Identifying Sources of Dichloromethane and Formaldehyde in the Bountiful Region

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In recent years, the Bountiful monitoring station has been experiencing elevated levels of two hazardous air pollutants (HAPs), formaldehyde and methylene chloride. Beginning in 2013, the Bountiful station began to experience elevated levels of formaldehyde during the winter. The mean formaldehyde concentrations at Bountiful exceed both the non-cancer risk threshold and the 1 in 1 million cancer risk threshold. Additionally, the Bountiful mean formaldehyde concentrations are more than double those at the Lindon and West Valley locations. Beginning in 2008, more than a half of Bountiful's methylene chloride measurements exceeded the cancer risk threshold of 0.3 ppb. On March 28, 2015, methylene chloride levels reached 291 ppbv, nearly 500 times the cancer risk threshold. However, the source(s) of formaldehyde and methylene chlorine have not been identified.

This study is applying complementary strategies to identify these HAP sources, source attribution and hourly gas chromatography (GC) measurements of formaldehyde and methylene chloride being collected during an intensive measurement campaign in the winter of 2019. The source attribution is focusing on positive matrix factorization (PMF) analysis of both the historical HAP and criteria pollutant data (2003 – 2017) as well as the online GC and Broadband Cavity Enhanced Absorption Spectrometer (BBCEAS) criteria pollutant measurements from the 2019 campaign. The preliminary historical PMF results suggest that the methylene chloride correlates poorly with other species and that it comes from a unique source. The highest methylene chloride levels occurred on Friday, Sunday or Monday. The results also suggest that formaldehyde is highly correlated with other aldehydes, but it showed no weekday versus weekend patterns.