

## **Comparison of surface water critical loads of acidity with modeled and measured deposition in the United States**

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This paper presents a comparison of critical loads for acidity of surface waters in the United States with estimates of acidifying nitrogen and sulfur deposition from atmospheric modeling and measurements. Models and measurements offer important complementary features for critical loads studies. Measurements of deposition provide data on atmospheric loading to ecosystems and atmospheric modeling helps fill in gaps in the spatial coverage and chemical composition of the measurements. In this study, critical loads for acidity were obtained from the CLAD US Critical Loads FOCUS database at over 9500 lakes and streams in the US and were examined in conjunction with measured and modeled atmospheric deposition in the US. Wet deposition measurements of sulfate and nitrate at NADP-NTN stations and dry deposition estimates of sulfur dioxide, total sulfate, nitric acid and particulate nitrate at CASTNET monitoring stations were analyzed in addition to deposition simulated by the Community Multiscale Air Quality (CMAQ) model that simulates the emission, transport, chemical transformations and wet and dry deposition of several nitrogen and sulfur compounds. The relative importance of different chemical species in wet and dry deposition as well as uncertainties and limitations in model estimates and measurements are discussed.

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