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Levels and composition of PM in the Mexico City metropolitan area: the MILAGRO campaign

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Due to the negative health impact caused by atmospheric particulate matter a great deal of environmental and scientific attention is being paid to PM speciation and source apportionment studies. Particle air pollution in urban agglomerations comes mostly from anthropogenic sources, mainly traffic, industrial processes, energy production, domestic and residential emissions, construction, but also a minor contribution from natural sources may be expected (bioaerosols, soil dust, marine aerosol). Once emitted into the atmosphere, this complex mixture of pollutants may be transformed as a function of the ambient conditions and the interaction among the different PM components, and also between PM components and gaseous pollutants. This system is especially complex in mega-cities due to the large emission volumes of PM components and gaseous precursors, the high variability and broad distribution of emission sources, and the possible long range transport of the polluted air masses. Speciation studies help to identify major sources of PM components with the end objective of applying plans and programs for PM pollution abatement. In this framework, concentration levels and compositions of particulate matter (PM2.5, PM10 and PST) have been measured simultaneously at two sites in the Mexico City Metropolitan Area (T0 and CENICA) and at one site 50 km away from Mexico City (T1) during an intensive measuring and sampling campaign (1st to 31st March 2006) of PM integrated into the MILAGRO project. Spatial and time (day and night) variations have been analysed. Contrary to what was expected, coarse fraction levels were higher at T1 than CENICA and T0, due to a high load of crustal component. Moreover, crustal levels were higher during daytime than during nights at all sites, while some secondary compounds (sulphate and ammonium) presented an opposite trend. Regarding trace elements, levels

of Pb, Zn and Cd were higher at T0 than at CENICA and T1, probably due to traffic contribution. Arsenic levels did not show a clear pattern, being alternatively higher at CENICA and T0. Two intense episodes of Hg particulare have been recorded, more noticeable at T1 than at the urban sites. V and Ni showed the same evolution at all sites and fractions, being alternatively higher at the three sites. In order to identify the sources of the studied pollutants, a statistical analysis has been carried out.