

Mobile Lab and Ozonesondes

National Oceanic and Atmospheric Administration

Global Monitoring Division
Chemical Sciences Division

University of Colorado

Cooperative Institute
for Research in
Environmental Sciences
Institute of Arctic and Alpine Research



The Mobile Lab is a measurement platform well-suited to study distributed point sources in a contained area like the Uintah Basin. It will be used to map ambient levels of various gases in the Basin and document background levels outside of the oil and gas fields and urban areas.

Background

During the last two winter seasons, the Uintah Basin experienced several days of highly elevated ground level ozone. Ozone (O_3) is the product of chemical reactions involving two types of trace gases: nitrogen oxides (NO_x) emitted by combustion processes and volatile organic compounds (VOCs) such as hydrocarbons emitted by vehicles or condensate tanks, or produced by flares. Funding from NOAA and the Western Energy Alliance is supporting two sampling efforts: vertical profiles of O_3 with balloon launches and surface mapping of O_3 and its precursors with an instrumented van, the NOAA Mobile Lab.

A moving experiment...

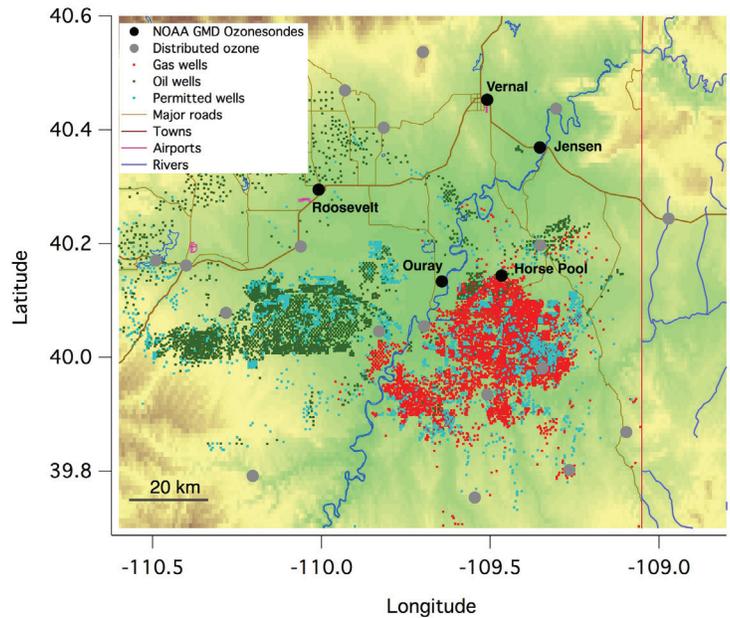
A team of NOAA scientists will be driving around the Uintah Basin during the winter 2012 campaign to collect high frequency measurements of O_3 , NO_x , carbon monoxide (CO) and methane (CH_4). CH_4 is a good tracer for natural gas leaks. Discrete air samples will also be collected in the oil and gas fields, along roads and in remote locations for analysis of VOCs in the NOAA Boulder lab and at CU INSTAAR.

Tracking ozone up... and down

The Global Monitoring Division at NOAA will be conducting vertical profiling of O_3 at three locations in the Uintah Basin (Roosevelt, Ouray and Jensen) for 15 days in February 2012. GMD is also collaborating with scientists from the University of Colorado at Boulder to acquire O_3 profiles from CU's 500-ft-long tethered balloon.



Data from the Mobile Lab's onboard fast-response analyzers are displayed in real time on screens in the van. Scientists in the Mobile Lab look for spikes or large enhancements in the data to identify a source plume and target air sample collection. The multiple compounds analyzed in the discrete air samples will allow scientists to fingerprint various sources in the Basin.



Data from the Mobile Lab will help scientists evaluate the region's NO_x and VOCs emissions inventories (used by regulatory agencies for air quality planning), and will provide source specific information to help interpret the chemical measurements obtained at the fixed supersites, such as Horse Pool and Roosevelt.



Along with O₃, the instrument packages attached to the balloon will record temperature, pressure and relative humidity. Similar packages are launched by GMD scientists or collaborators every week in locations as remote as the high Arctic and the Antarctic.



To minimize the loss of equipment and maximize the amount of data collected during the campaign, the GMD Ozone group has built a new slow-release mechanism to tether the sondes up to 500 ft and bring the balloon back down on demand.

Contacts:

Russell.C.Schnell@noaa.gov
Gabrielle.Petron@noaa.gov