

Atlanta Rail Yard Study (ARYS): Evaluation of local-scale air pollution trends and emissions quantification using stationary and mobile monitoring strategies

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Abstract

Intermodal rail yards are important nodes in the freight transportation network, where freight is organized and moved from one mode of transport to another, critical equipment is serviced, and freight is routed to its next destination. Rail yard environments are also areas with multiple sources of air pollutant emissions (e.g., heavy-duty vehicles, locomotives, cranes), which may affect local air quality in residential areas nearby. In order to understand emissions and related air quality impacts, two field studies took place over the time span of 2010-2012 to measure air pollution trends in close proximity to the Inman and Tilford rail yard complex in Atlanta, GA. One field study involved long-term stationary monitoring of black carbon, fine particles, and carbon dioxide at two stations nearby the rail yard. In addition, a second field study performed intensive mobile air monitoring for a one month period in the summer of 2012 at a roadway network surrounding the rail yard complex and measured a comprehensive array of pollutants. Real-time mobile particulate measurements included particle counts, extinction coefficient, black carbon via light-absorption and particle incandescence, and particle composition derived by aerosol mass spectrometry. Gas-phase measurements included oxides of nitrogen, sulfur dioxide, carbon dioxide, and air toxics (e.g., benzene). Both sets of measurements determined detectable local influence from rail yard-related emissions. Preliminary analysis of mobile monitoring data indicates that pollutants directly emitted by diesel emissions had moderate to high inter-pollutant correlation spatially and elevated concentrations downwind of the rail yard area.