

Cumulative Anthropogenic Impacts of Past and Future Emissions and Releases on the Global Mercury Cycle

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Humans have intentionally mined and released mercury (Hg) from the Earth's lithosphere over millennia, enriching the global biogeochemical cycle. Enrichment factors for different media (atmosphere, land, ocean) have been intensively debated over the last decade with multiple studies proposing alternate formulations of the global Hg cycle. Here we present an online global biogeochemical box model visualization tool (https://sunderlandlab.github.io/interactive_gbbm/www/) that explores the effects of different assumptions regarding chemical rates of exchange and historical emissions proposed across studies. We evaluate the performance of alternate historical emissions and rates from various primary studies using available global constraints from atmospheric measurements and archival data from lake sediment records of historic Hg accumulation. Implications of different future anthropogenic mercury emissions forcings on global concentrations in biologically important reservoirs will be discussed, as well as an assessment of major uncertainties in the global cycle that affect projected changes.