1.105 Pollution characteristics and source apportionment of volatile organic compounds in different functional zones in a coastal city of Southeast China.

Early Career Scientist

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Abstract:

Volatile organic compounds (VOCs) are the key precursors of tropospheric ozone and the contributors to the formation of secondary organic aerosol. VOCs from six functional zones in a coastal city, China, were collected by Summa canisters and determined by gas chromatography-mass spectrometer (GC-MS). The annual average concentrations of total VOCs (TVOCs) were obtained as follows: background site (36.00 μg·m^{-3}) < residential site (48.71μg·m^{-3}) < port site (61.09 μg·m^{-3}) ~development site (62.25 μg·m^{-3}) < traffic site (73.82μg·m^{-3}) < industrial site (98.33 μg·m^{-3}). Concentrations of TVOCs in spring and summer were higher than those in autumn and winter. Ozone formation potentials (OFPs) were calculated in this study, and the results indicated that 1-Butene had the highest OFP in residential zone, while Toluene contributed most to the OFP in other functional zones. The ratio of Xylene to Ethylbenzene was used to analyze the aging of atmospheric VOCs in background site, which was affected by transport of air pollutants from anthropogenic activities in urban areas. VOCs sources were identified by the Positive Matrix Factorization (PMF) model, including vehicle exhausts, fuel evaporation, biomass burning, industrial processes, and coal combustion. The vehicle exhaust was the largest sources of atmospheric VOCs in all seasons, ranging from 22.41% to 38.95%, and the percentage of fuel evaporation was enhanced in summer, up to 25.94%. The contributions of biomass burning in autumn (21.11%)and winter (18.01%)were larger than those in spring (11.23%) and summer (16.94%), probably due to crop straw burning from local residents. The vehicle exhaust was the dominant source across all functional zones (30.04%-44.39%), while fuel evaporation was also the major contributor (36.20%) in residential site.