origin of these aerosols. It has been found that elemental analyses of aerosol samples, covering as many elements as possible, are a valuable method to identify several emitting sources.

As a consequence, a study was performed in the Winter of the year 2015 in a Southwestern site in the MAMC (Ciudad Universitaria), collecting PM_{2.5} samples with a MiniVol sampler. This work is part of wider study focused to fully characterize aerosols at this site. An X-ray Fluorescence (XRF) spectrometer (based on an Rh X-ray tube) built to analyze environmental samples [1], was used to analyze the sample set. A total of 16 elements (Al, Si, P, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, and Pb) were detected in most samples. Mean concentrations are presented and compared to previous studies carried out in the MAMC [2].

The calculation of enrichment factors relative to Si were useful to find out which elements have a crustal or a human origin. Additionally, cluster analysis applied to the elemental concentration results in a possible identification of emitting sources. Moreover, possible relationships to organic and elemental carbon contents in the aerosols are suggested.

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[1] A.A. Espinosa, J. Reyes-Herrera, J. Miranda, F. Mercado, M.A. Veytia, M. Cuautle, and J.I. Cruz, Instrumentation Science and Technology 40 (2012) 603-617.

[2] R.V. Díaz, J. López-Monroy, J. Miranda, and A.A. Espinosa, Nucl. Instrum. and Meth. B 318 (2014) 135-138.