

Estimates of Wet Deposition across North America: the Challenges and Opportunities of Merging Data across Nations

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The absence of a national atmospheric deposition network in Mexico represents a significant monitoring gap for North America. Although air quality measurements have been conducted in major cities throughout the country since the 1980s, the Red de Depósito Atmosférico (REDDA) in the Metropolitan Area of the Valley of Mexico is currently the only formal set of sites used to assess bulk wet and dry deposition. For other parts of Mexico, data on atmospheric deposition are scarce and limited to relatively few published studies. Many of these are restricted to a handful of sites and are short in duration. As a result, it is not possible to extrapolate findings to surrounding areas. Notwithstanding the paucity of atmospheric deposition research in Mexico, it is clear that this rapidly urbanizing and industrializing nation needs a national-scale deposition monitoring network. First, SO₂ and NO_x emissions to the atmosphere are either stable or increasing. Second, evidence from central and eastern Mexico indicates that deposition rates to natural and managed ecosystems may also be rising, with potentially acidifying effects on terrestrial and aquatic ecosystems. Third, more than half of Mexico's territory is >1000 m elevation. Deposition rates to montane landscapes are generally elevated compared to lowland areas, while deposition patterns are also more heterogeneous due to climatic, vegetational and topographic diversity. Finally, cross-boundary transport of atmospheric pollutants and the cascading ecological effects of enhanced deposition affect shared airsheds and watersheds between Mexico and its North American neighbors. For these reasons, a spatially-extensive and well distributed network of sites is necessary to identify levels of exposure to nutrients and pollutants across Mexico, and to assess and predict deposition effects on species diversity, sensitive ecosystems, watersheds, and climate.

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