Geophysical Research Abstracts
Vol. 20, EGU2018-10308, 2018
EGU General Assembly 2018

Mercury chemostratigraphy links Deccan volcanism to global climate change, biotic turnover, end-Cretaceous mass extinction and delayed recovery

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Mercury (Hg) chemostratigraphy in marine and terrestrial sequences yields a direct record of the timing and intensity of LIP volcanism that potentially links global climate changes, mass extinctions and delayed recovery to specific LIP eruptions phases. Although Hg anomalies have been reported from at least four of the five major mass extinctions, the global distribution, environmental impact on marine and terrestrial life, and potential role of LIP volcanism in mass extinctions and delayed recovery remain to be demonstrated beyond regional distributions and narrow time intervals. Deccan volcanism in India provides a unique opportunity to test Hg chemostratigraphy's link on a global basis due to recent developments in high-resolution U-Pb geochronology of the main phase of Deccan eruptions in C29r and the well-documented global climate and microfossil records. We present the first comprehensive high-resolution analysis of Deccan Trap Hg loading, climate change and end-Cretaceous (KTB or KPB) mass extinction from the world's most complete and expanded C29r sedimentary record at Elles, Tunisia, the global GSSP auxiliary to El Kef. We demonstrate the global distribution based on biostratigraphy and Hg correlation with sections in Spain (Agost and Zumaia) and Israel (Mishor) plus another 18 localities have been analyzed for global coverage (Adatte et al., this session). The sum total of these analyses yields the first comprehensive correlation directly linking Deccan volcanism to climate change and the global mass extinction in marine sediments via Hg chemostratigraphy. This is a major turning point in mass extinction studies with the power to reveal the nature and cause of mass extinctions, the long delayed recovery that followed, and the roles of Deccan volcanism and Chicxulub impact in the KTB mass extinction.