

A Hybrid Approach for Estimating Total Nitrogen And Sulfur Deposition In The United States

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Atmospheric deposition of sulfur and nitrogen can lead to the decline of ecosystems through acidification and excess eutrophication which lead to effects such as decreases in forest growth, loss of species diversity, shifts in the geographical distribution of species, and increases in harmful algal blooms. In the U.S., strategies for improving ecosystem health often require estimation of the total atmospheric deposition as well as components of the total deposition as input to the analyses. Obtaining estimates of total deposition of sulfur and nitrogen is a challenge in the U.S. due to the difficulty in measuring dry deposition. While modeling of dry deposition is done at sites in the Clean Air Status and Trends Network (CASTNET), these values cannot be spatially interpolated due to the complexity of the deposition fields. Additionally, several important species such as NO₂, N₂O₅, HONO, PANs and alkyl nitrates, which contribute to the nitrogen budget, are not routinely measured at network sites. In response to this need, we developed a methodology for developing spatially continuous estimates of total deposition for the US using an approach that uses information from existing monitoring networks and the Community Multiscale Air Quality (CMAQ) model. The methodology gives precedence to measurements and supplements with modeled data as needed to provide a complete budget. We provide a description of the data sets and methodology used to develop estimates of total deposition as well as a discussion of the outputs derived from this technique. Results are available for download at <ftp://ftp.epa.gov/castnet/tdep>

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