

Air-Snow interface influxes of Organic Compounds

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Physical and chemical processes occur in snowpacks that have a significant impact on the chemistry of the atmosphere (Grannas et al., 2007). Snowpacks act as reservoirs and exchange media, in addition to acting as a photochemical reactor. Carbonyl compounds contribute to atmospheric conditions that lead to poor air quality. Carbonyls are very reactive with respect to winter ozone production. To understand carbonyl fluxes at the air-snow interface, we built a custom freezer apparatus, which allows us to observe reactions of organic compounds within snow under controlled conditions. After two series of laboratory analysis we consistently observed higher levels of formaldehyde and much higher levels of acetaldehyde in the snow experiments conducted in sunlight, in contrast to experiments in the absence of sunlight. These findings suggest that photochemical processes may be creating formaldehyde and acetaldehyde in the snow, or at least driving it out of the snow. Flux chamber measurements made in previous years yielded similar results. Together, these evidences indicate that snowpack is a source of reactive carbonyls to the Uinta Basin atmosphere.