## Wintertime Ambient Ammonia Concentrations in Northern Utah's Urban Valleys Ian Hammond, Randal S. Martin, Philip Silva, Munkh Baasandorj

Many of the population centers in northern Utah are currently classified as nonattainment or serious non-attainment, Wasatch Front, for PM<sub>2.5</sub> and previous studies have shown ammonium nitrate to often be the largest contributor to the particulate mass. Furthermore, measurements have shown several of the Wasatch Front cities and Cache Valley (UT/ID) consistently recorded some of the highest ambient ammonia (NH<sub>3</sub>) concentrations in the continental United States. As a part of the multi-organization 2017 Utah Winter Fine Particulate Study real-time NH<sub>3</sub> concentrations were monitored in the Cache Valley at the Logan, UT site, collocated at an EPA sampling trailer near the Utah State University (USU) campus. A Picarro model G2508 was to used collect 5sec averaged concentrations of NH<sub>3</sub>, carbon dioxide (CO<sub>2</sub>), and methane (CH<sub>4</sub>) from January 16<sup>th</sup> to February 14<sup>th</sup>, 2017. Parts of three inversion events, wherein the PM<sub>2.5</sub> concentrations approached or exceeded the National Ambient Air Quality Standards, were captured during the sampling period, including a 10-day event from January 25<sup>th</sup> to February 4<sup>th</sup>. Concentrations of all three of the observed species showed significant accumulation during the events, with NH<sub>3</sub> concentrations ranging from below the detection limit (<0.5 ppb) to >70 ppb. Preliminary analysis suggested the temporal NH<sub>3</sub> changes tracked the increase in PM<sub>2.5</sub> throughout the inversion events; however, a oneday period of NH<sub>3</sub> depletion during the main inversion event was observed while PM<sub>2.5</sub> continued to increase. Additionally, a network of passive NH<sub>3</sub> samplers (Ogawa Model 3300) were arrayed at 25 sites throughout the Cache Valley and at 11 sites located along the Wasatch Front. These networks sampled for three 7-day periods, during the same study time frame. The samples underwent Ion chromatographic (IC) analyses with each sample being measured in triplicate. The Cache Valley 2016-2017 NH<sub>3</sub> concentration contours and levels were similar and indicate that CAFO (poultry, dairy, fur) facilities are likely leading NH<sub>3</sub> sources. The study also demonstrates the need for a better array of passive samplers along the Wasatch Front in order to fully characterize local, ambient NH<sub>3</sub>.