

1.116 Evaluating the spatial heterogeneity of anthropogenic VOC in São Paulo with other urban worldwide observations: a global comparison of source emission composition.

Early Career Scientist

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Abstract:

Volatile organic compounds (VOCs) are important pollutants present in urban environments which affect air quality producing other secondary pollutants (ozone and SOA). Field observations of VOCs can provide relevant information for a better prediction of their products, likewise for building up emission inventories, which strongly depend on an accurate knowledge of their primary emissions.

Several studies developed in northern mid-latitude megacities estimated the urban emission ratios (ER) of several VOCs relative to CO and acetylene from field observations. These calculated ER were successfully used as constraints to evaluate emission inventories, and to assess the spatial variability by comparison to other cities worldwide. In this work we used detailed databases of speciated VOCs collected in contrasted urban environments worldwide. VOCs measurements have been collected during intensive field campaigns in Europe (Paris, London, Istanbul), North America (Los Angeles), Asia (Beijing, Beirut, Mecca), and very recently in São Paulo Megacity (MASP-Brazil) and West Africa cities. Data can either encompass source emission measurements and ambient concentrations. In particular, MASP with more than 20 million inhabitants and 7 million vehicles, is among the world's most populous cities; where ethanol is widely used by flex-fuel vehicles. Even though some short campaigns were carried out, little is known about VOCs emission and composition due to limited temporal and spatial measurements. Since 2012, continuous observations were performed in MASP. A first multi-spatial insight of VOCs composition revealed a similar profile compared to those of other megacities, while they present higher mean values suggesting VOCs distribution is not affected by the large use of ethanol.

The global comparison were accomplished in order to elucidate agreements and discrepancies in MASP VOCs profiles and, therefore, understanding spatial heterogeneity of VOCs composition. For that, exploratory tools were applied and ER were estimated and

compared with the values derived from other urban sites.