

## 2.021 Atmospheric Reactive Nitrogen in Rocky Mountain National Park.

Early Career Scientist

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Abstract:

Deposition of excess atmospheric reactive nitrogen in Rocky Mountain National Park (RMNP) poses threats to sensitive ecosystems. The Front Range urban corridor in Colorado, located east of RMNP, includes a variety of urban sources of nitrogen oxides, while high emissions of ammonia are found in agricultural sources on the eastern plains of Colorado. Periods of upslope (easterly) flow can transport atmospheric reactive nitrogen from the Front Range and eastern Colorado into the park. It is important to understand the degree to which these different urban and agricultural sources impact RMNP, and how meteorological conditions are associated with high-deposition periods in the park. Research associated with reactive nitrogen in the RMNP started in the mid-2000s. Ongoing measurements at RMNP include 24hr-integrated gaseous and particulate nitrogen species measured by denuder/filter pack methods, gaseous ammonia measured continuously by cavity ring-down spectroscopy (CRDS), and wet deposition of nitrogen compounds. Measurements of gaseous ammonia at high-time resolution are also available at sites to the east in Greeley and Loveland, CO. The combination of these three sites with high-time resolution ammonia concentrations helps document westward transport of ammonia from NE Colorado into RMNP. A small ensemble of forecasts using the Advanced Research version of the Weather Research and Forecasting (WRF-ARW) model has been run routinely to calculate air parcel trajectories released from the eastern plains of Colorado to RMNP. An Early Warning System allows agricultural producers to implement management practices that reduce nitrogen emissions when an upslope event is forecast. Early Warning System predictions will be evaluated in this presentation to examine how well the model predicts high concentrations of ammonia and high nitrogen deposition events in RMNP.