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Deccan Volcanism likely cause for K-T Mass Extinction

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Recent advances in Deccan volcanic studies suggest that the main phase of eruptions occurred rapidly over tens of thousands of years near the end of the Maastrichtian (Chenet et al. 2007, 2008) and may have caused the mass extinction as initially discovered in intertrappean sediments exposed in quarries of Rajahmundry, SE India. In these shallow marine sediments early Danian zone P1a planktic foraminifera were deposited in C29r immediately above the last mega eruption of the main volcanic phase (Keller et al. (2008). At Jhilmili in central India (Madhya Pradesh), early Danian zone P1a assemblages were also discovered in intertrappean sediments, which mark a marine incursion in a predominantly terrestrial sequence which signals a major seaway existed at K-T time. In Meghalaya, NE India, about 600 km from the Deccan volcanic province the K-T boundary and mass extinction identified from planktic foraminifera, calcareous nannofossils and palynomorphs is marked by very large Ir (11.8 ppb), Ru, Rh and Pd anomalies. High biotic stress conditions precede the KTB.

Critical new data linking Deccan volcanism to the K-T mass extinction comes also from investigations of subsurface cores drilled in the Krishna-Godavari Basin, eastern India, by the Oil and Natural Gas Corporation of India (ONGC). In eight subsurface cores examined, a total of 4 volcanic megaflows have been identified as occurring in very rapid succession near the end of the Maastrichtian. These megaflows span a 1000 km across India and out to the Gulf of Bengal. They are the longest lava flows known in Earth's history. Preliminary evaluation of the biotic effects of these megaflows on planktic foraminifera indicate that after the first megaflow up to 50% of the species disappeared and with each new megaflow more species died out culminating in near total mass extinction coincident with the last megaflow by K-T boundary time. After the mass extinction, no megaflows reached the Krishna-Godavari Basin for about 250-280 ky during which time a low diversity early Danian assemblage of small new species evolved globally. The last major Deccan volcanic pulses began at the C29R/C29N boundary and may have been the cause for the long delay in the full biotic recovery.

These studies suggest that the real cause for the K-T mass extinction may have been the main phase of Deccan volcanic eruptions at the end of the Maastrichtian. In particular, the rapid succession of megaflows and the massive SO2 emissions estimated at least 10 to 30 times those from the Chicxulub impact may have caused a deadly runaway effect that lead to the K-T mass extinction.

Chenet, A-L. et al. (2007) EPSL 263, 1-15; Chenet et al. (2008) JGR, 113, B04101; Keller, G. et al. (2008) EPSL 268, 293-311.