



## **The global imprint of Deccan volcanism in the sedimentary record across the end-Cretaceous mass extinction**

Eric Font (1), Thierry Adatte (2), Gerta Keller (3), Anne Nédélec (4), Jahnavi Punekar (5), Julie Carlut (6), Céline Rémazeilles (7), Tamsin Mather (8), and José Mirão (9)

(1) IDL-FCUL, Instituto Dom Luís, Faculdade de Ciências da Universidade de Lisboa, Portugal, Fundacao da Faculdade de Ciências FCUL, IDL, Lisbon, Portugal (font\_eric@hotmail.com), (2) ISTE, Lausanne University, Geopolis, CH-1015 Lausanne, Switzerland, (3) Department of Geosciences, Princeton University, Princeton, NJ 08544, US, (4) GET-OMP, Université de Toulouse III, Toulouse, France, (5) Indian Institute of Technology Bombay, Powai, Mumbai 400 076, India, (6) Institut de Physique du Globe de Paris, Sorbonne Paris cité, Univ. Paris Diderot, UMR 7154 CNRS, Paris cedex 05, France., (7) Laboratoire des Sciences de l'Ingénieur pour l'Environnement, Pôle Sciences et Technologie, Avenue Michel Crépeau, 17042, La Rochelle Cedex 1, France., (8) Department of Earth Sciences, University of Oxford, Oxford, UK., (9) HERCULES Centre, ECT-Geosciences Department, University of Évora, Évora, Portugal.

Recent advances in U–Pb and Ar–Ar radiometric dating have improved constraints for the onset and duration of the entire Deccan Magmatic province. However, deciphering the global climate and environmental effects of Deccan volcanism and the contribution to the end-Cretaceous mass extinction remain challenging. Here we present a review of the sedimentary markers indicative of Deccan-induced global changes, including an interval of low magnetic susceptibility, mercury anomalies, akaganéite, and biologic markers of high-stress conditions (e.g., disaster opportunist species, test fragmentation). In Bidart (France), Zumaia (Spain) and Gubbio (Italy), a low magnetic susceptibility interval marks the uppermost 50 cm below the mass extinction, which corresponds to the loss of detrital and biogenic magnetite produced by magnetotactic bacteria, and to dwarfed disaster opportunistic foraminifera, marked by test dissolution and fragmentation. This is interpreted as the result of continental and oceanic acidification and change in seawater/sediment chemistry. The low MS interval is accompanied by mercury anomalies, which indicate input of volcanic origin as suggested by lack of total organic carbon. A chlorine-rich iron (oxyhydr)oxide in the mercury-rich low magnetic susceptibility interval indicates akaganéite, which is very rare on Earth because its precipitation requires hyper-chlorinated, acidic and oxidizing conditions compatible with a volcanic environment. We propose that the observed akaganéite formed at low temperature and high altitude in the Deccan volcanic plumes and via global atmospheric transport deposited at Bidart, Zumaia and Gubbio. The association of low magnetic susceptibility, mercury, akaganéite, and high-stress microfossil species and disaster opportunists thus provide new sedimentary markers of Deccan volcanism and environmental acidification leading up to the end-Cretaceous mass extinction.

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