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Measurements of volatile organic compounds in Southeastern Mexico City, 1998 - 2007

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Air pollution is one of the principal environmental problems in Megacities. In Mexico City, very high ozone concentrations, a result of precursors like nitrogen oxides (NOx) and volatile organic compounds (VOCs), are thought to cause severe health effects on a population of about 20 million. In addition, there are several air toxics among VOCs that threaten public health. Therefore, measuring VOCs is crucial for the definition of air quality management control strategies.

In this paper we report a time series of VOC measurements, carried out in Southeastern Mexico City from 1998 to 2007. Over 26,000 grab samples were taken at different hours of the day and stations of the year, which permits a detailed analysis of changes and tendencies of VOC species, in particular the air toxics benzene, toluene and xylene (BTX). Totally, 13 species have been quantified by GC-FID.

A significant decreasing tendency has been observed in VOC species, especially in BTX. The reductions were 0.1 ppbV per year for benzene and toluene. o-xylene decreased with an average rate of 0.3 ppbV per year. For the morning hours, when emissions are strongest, the reductions were even more notable (0.2, 1.3 and 0.5 ppbV per year, respectively). With this, the annual average for benzene concentrations is below the standard of 1.5 ppbV established by the European Community. The observed reductions can be attributed to an improving vehicle technology, in spite of an increasing vehicular fleet.

Furthermore, in this paper we discuss total VOC data in comparison with simultaneous NOx measurements, and its implications on photochemical air pollution and validation of the emissions inventory.