

Reactive nitrogen deposition in the United States: the increasing importance of ammonia

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While initial interests in U.S. wet deposition focused largely on sulfate content and acidity, increasing attention has been paid in recent years to scavenging and deposition of reactive nitrogen compounds. NADP wet deposition measurements have a long history of measuring both oxidized and reduced forms of inorganic nitrogen: nitrate and ammonium. While some networks measure concentrations and/or deposition of gaseous nitric acid and fine particle nitrate, less is known historically about atmospheric concentrations or dry deposition of gaseous ammonia and fine particulate ammonium. Over the past three decades, NADP wet deposition data indicate that ammonium has become a relatively larger component of inorganic nitrogen wet deposition. Since the 1980s many regions of the country have shifted from nitrate-dominated wet inorganic nitrogen deposition to a situation where ammonium is the majority contributor. We will review this change in the NADP wet deposition data record. We will also examine available observations of gaseous ammonia and nitric acid and fine particle ammonium and nitrate to see whether the shift in wet deposition contributions is closely tied to the relative abundance of oxidized and reduced inorganic nitrogen in the atmosphere. Finally, we will use available records to assess the relative importance of dry deposition of oxidized and reduced inorganic reactive nitrogen in select regions of the country.

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