



PM10 air quality variations in urbanized areas and industrialized creek valley in Istanbul

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Abstract

In this paper we investigate the PM10 pollution episodes associated with emissions and meteorological situations in ten urban areas in both Asian and European sides and industrialized Kağıthane creek valley of the northeast part of the old city Istanbul. These ten stations represent the air quality in different locations of Istanbul. Six of them are at the European side (Aksaray, Alibeyköy, Beşiktaş, Esenler, Sarıyer, and Yenibosna) and four of them are at the Asian side of Istanbul (Kadıköy, Kartal, Üsküdar, and Ümraniye). Furthermore, Kağıthane valley is the source part of the Golden Horn and forming the natural harbor that has sheltered in the Golden Horn waterway, named in antiquity because of its shape is an estuary that receives water from Kağıthane and Alibeyköy creek. The Kağıthane creek region is one of the most polluted locations in Istanbul due to its topographical form and pollutant sources in the region. In spite of the risks to human health, relatively little is known about the levels of air pollutants in the region. Kartal, Esenler and Alibeyköy, urban high-traffic and industrial areas, were seriously polluted by PM10. The air pollution episodes are often associated with high pressure conditions. Generally, high pressure systems can cause light winds and stable atmospheric conditions. To illustrate the influences of meteorological characteristics and emission sources on PM10, we defined the episodic periods in the citywide including industrialized creek valley. The local meteorological conditions and synoptic meteorological patterns affecting the PM10 levels in the city were classified before the episode, during episode and after episode. Kartal at the Asian side and Kağıthane creek region are the most polluted locations in Istanbul due to its topographical form and pollutant sources in the region. In both locations EU's daily average PM10 air quality standards were exceeded approximately throughout the year (The current period of PM10 measurements in industrialized creek region is nine months). Besides, in order to account for possible long range transport of particles in Istanbul, the association of the PM10 levels with backwards trajectories was examined.

Keywords: Air quality, PM10, industry, meteorology, urban, Kağıthane, İstanbul.

Acknowledgment: This work was part of the Turkish Scientific and Technical Research Council Project No: 109Y132.