

## Emissions from Oil and Natural Gas Operations in Northeastern Utah

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The Uintah oil and natural gas Basin in Northeastern Utah experienced several days of high ozone levels in early 2011 during cold temperature inversions. To study the chemical and meteorological processes leading to these wintertime ozone pollution events, the State of Utah, EPA Region 8, and oil and gas operators pulled together a multi-agency research team, including NOAA ESRL/CIRES scientists. The data gathering took place between January 15 and February 29, 2012. To document the chemical signature of various sources in the Basin, we outfitted a passenger van with in-situ analyzers (Picarro: CH<sub>4</sub>, CO<sub>2</sub>, CO, H<sub>2</sub>O, <sup>13</sup>CH<sub>4</sub>; NOxCaRD: NO, NO<sub>x</sub>, 2B & NOxCaRD: O<sub>3</sub>) meteorological sensors, GPS units, discrete flask sampling apparatus, as well as a data logging and “real-time” in-situ data visualization system. The instrumented van, also called Mobile Lab also hosted a KIT Proton Transfer Reaction Mass Spectrometer (suite of VOCs in situ measurements) for part of the campaign. For close to a month, the Mobile Lab traveled the roads of the oil and gas field, documenting ambient levels of several tracers. Close to 180 valid air samples were collected in February by the Mobile Lab for future analysis in the NOAA and CU/INSTAAR labs in Boulder. At the same time as the surface effort was going on, an instrumented light aircraft conducted transects over the Basin collecting air samples mostly in the boundary layer and measuring in situ the following species CH<sub>4</sub>, CO<sub>2</sub>, NO<sub>2</sub>, O<sub>3</sub>. We will present some of the data collected by the Mobile Lab and the aircraft and discuss some early analysis results.



**Figure 1.** Mobile Lab sampling downwind of an oil well pad near Horse Pool, Uintah Basin, February 2012.