Measurement and Modeling of Near-Road & Near-Port Air Quality

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Abstract: Air pollution from mobile sources has been identified by numerous organizations as a potential public health concern. Based upon multiple near-road and near-source monitoring studies, both busy roadways and large emission sources at ports can significantly impact local air quality within several hundred meters of these facilities. With increasing traffic volumes on major interstates, an increasing number of people are at risk of exposures to a higher level of near-road air pollution. Similarly, as the volume of trucking and rail use to support freight movement increases, air quality along transportation routes could be affected even beyond port boundaries.

With increasing concerns about human exposure and related adverse health effects near roadways, we have conducted multiple mobile monitoring studies to examine concentrations and gradients of mobile source related pollutants. These mobile monitoring assessments along major interstates across the country used the EPA's all-electric Geospatial Monitoring of Air Pollutants vehicle, providing high spatially and temporally resolved data to assess the transport and dispersion of traffic emissions in these microenvironments. This type of data is needed to fully evaluate and improve computer models to assess the impacts of roadway and port sources on nearby air quality and population exposures.

This presentation provides a summary of mobile monitoring assessment studies conducted on major interstates in Detroit, Michigan and Phoenix, Arizona along with a near-port assessment focusing on the Port of Charleston in South Carolina, USA. We will also present our mobile measurement methodology and results on the spatial patterns of mobile source emitted gas- and particle- phase pollutants. The presentation will also highlight how this data was useful in the development and evaluation of local-scale air dispersion models assessing the impacts of roadway and port emission sources.

Key words: Ports, Traffic, Mobile monitoring, Dispersion Modeling, Air pollution