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Deccan Volcanism or the Chicxulub Impact: The Chicken or Egg Question

Gerta Keller
Gerta Keller, Geosciences Department, Princeton University, Princeton NJ 08540, USA

The Cretaceous–Paleogene boundary (KTB or KPB) mass extinction is primarily known for the demise of the dinosaurs, the Chicxulub impact, and the rancorous forty-year-old controversy over the cause of this mass extinction. For the first 30 years, the controversy primarily revolved around the age of the impact claimed as precisely KTB based on the assumption that it caused the mass extinction. The iridium (Ir) anomaly at the KTB was claimed proof of the asteroid impact, but no Ir was ever associated with impact evidence and recent findings reveal no extraterrestrial component in PGEs or the KTB Ir anomaly. Impact melt rock glass spherules are also claimed as indisputable evidence of the KTB age impact, but such spherule layers are commonly reworked from the primary (oldest) layer in late Maastrichtian, KTB and Danian sediments; thus only the oldest impact spherule layer documented near the base of zone CF1 ~200 ky below the KTB can approximate the impact's age. Similarly, the impact breccia in the Chicxulub impact crater predates the KTB. The best age derived from Ar/Ar dating of impact glass spherules is within 200 ky of the KTB and thus no evidence for the KTB age. All evidence strongly suggests the Chicxulub impact most likely predates the mass extinction ~ 200 ky and played no role in it.
Deccan volcanism (LIP) was dismissed as potential cause or even contributor to the KTB mass extinction despite the fact that all other mass extinctions are associated with Large Igneous Province (LIP) volcanism but none with an asteroid impact. During the last decade, Deccan volcanism gained credence based on a succession of discoveries: 1) the mass extinction in between the longest Deccan lava flows across India; 2) high-precision dating of the entire sequence of Deccan volcanism based on UPb zircon dating; 3) recognition of four distinct eruption pulses all related to global climate warming with the largest pulse beginning 20 ky prior to and ending at the KTB; 4) Identifying the climate link to Deccan volcanism based on age dating and mercury from Deccan eruptions in marine sediments; and 5) Identifying the KTB mass extinction directly related to the major Deccan eruption pulse, hyperthermal warming and ocean acidification all linked to global mercury fallout from Deccan eruptions in marine sediments. Despite this remarkable culmination of evidence, the controversy continues with impact proponents arguing that Deccan volcanism didn't exist at the KTB – the impact was the sole cause.