Global mercury chemostratigraphy during the end-Permian mass extinction and the following Early Triassic recovery

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The end-Permian mass extinction (EPME) at ~252 Ma was the most severe extinction in the Phanerozoic, and marine ecosystems did not recover substantially until after the Smithian–Spathian substage boundary (SSB) of the Lower Triassic. The Siberian Traps large igneous province (STLIP) is invoked as the driver of the mass extinction and has been linked to the protracted recovery. To further investigate this relationship we examined mercury chemostratigraphy, including mercury concentrations and isotopes, from high latitude and low latitude sections that span the Late Permian Changhsingian to Early Triassic Spathian substage successions; the Guryul Ravine section, Kashmir in North India and the Chaohu section in South China. Organic and inorganic carbon-isotope data define the EPME horizon in the Chaohu section and the SSB in the Guryul Ravine section, respectively. Hg/TOC values are dramatically elevated approaching the EPME horizon and maintain high values until the lower *Isarcicella Isarcica* conodont zone, the base of which is believed to be the end of the mass extinction. In the stratigraphically overlying beds, Hg/TOC generally displays lower values with slight fluctuations through the two sections. These fluctuations are likely related to the increased terrestrial Hg influx associated with strong chemical weathering in the Early Triassic, as shown by a positive correlation between the contents of Hg and Al, and by less positive Δ^{199}Hg values in Early Triassic samples. Our data, especially the first Southern Hemisphere Hg record in Guryul Ravine, in combination with previous results, indicate global (high northern, equatorial and high southern paleolatitudes) abnormal mercury deposition at the EPME. This corresponds to eruption of STLIP as indicated by the generally positive Δ^{199}Hg values, which reflect increased atmospheric-derived Hg. In contrast, there is no evidence for a global Hg/TOC anomaly during the protracted Early Triassic biotic recovery, arguing against continuing massive Hg input from the STLIP