**A Combined PMF Back-trajectory Analysis of Sources of Dichloromethane in Bountiful**

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From February - April 2019, BYU directed an eight-week intensive campaign measuring the components expected to be important to understanding the sources of dichloromethane at the Bountiful sampling site located at Bountiful Viewmont High School, 171 W. 1370 N. Bountiful, UT (EPA AIRS code: 490110004) on an hourly basis. This included the hourly average measurement of dichloromethane and other gases (focusing on PAMS compounds) measurable by GC-FID. PM2.5 as measured with an FDMS TEOM, a 7-channel aethalometer and a BYU GC-MS Organic Aerosol Monitor (OAM) for the determination of fine particulate organic marker compounds. In addition, the concentrations of NOX, and NO2 were also measured. These data were used in an EPA PMF v5 analysis based on 2-hour average data. Corresponding back trajectory calculations for selected time periods based on the PMF analysis were also obtained and their interpretation was included in interpreting the results of the PMF analysis. Analysis of the sources of PM2.5 indicated three sources could be identified, primary emission from wood smoke (26%), diesel exhaust (10%) and automobile exhaust. (1%). The sources of the remainder of the PM2.5 (62%) was secondary material which could not be identified because there were no secondary material indicators in the data set. However, it could be inferred that 21% was from secondary material formed from wood smoke emissions. Analysis of the sources of dichloromethane indicated that 2% was associated with emission from diesel traffic, 15% was associated with BTEX compounds and was assumed to be associated with oil refinery activities and the source of 83% was not identified from the analysis. The time dependent results of the PMF identification of diesel PM and diesel dichloromethane were in excellent agreement. The back-trajectory data were used to see if the inference of an oil refinery source was consistent with the back-trajectory data and if any consistent impact direction could be identified for the unidentified source of dichloromethane. These comparisons, together with the PMF source profile information, strongly indicated that the most probable source of both classes of dichloromethane are located to the south, southwest of the sampling site were the oil refineries are located and that the emission were intermittent. Our results lead to the hypothesis that the most probable source is the oil refineries but cannot identify the processes which may contribute to the observed emission. Several additional studies are proposed to determine if the refineries are the source and to identify the probable activities responsible for the observed emissions. It is possible that these proposed studies would provide data that would indicate why we observed lower concentrations of dichloromethane in the present study compared to historic data and if these improvements are due to changes in oil refinery operations.