

Saturation Monitoring of Air Toxics in Davis County, Utah

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A saturation monitoring study was conducted to determine sources of formaldehyde and acetaldehyde, both of which are hazardous air pollutants often found in concentrations exceeding their one-in-a-million cancer risk threshold in the Bountiful area in Davis County, Utah. Passive samples were collected at 34 air monitoring sampling sites located throughout Davis County and at varying distances from potential emission sources, including industries and oil refineries. Samples were collected during winter and summer 2017 then analyzed for a suite of carbonyls and volatile organic compounds. Mobile and grab canister sample measurements were also conducted during February 2018. Findings indicated that formaldehyde concentrations were generally higher at all sampling sites over the summer than winter. Formaldehyde levels also displayed limited spatial variation, particularly during winter, likely suggesting a mix of source emissions. This finding was also supported by the grab canister sample measurements that showed that samples collected at most stations were dominated by ethanol and acetone, with potential sources including industrial emissions/solvent usage and secondary carbonyl production. Samples collected close to oil refineries and at the Bountiful (BV) station operated by the Utah Division of Air Quality also showed contributions from aromatics, hexane, cyclohexane and heptane, suggesting an additional source at these sites, possibly fuel emissions. Dichloromethane levels, on the other hand, were only higher during winter than summer in the northern part of the sampling area. Dichloromethane concentrations also varied across sampling weeks and sampling sites, with daytime wintertime concentrations overall exceeding overnight levels. The relatively large spatial variation in dichloromethane concentrations suggests the influence of emission hotspots.

While this study provides additional insight on the sources and spatial distribution of dichloromethane and formaldehyde, findings were limited by the long sampling durations and relatively low dichloromethane concentrations compared to historical measurements collected at the BV site. A follow-up study has been conducted by the University of Utah and Brigham Young University.