



## Identification of local air pollution sources in a significantly weak dispersion region of Istanbul: A case study for Kagithane, Golden-Horn

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Identification of local air pollution sources in weak dispersion regions of cities is a primary step in air pollution control. Kağıthane valley is at the upstream section of the Golden Horn estuary in western Istanbul. The estuary receives waters from Kağıthane and Alibeyköy creeks. In recent decades, Kağıthane district creek valley at the north-east quarters of the old city of Istanbul has gradually become urbanized and industrialized. Today, the region frequently experiences air pollution problems due to emissions from nearby industries and road traffic, often aggravated by unfavourable meteorological conditions

In this study, sources and factors affecting the air quality were investigated in Kagithane (Golden Horn) creek valley for the purpose of developing necessary scientific framework for integrated air pollution mitigation and control strategies. For this purpose, hourly PM10, CO, NO, NO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub> and O<sub>3</sub> concentrations at the monitoring station in Kagithane creek valley and Alibeyköy, a neighboring site to the valley, were analyzed and compared during a measurement period between March 2010 and October 2011. The relationships between pollutant concentrations and meteorological parameters (temperature, wind speed) were examined (April - October 2011). The analyses revealed that both sites experienced poor air quality, while a large number of exceedances of daily PM10 and NO<sub>2</sub> concentrations were observed by box-whiskers plots. These measurements were also compared with the measurements obtained from nine other monitored sites in Istanbul.

It was found that PM10 and NO<sub>2</sub> significantly exceeded the EU air quality standards. PM10 concentration levels varied from 12.0 to 328.5  $\mu\text{g}/\text{m}^3$ , while NO<sub>2</sub> levels varied from 4.3 to 135.7  $\mu\text{g}/\text{m}^3$ . Daily distributions of PM10 showed that wednesdays and sundays were the most polluted days with levels of 106  $\mu\text{g}/\text{m}^3$  and 104.5  $\mu\text{g}/\text{m}^3$ , respectively. Due to uncontrolled industrial activities during weekends, sundays generally recorded the highest PM10 values. Saturdays and thursdays were the least polluted days with levels of 94 and 94.5  $\mu\text{g}/\text{m}^3$ . The monthly distributions of PM10 and NO<sub>2</sub> concentrations were also high, above 76.5  $\mu\text{g}/\text{m}^3$  and 50  $\mu\text{g}/\text{m}^3$  (except summer months), respectively.

Keywords: Air quality, PM10, NO<sub>2</sub>, meteorology, urban, Kagithane, Istanbul.

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