

Precipitation Chemistry Monitoring Data Report

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Abstract:

Continuous monitoring of wet deposition chemistry has been conducted at the VMC Mount Mansfield and Lye Brook Wilderness Area sites. The work is a fundamental component of the monitoring and research activities there, providing basic information on the chemical environment.

NADP has operated at PMRC since 1984 and at Bennington, Vermont since 1981, providing weekly analysis of major ions in precipitation. AIRMoN, established at PMRC in January of 1993, providing similar data on a daily basis at PMRC. CASTNet has been operating since 1994, just south of the Lye Brook Wilderness Area, providing weekly analysis of major ions in precipitation.

Wet chemical concentration data and calculated deposition are summarized and compared between networks and sites based on annual, seasonal, monthly and weekly time steps.

Objectives:

Continuous monitoring, at the VMC Mount Mansfield and Lye Brook sites, of the chemistry of precipitation. Summary of data from the chemical deposition monitoring program.

Methods:

NADP has maintained a site at the air quality monitoring station at the PMRC since 1984, and another site near Bennington since 1981. Weekly collection of precipitation for chemical analysis is performed at these sites. Precipitation amount, pH and conductivity are measured locally, and the sample is then shipped to the NADP Central Analytical Laboratory in Illinois for analysis of pH, conductivity, Ca, Mg, K, Na, NH₄, NO₃, Cl, and SO₄.

AIRMoN is an event based precipitation monitoring program established at the end of 1992 to provide high-resolution data on precipitation chemistry to support regional modeling efforts. Except for being an event based sampling program, it follows the

protocol and measures the variables of the NADP program. The sampler is located at the Air Quality site at PMRC.

CASTNet is a weekly sampling program precipitation amount, pH and conductivity are measured locally, and the sample is then shipped to QST Environmental, Inc. in Florida for analysis of pH, conductivity, Ca, Mg, K, Na, NH₄, NO₃, Cl, HNO₃, H⁺, and SO₄. This station is just south of the Lye Brook Wilderness Area boundary. The results are comparable with over 70 sites in the CASTNet program and over 200 sites in the NADP network.

Precipitation-weighted concentrations were calculated for annual, seasonal and monthly time steps. (A separate report summarizing and comparing weekly deposition and concentration is available upon request from the Vermont Monitoring Cooperative.)

Deposition (kg/ha) was calculated for chemicals reporting concentration in mg/l for annual, seasonal and monthly time steps. Total Nitrogen (Total N) deposition was calculated as the combined fraction of NH₄ (16/18) and NO₃ (14/62) deposition. Total Sulfur (Total S) deposition was calculated as a fraction of SO₄ (32.064/96) deposition. Charts and tables of precipitation-weighted concentrations and calculated deposition are presented. In addition the long-term average (Period of Record Average) and years of data used to calculate this average are reported. Only years with 50 weeks of data are summarized.

Citations:

National Atmospheric Deposition Program (NRSP-3)/National Trend Network. (2000). NADP Program Office, Illinois State Water Survey, 2204 Griffith Drive, Champaign, IL 61820

National Atmospheric Deposition Program (NRSP-3)/Atmospheric Integrated Research Monitoring Network. (2000) NADP Program Office, Illinois State Water Survey, 2204 Griffith Drive, Champaign, IL 61820