Geophysical Research Abstracts,
Vol. 11, EGU2009-6515, 2009
EGU General Assembly 2009

Application of PMF in the Investigation of VOCs Emission Sources for Lake Champlain Basin

N. Gao (1), K. Anderson (1), and R. Poirot (2)

(1) Dept. of Chemistry, St. Lawrence University, Canton, NY, USA (ngao@stlawu.edu), (2) Air Pollution Control Division, Dept. of Environmental Conservation, Waterbury, VT, USA

Volatile Organic Compounds (VOCs) have long been considered hazardous atmospheric pollutants. VOCs account for the majority of the 188 air toxics species listed in the 1990 Clean Air Act (US). The National-Scale Air Toxics Assessment (NATA) Program established by EPA aims to coordinate national and state level efforts on concentration data collection, emission inventory, and population risk assessment. Like many other states, the State of Vermont established its Air Toxics Program which consists of seven monitoring sites, some of which started sample collection as early as 1993.

This presentation focuses on an ongoing project to investigate emission sources of VOCs in the Lake Champlain Basin. Two monitoring sites, Burlington and Underhill sites were selected for their representation of two distinctly different urban and rural environments. Statistical methods including the Positive Matrix Factorization were employed. Identified likely sources, up to fourteen of them for each site, that are either common to both sites or unique to one of the two, as well as the apportionment results, will be discussed. In addition, the presentation will discuss particular challenges arisen in the source-receptor modeling processes due to low concentration levels of many VOCs, the absence of some very volatile species in the Vermont Air Toxics monitoring program, rapid chemical transformations or decompositions occurred during atmospheric transport of the VOCs, and the complexity and uncertainty in the emissions inventory.