



## **Examination of VOCs Sources in Urban Air of Bursa**

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Ambient concentrations of C<sub>6</sub>-C<sub>12</sub> volatile organic compounds (VOCs) were measured at an urban station, which is located at a highly populated area in the city of Bursa, Turkey. The measurements were hourly and performed using an on-line gas chromatograph (Agilent Model 6890, gas chromatograph equipped with flame ionization detectors and coupled to a Unity Model thermal desorption and a Markes Air Server sampling system). The GC was calibrated using calibration gas mixture which includes 148 VOCs and obtained from Environment Canada. Data were generated during two measurement campaigns, which were performed between September 14 - November 6, 2005 and March 17 - May 10, 2006. A total 1667 ambient VOC chromatograms were generated during the two campaigns and 51 VOCs were determined in each chromatogram.

In two campaigns, ambient air was found to be rich in benzene, toluene, ethylbenzene and xylenes (BTEX). Geometric Mean benzene, toluene, ethylbenzene, m,p-xylene and o-xylene concentrations were 1.47, 12.26, 1.1, 2.35, 0.52  $\mu\text{g m}^{-3}$ , respectively in the first campaign and 3.36, 14.63, 1.56, 4.37, 0.75  $\mu\text{g m}^{-3}$  respectively, in the second campaign. Higher concentrations of VOCs in the summer campaign are attributed to high elevation of the station. The station is on a slope with an altitude of approximately 300 m. In the winter the mixing height is occasionally lower than 300 m separating sampling point from emissions at the bulk of the city. In such cases the VOC concentrations are determined by emissions around the station. However, during summer mixing height is well above 300 m and the station is under direct influence of all emissions in the city.

Major sources affecting VOC levels at the sampling location were investigated using

positive matrix factorization (PMF). Traffic, particularly light duty vehicles appear to be the most important sources in Bursa. Heavy dusty vehicles are characterized by the presence of heavy VOCs. The contribution of heavy duty traffic on the measured concentrations of VOCs was smaller than that of light duty vehicles, probably due to dominance of the light duty vehicles in the close proximity of the station. As the station is relatively difficult-to-reach point in the city, and away from most of the main arteries, heavy trucks and busses cannot easily pass through narrow roads around the station.