



Main Deccan Trap Eruptions occurred close to the Cretaceous-Tertiary Boundary: increasing Multiproxy Evidence

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Recent studies indicate that the bulk (80%) of the Deccan trap eruptions occurred over less than 0.8 m.y. in magnetic polarity C29r spanning the Cretaceous-Tertiary boundary (KTB) (Chenet et al, 2007, 2008). Detailed multiproxy studies from several sections from southeastern India (Rajhamundry, Andhra Pradesh) and central India (Jilmili, Madhya Pradesh) place the KTB event near the end of the main Deccan eruptive phase and indicate that Deccan volcanism could have been a major contributor to the mass extinction (Keller et al., 2008, 2009). Geochemical, mineralogical and micropaleontological evidence from localities outside India suggest that this megapulse took place in the uppermost Maastrichtian C29r (CF2-CF1 transition). For example, a rapid shift in 187Os/188Os ratios observed in three deep-sea sections (Atlantic, Pacific and Indian Oceans) are interpreted to mark the onset of the main Deccan pulse in C29r (Robinson et al., 2009). Foraminiferal oxygen isotope data from DSDP Site 525 (South Atlantic) show a short rapid global warming in C29r (Li and Keller, 1998) coincident with the decline in 187Os/188Os ratios. This warming is also observed in the terrestrial plant record (Wilf 2003). A coeval increase in weathering observed in Site 525 and Tunisia (Adatte et al., 2002) is marked by dominant kaolinite clay assemblages. In the same interval a significant decrease in bulk carbonate content suggests acidification due to volcanic SO₂. Enhanced dissolution is also observed at DSDP Site 527 and Gubbio, Italy. Calcareous microfossils (planktic foraminifera and nannofossils) experienced major stress conditions expressed by species dwarfing, decreased diversity and decreased abundance (Keller, 2005). These observations indicate that Deccan volcanism played a key role in increasing atmospheric CO₂ levels that resulted in global warming and enhanced greenhouse effect, which coupled with high SO₂ emission increased biotic stress and predisposed faunas to eventual extinction at the KTB.

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