Particle/Gas Partitioning of PAHs in the Great Lakes Atmosphere as Measured by IADN

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Annual and seasonal estimates of PAH deposition to the Great Lakes have been made by the Integrated Atmospheric Deposition Network (IADN) since the early 1990's. Three deposition pathways are considered in the IADN model: wet deposition, gas absorption/volatilisation and dry particle deposition. The phase distribution of PAHs in the atmosphere is needed to estimate the latter two processes, and a long-term dataset useful for assessing particle/gas partitioning in the region is now available.
Results show significantly different relationships between partitioning and temperature from site-to-site even amongst stations without local urban or industrial influences. This inter-site variability precludes the use of a single set of parameters to describe the observed relationships between partitioning and temperature. A more detailed examination of the data from the urban site at Chicago shows that relationships between partitioning and compound volatility vary on a seasonal basis and that individual compounds deviate from the average regressed response is consistent ways.
Including the partitioning of semivolatiles such as PAHs in air quality models will most likely rely on proportionality of partitioning to measured soot-air partition coefficients. In support of such efforts, further work is needed to characterize the aerosol black carbon fraction as well as to measure temperature-dependent partition coefficients.