MERCURY REACTIONS IN LIQUID CLOUD DROPLETS AND ON OXIDE SURFACES

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Mercury is a toxic metal emitted into the atmospheric reservoir from a variety of natural and anthropogenic sources. Atmospheric transport results in long-distance travel and wide dispersion of the pollutant. Current models for atmospheric mercury cycling include chemical oxidation/reduction in both gaseous and aqueous phases, wet and dry deposition of particulate and soluble mercury, and re-emission from natural surfaces.

In order to increase our understanding of chemical oxidation and reduction processes involving mercury, basic kinetic and thermodynamic data are required. The aim of our study is to measure experimentally the rates of aqueous phase oxidation of Hg(0)and reduction of Hg(II) by environmentally-relevant redox partners such as sulfite, nitrite, hypochlorite (aqueous chlorine) and peroxides, using UV-visible spectroscopy and cold vapor atomic absorption spectroscopy (CVAAS). The heterogeneous reduction and photoreduction of particulate HgO by gaseous redox partners, as monitored by gas phase IR spectroscopy, will also be reported. Model development will be presented in order to further understanding of multiphase chemistry.