



Volatile Organic Compound Analysis in Istanbul

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One of the major problems of megacities is air pollution. Therefore, investigations of air quality are increasing and supported by many institutions in recent years. Air pollution in Istanbul contains many components that originate from a wide range of industrial, heating, motor vehicle, and natural emissions sources. VOC, originating mainly from automobile exhaust, secondhand smoke and building materials, are one of these compounds containing some thousands of chemicals. In spite of the risks to human health, relatively little is known about the levels of VOC in Istanbul.

In this study, ambient air quality measurements of 32 VOCs including hydrocarbons, halogenated hydrocarbons and carbonyls were conducted in Kağıthane (Golden Horn) region in Istanbul during the winter season of 2011 in order to develop the necessary scientific framework for the subsequent developments. Kağıthane creek valley is the source part of the Golden Horn and one of the most polluted locations in Istanbul due to its topographical form and pollutant sources in the region. In this valley, horizontal and vertical atmospheric motions are very weak. The target compounds most commonly found were benzene, toluene, xylene and ethyl benzene. Concentrations of total hydrocarbons ranged between 1.0 and 10.0 parts per billion, by volume (ppbv). Ambient air levels of halogenated hydrocarbons appeared to exhibit unique spatial variations and no single factor seemed to explain trends for this group of compounds. N-octane, 3-methylheptane, n-nonane, 2,3,4-trimethylpentane and n-hexane parameters ranged between 3 ppbv and maximum value of 10 ppbv. The other VOC parameters are measured below 3 ppbv value. At participating urban locations for the year of data considered, levels of carbonyls were higher than the level of the other organic compound groups, suggesting that emissions from motor vehicles and photochemical reactions strongly influence ambient air concentrations of carbonyls. Of the most prevalent carbonyls, formaldehyde and acetaldehyde were the dominant compounds, ranging from 1.5–7.4 ppbv for formaldehyde, to 0.8–2.7 ppbv for acetaldehyde.

Keywords: Air quality, Volatile Organic Compounds (VOC), industry, meteorology, urban, Kağıthane, İstanbul.

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