

Analysis of long-term, high time-resolution measurement of gaseous and particulate pollution near the Port of New York and New Jersey

Daniel Birkett¹, Gayle S.W. Hagler², Ronald C. Henry³, Richard E. Peltier⁴, Eben D. Thoma²

¹US EPA, Region 2, New York, NY

²US EPA Office of Research and Development, Research Triangle Park, NC

³University of Southern California, Department of Civil and Environmental Engineering, Los Angeles, CA

⁴University of Massachusetts, Department of Environmental Health Sciences, Amherst, MA

Abstract:

The Port of New York and New Jersey is one of the largest and busiest ports in the United States and is located in close proximity to densely populated communities. To understand the local air quality impact of pollutant emission reduction activities at the port – including switchover to lower sulfur fuel and lower emission heavy-duty vehicles – an air monitoring study was initiated in 2012 by the US EPA. With the port located immediately adjacent to a major roadway and an airport, a hybrid model-field study design was implemented to optimize the isolation of confounding source areas. An air monitoring site was located due south of the port to minimize co-linear sources and one-minute resolution measurements were conducted of black carbon, fine particulate matter, carbon monoxide, oxides of nitrogen, sulfur dioxide, and meteorology for approximately three years. In addition, measurements of hourly particulate trace metals were initiated in 2014 to characterize local sources and to facilitate receptor modelling efforts. Preliminary findings using nonparametric trajectory modeling coupled with the one-minute time resolution data indicate multiple source areas contributing to the local measurements, including the port area, shipping routes, and other surrounding sources.