



Near Coincidence Of Maximum Deccan Volcanism With The Cretaceous-Paleogene Boundary: A Multiproxy Approach

Thierry Adatte (1), Gerta Keller (2), Eric Font (3), Blair Schoene (2), André Mbabi Bitchong (4), and Syed Khadri (5)

(1) Lausanne, Institute of Earth Sciences, ISTE, Lausanne, Switzerland (thierry.adatte@unil.ch), (2) Department of Geosciences, Princeton University, Guyot Hall, Princeton, NJ 08544, USA, (3) Faculdade de Ciências, University of Lisbon, Campo Grande, Edifício C8, Piso 3, Lisbon, 1749-016, Portugal, (4) Department of Earth Sciences, Faculty of Science, University of Yaounde 1, Yaounde Cameroon, P.O.Box 812, Cameroon, (5) P.G. Department of Geology, Amravati University, Amravati, 444602, India

Several studies evaluated the relationship between Hg anomalies in sediments and LIP activity across mass extinction horizons. The bulk (80%) of Deccan Trap eruptions occurred over a relatively short time interval in magnetic polarity C29r. U-Pb zircon geochronology reveals the onset of this main eruption phase 250 ky before the Cretaceous-Tertiary (KT) mass extinction and continued into the early Danian suggesting a cause-and-effect relationship. We investigate the mercury (Hg) contents of sections in France (Bidart), Spain (Zumaya), Denmark (Nye Klov), Austria (Gams), Italy (Gubbio), Tunisia (Elles, El Kef), Egypt (Wadi Nukhul, Sinai, Duwi, Eastern Desert), Israel (Negev), India (Meghalaya), Texas USA (Brazos River) and NE Mexico (El Penon, La Parida). In all sections, results show Hg concentrations are more than 2 orders of magnitude greater during the last 100ky of the Maastrichtian up to the early Danian P1a zone (first 380 Ky of the Paleocene). These Hg anomalies are correlative with the main Deccan eruption phase. Hg anomalies generally show no correlation with clay or total organic carbon contents, suggesting that the mercury enrichments resulted from higher input of atmospheric Hg species into the marine realm, rather than organic matter scavenging and/or increased run-off. At Gams, Bidart and Elles, Hg anomalies correlate with high shell fragmentation and dissolution effects in planktic foraminifera indicating that paleoenvironmental and paleoclimate changes drastically affected marine biodiversity. Hg isotope data from Bidart support a direct fallout from volcanic aerosols. PGEs data from Mishor Rotem (Israel) from the KPg layer and two uppermost Maastrichtian red clay layers provide some important clues about the Hg deposited in the KPg layer, which appears to be more linked to volcanism than impact, suggesting a major pulse of Deccan activity just before and at the KPg. These observations provide further support that Deccan volcanism played a key role in increasing atmospheric CO₂ and SO₂ levels that resulted in global warming and acidified oceans, increasing biotic stress that predisposed faunas to eventual extinction at the KPg.