The National Atmospheric Deposition Program/Ammonia Monitoring Network (NADP/AMoN): Five Years of Trends

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The NADP's Ammonia Monitoring Network (AMoN) was established in October 2007 to routinely measure ammonia gas using cost-efficient passive type air samplers. The purpose of AMoN is to provide land managers, air quality modelers, ecologists, and policymakers critical data to assess the long-term trends in ambient NH_3 concentrations and deposition of reduced nitrogen species; validate atmospheric models; better estimate total nitrogen inputs to ecosystems; assess changes in atmospheric chemistry due to sulfur and nitrogen dioxide reductions; and assess compliance with fine particulate (PM2.5) standards.

The NADP/AMoN uses Radiello™ type passive samplers, which are deployed continuously over 2 week periods at each site at a standardized height (~2m). Triplicate samples and travel blanks are deployed randomly as an indicator of data quality. All site operators comply with the Standard Operating Procedures (SOPs), using only sampling materials provided by the NADP/AMoN. Further information about AMoN methods is available at http://nadp.isws.illinois.edu/AMoN.

Five-year (winter 2008 - fall 2012) AMoN trends were evaluated using the Seasonal Kendall Trend (SKT) test in the EnvironmentalStats version 2.0 package of S-PLUS 8.0. Statistical significance levels were set at $p \leq 0.10$ for trend and at $p > 0.10$ for seasonal homogeneity, indicating 90% confidence of trend existence. The trend slope magnitude was determined by the Sen's median estimator. Two-week deployments were aggregated into seasonal averages, as defined by the midpoint of the two-week period (i.e., December – February = meteorological winter, March – May = spring, etc.) Meteorological seasons were included in the trend analysis if they had a minimum of 9.75 weeks (i.e., 75%) valid data. All sites were included that had a minimum of 5 years' data, which comprised 14 sites.

Mean atmospheric NH_3 concentrations (2007 – 2012) at the 14 sites ranged from 0.32 – 3.42 µg/m^3. Statistically-significant trends were determined at 8 of the 14 sites evaluated, and the overall magnitude of the trend ranged from 0.03 – 0.31 µg/m^3-yr. All trends were increasing in magnitude, and statistically consistent across seasons.

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