

An Emerging Greenhouse Gas Observational Network in the Intermountain West: Observing Greenhouse Gas Mixing Ratios and Isotopes Across Rural to Urban Gradients

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We introduce a nascent regional measurement network to observe greenhouse gas (GHG) mixing ratios and isotopes in the Intermountain West, spanning desert, mountain, and urban ecosystems from western Utah to the Colorado Front Range. This region is an area of the U.S. undergoing significant economic and land-use changes: rapid population increase and urbanization, climate change, enhanced disturbance from insect and wildfire activity, and unconventional fossil fuel extraction.

Despite the importance, from a GHG perspective, of the Intermountain West, this region had historically been under-sampled. However, thanks to investments from agencies such as NOAA and DOE, we have been able to develop a network of 11 fixed GHG monitoring sites, including the 4 sites within NCAR's Regional Atmospheric Continuous CO₂ Network in the Rocky Mountains (RACCOON). In addition, we have established a continuous mobile GHG monitoring platform using the TRAX light rail system of the Utah Transit Authority. Combined with the existing NOAA/GMD measurement network, this network is opening up opportunities to address various scientific questions—e.g., the carbon balance of the American Rockies and impacts from drought and insect/wildfire disturbance, emissions from oil/gas development, the “carbon footprint” of cities, and the propagation of urban emission signatures into the mountains.

In this paper, we will describe the network, focusing on new sites that have been added over the recent few years. Preliminary measurement and modeling results will also be presented.

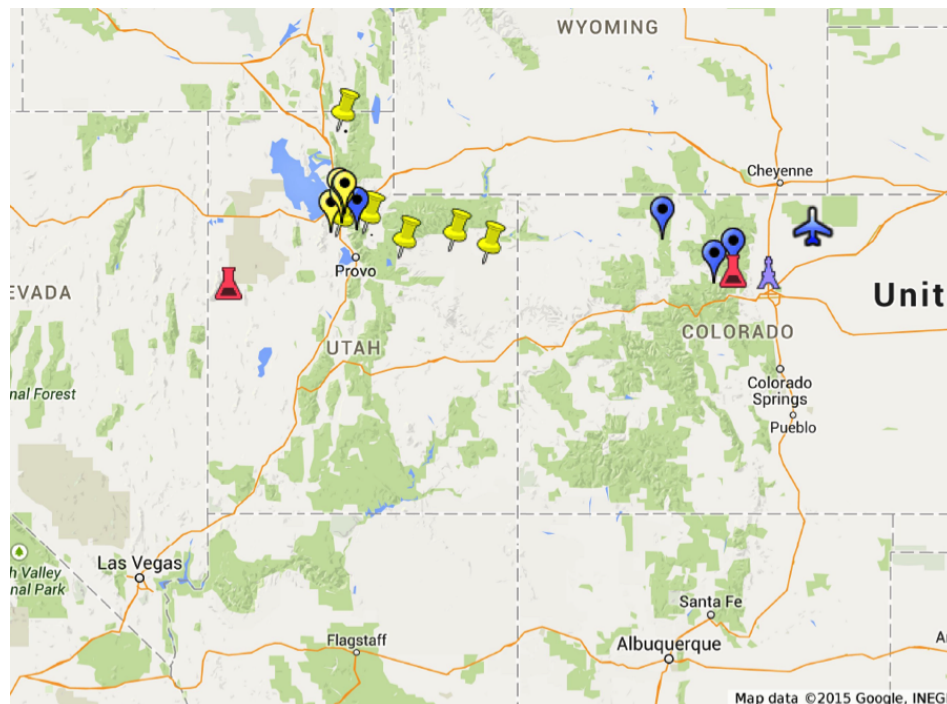


Figure 1. Map of the emerging Intermountain West Greenhouse Gas Observational Network. The recently expanded sites are shown as yellow pins. Also shown are the Salt Lake City urban CO₂ network (yellow), NCAR's RACCOON network (blue), as well as NOAA's flask, tower, and aircraft sites.