Geophysical Research Abstracts
Vol. 20, EGU2018-11668, 2018
EGU General Assembly 2018

Characteristics of Air Toxics in Industrial City – A Case Study in Kaohsiung, Taiwan.

Tsai Jiun-Horng (1), Lee Chun-Yi (2), and Hung Tzu-Lin (3)

(1) National Cheng-Kung University, Department of Environmental Engineering, Taiwan (jhtsai@mail.ncku.edu.tw), (2) National Cheng-Kung University, Department of Environmental Engineering, Taiwan (cceq10604cyl@gmail.com), (3) National Cheng-Kung University, Department of Environmental Engineering, Taiwan (cceq10602zlh@gmail.com)

This study investigated the characteristics of air toxics in an industrial city, Kaohsiung city, by field monitoring, emission estimation and air quality simulation. There are 2.8 million people in the city and more than 70% of population are concentrated in the plain with the area of 300 km2. The environmental burden comes from 3 petrochemical industrial complex, 1 steel and iron industrial complex, 3 power plants, 21.7 million gasoline vehicles and motorcycles, 31 thousand diesel trucks, and one port.
The target pollutants in this study include Benzene, Toluene, Xylene, ethylbenzene, formaldehyde, 1,3-butadiene, and n-hexane which were on the candidate air toxic list proposed by Taiwan EPA. Emission estimation of these target pollutants had been conducted by emission factors and activity data. Field measurement of airborne toxics had been conducted by canister-GC/MS method at different sites. Spatial variation of target pollutant concentration had been simulated by modelling work with AERMOD.
Field measurement results indicated that the diurnal pattern of target air toxics were strongly influenced by mobile sources emission. The benzene concentrations were 0.2 – 5.4 ppbv. The concentration of these air toxics in summer were higher than those in winter. Emission estimation of each toxic pollutant indicated toxic-VOCs were contributed by mobile sources, industrial processes, and activities in the port in the downtown area. However, mobile source was the dominant one in rural area. BTEX were dominantly emitted from gasoline vehicles.
Air toxic concentration simulation indicated that hot-zone was found in the vicinity of industrial complex and port area. Air toxic emissions from industrial process and operation in port area caused the hot-zone clearly. However, the emission from truck, passenger cars, and motorcycles caused high concentration along highway and main street both in downtown and rural areas. Control the emissions from industrial complex and activity in the port could improve the air toxic hot-zone issue in the city. Control the emission from gasoline vehicles, both motorcycles and passenger cars, and diesel trucks could improve the air toxic potential impact throughout the industrial city.