# A stable isotope view of the atmospheric Hg cycle

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A decade of research on the natural variations in mercury (Hg) stable isotope abundances has shown large variations across biogeochemical reservoirs. These variations result from the gradual separation of heavy/light or even/odd Hg isotopes during the numerous physicochemical processes that shuttle Hg across the Earth's surface. As a result, a Hg isotopic measurement gives rise to multiple isotope fingerprints that may characterize its source, or code for the transformations that Hg has undergone in the past.

The atmospheric cycle of Hg has been studied for over decades. Natural and anthropogenic Hg emissions are mainly in the gaseous $Hg^0$ form. $Hg^0$ is thought to have a long (6-12 months) half-life and travel far from its source before being deposited by dry and wet deposition pathways back to terrestrial and marine environments across the globe. Major uncertainties still exisit regarding the oxidants of $Hg^0$, the exact nature of oxidized $Hg^{II}$ forms, the presence of in-cloud photoreduction of $Hg^{II}$ (back to $Hg^0$), and the relative importance of dry and wet deposition.

In this presentation we will review Hg isotope observations of atmospheric Hg. We will show how Hg isotopes may help answer the indicated outstanding questions on Hg cycling, and we will discuss opportunities for Hg isotope tracing of Hg emission sources.