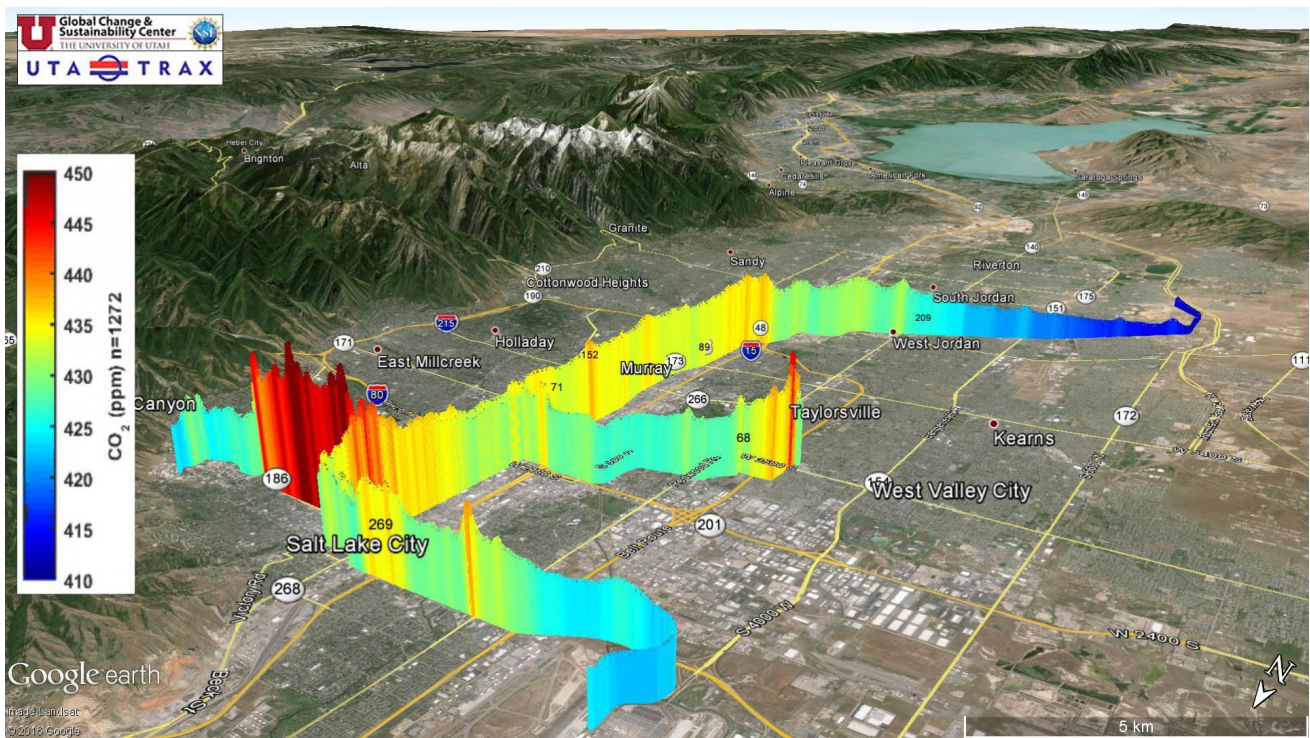


# Spatiotemporal Patterns of Urban Trace Gases and Pollutants Observed with a Light Rail Vehicle Platform in Salt Lake City, UT

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Urban environments are characterized by both spatial complexity and temporal variability, each of which present challenges for measurement strategies aimed at constraining estimates of greenhouse gas emissions and air quality. To address these challenges we initiated a project in December 2014 to measure trace species ( $\text{CO}_2$ ,  $\text{CH}_4$ ,  $\text{O}_3$ , and Particulate Matter) by way of a light rail vehicle (Utah Transit Authority) whose fixed route traverses the entire Salt Lake Valley in Utah on an hourly basis through commercial, residential, suburban, and rural typologies. Light rail vehicles offer three advantages as a measurement platform: the absence of *in situ* fossil fuel emissions, repeated transects across urban typologies that provides both spatial and temporal information, and relatively low operating costs. We present initial results of the spatiotemporal patterns of greenhouse gases and pollutants across the Salt Lake Valley from the first year of operations.



**Figure 1.** Preliminary observations of the spatio-temporal average  $\text{CO}_2$  mixing ratios across the Salt Lake metropolitan area (averaged over Dec 2014 to Nov 2015).