Quantification of Molecular Markers in Samples of Fine Particulate Matter from Houston

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One of the most powerful means of determining the relative contributions from different source categories to ambient fine particle concentrations uses quantifications of organic compounds in source emissions and the ambient atmosphere. By measuring organic compounds that are unique to different emission sources and compounds that are conserved in atmospheric transport, the relative contribution from different source categories can be determined (i.e., the contribution from diesel vehicles can be separated from the contribution from wood combustion). The research analyzed archived fine particulate matter samples collected in the Houston area between 1997 and 1998. Archived filters collected during 1997 to 1998 by the Desert Research Institute (DRI) under contract to the Texas Natural Resources Conservation Commission (TNRCC), the City of Houston, and the Houston Regional Monitoring Corporation (HRM) will be used in this analysis. During 1997 to 1998, 24-hour integrated samples of fine particulate matter were collected at nine locations in the Houston region every sixth day. Samples from two industrial locations (Clinton Drive and HRM-3), one suburban location (Bingle), and one background location (Galveston) were analyzed. Because it is important to understand what are the major sources contributing to this total carbon burden of the atmosphere, the molecular markers identified in previous source testing were quantified. The analysis of the concentrations of 85 individual organic compounds allowed generalized understanding of the relative importance of various source categories. Complete analysis of important sources was conducted by chemical mass balance modeling and determined the importance of six primary particle sources.

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