The Potential for Public-transit Based Atmospheric Monitoring to Advance Air Quality and Atmospheric Chemistry Research and to Engage Urban Stakeholders

L.E. Mitchell, E. Crosman, B. Fasoli, A. Jacques, D. Mendoza, D. Mallia, J. Horel, and J.C. Lin

University of Utah, Salt Lake City, UT 84112; 541-207-7204, E-mail: logan.mitchell@utah.edu

Urban environments are characterized by both spatial complexity and temporal variability, each of which present challenges for measurement strategies aimed at understanding greenhouse gas emissions and air quality. To address these challenges, we initiated a project in December 2014 to measure greenhouse gases and air pollutants (CO_2, CH_4, O_3, $PM_{2.5}$, and NO_2) by way of a Utah Transit Authority (UTA) light rail train car whose route traverses the Salt Lake Valley in Utah, retracing the same route through commercial, residential, suburban, and rural typologies. Public transit light rail vehicles present advantages as a measurement platform, including the absence of *in situ* fossil fuel emissions, repeated transects across an urban region that provides both spatial and temporal information, and relatively low operating and maintenance costs. We will discuss this ongoing project and how the observations are being used to advance our understanding of atmospheric chemistry, identify emission sources, evaluate emission inventories, and improve air pollution exposure models. We will also discuss the public, stakeholder, and policymaker engagement opportunities that arise from this approach to monitoring. Lastly, we will discuss how public transit platforms can complement existing and emerging monitoring networks, and the many future applications.

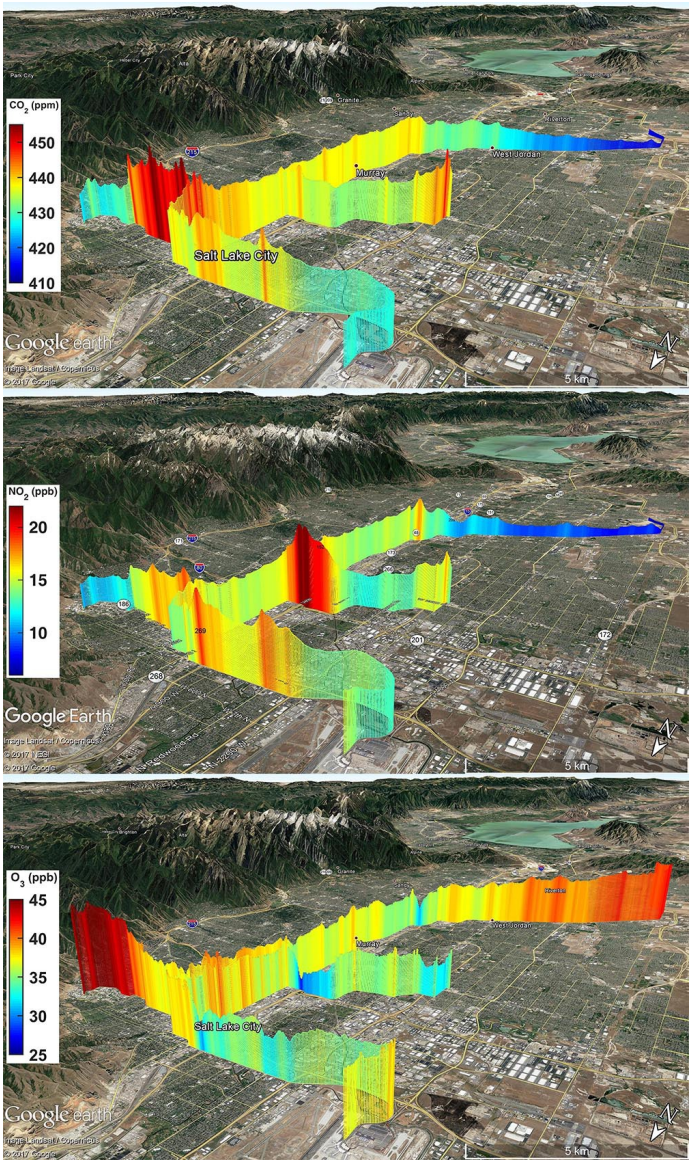

Figure 1. Spatial patterns of CO_2, NO_2, and O_3 in Salt Lake City averaged over time.