Mercury chemostratigraphy as indicator of Deccan volcanism in Hell Creek, Montana

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Despite substantial research, the exact cause of the end-Cretaceous extinction remains unknown. The dominant hypotheses point to either the Chicxulub bolide impact, Deccan Traps (DT) volcanism, or both, as the instigator of the ecological and environmental changes that led to the mass extinction. In order to test whether the pacing of DT eruptions and associated atmospheric volatiles were a factor in the extinction and ensuing recovery, a tracer is needed to construct a relative timeline with high precision—making it more useful for comparison with biological and paleoenvironmental records.

This study uses mercury (Hg) concentration as one such tracer. Hg is ideal for this purpose, as volcanic eruptions are its primary non-anthropogenic source and it is capable of global dispersion and deposition. We assemble Hg chemostratigraphy in the Hell Creek region of Montana, where a high-resolution chronostratigraphy through the Cretaceous-Paleogene boundary (KPB) extinction and recovery interval has already been established. Terrestrial ecosystems were more severely affected than marine ecosystems at the KPB. This record, one of the first from a terrestrial environment, is directly correlatable with the region's extensive paleontological and paleoclimatological data.

We will present Hg concentration data spanning the known DT eruptive interval from the Hell Creek region. We see multiple peaks in Hg concentration, including one within centimeters of the KPB, as well as several in the early Paleogene. The (~3x background) peaks in the early Paleogene suggest several large DT eruptive intervals immediately post-KPB, which could have suppressed ecological recovery.