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An overview of measurement and modeling approaches for the estimation of temporal and spatial variations in mercury dry-deposition

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The atmospheric deposition of mercury occurs through both wet- and dry-deposition processes, with the relative importance of each process at a given location being related to variations in both meteorology and the proximity to natural/anthropogenic emissions of mercury. Over the past two decades, a number of field campaigns and measurement networks have provided valuable information on the temporal and spatial variation of mercury wet-deposition. In contrast, the ability to similarly characterize mercury dry-deposition has been hampered by the relative lack of such measurements. Of late, an increasing number of researchers have performed measurements of mercury dry-deposition using a variety of direct (e.g., surrogate surface) and indirect (e.g., micrometeorological) techniques. While the majority of these measurements have been performed as part of relatively short-term studies, more recent work has sought to develop approaches that will allow for the extension of mercury dry-deposition measurements to long-term, unattended modes. These latter developments would allow such approaches to be used in regional and national networks to address questions related to the temporal and spatial variability of mercury dry-deposition. This presentation will provide an overview of developments in both direct and indirect approaches for the measurement of total- and speciated-mercury dry-deposition. Given concurrent advances in the measurement of ambient, speciated-mercury concentrations, this presentation will also touch upon the current state of mercury-dry deposition modeling approaches, which can utilize such ambient concentration data to provide another approach of estimating the temporal and spatial variation of mercury dry-deposition on regional, national and global scales.

Biography

Frank J Marsik is an associate research scientist/lecturer in atmospheric science at the University of Michigan, Ann Arbor, MI, USA. He has used a hybrid-approach to the study of the air-surface exchange of mercury through the performance of combined measurement/modeling studies. This approach has allowed for a better understanding of the uncertainties associated with both the field measurement and ecosystem-level modeling of mercury dry-deposition. He has been involved in the development and testing of surrogate surface-based mercury dry-deposition measurement approaches and, in August 2008, he organized an international intercomparison/workshop of mercury dry-deposition measurement techniques.

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