Hg chemostratigraphy and Hg isotopes from sections straddling the KTB in Europe, India and South America

A. N. SIAL[1*], JIUBIN CHEN[2], L. D. LACERDA[3], V. C. TEWARI[4], M. K. PANDIT[5], C. GAUCHER[6], R. FREI[7], S. CIRILLI[8], V. P. FERREIRA[1], S. PERALTA[9], J. A. BARBOSA[1] AND N. S. PEREIRA[1]

[1]NEG-LABISE, Dept. Geology, UFPE, Recife, Brazil (*correspondence: sial@ufpe.br)
[2]Institute of Geochemistry, Guiyang 550002, China
[3]LABOMAR, UFC, Fortaleza, 60165-081, Brazil
[4]Wadia Inst. of Himalayan Geol., Dehradun, 248001, India
[5]Dept. Geology, University of Rajasthan, Jaipur, India
[6]Fac. Ciencias, Univ. República, Montevideo, Uruguay
[7] Dept. Geo. Nat. Res., Univ. of Copenhagen, Denmark
[8]Dipt. Sci. Terra, Univ. Studi Perugia, Perugia 06123, Italy
[9]Inst. Geología, UNSJ, San Juan, Argentina, 5400

We review and further investigate the use of Hg as a proxy for volcanism, using six distal and two proximal sections in relation to the Deccan volcanic center, straddling the KTB: (a) Europe (Stevns Klint, Gubbio, Padriciano), (b) India (Meghalaya, Jhilmili) and (c) South America (Bajada del Jagüel, Cabra Corral, Poty Quarry). Complete sections display strong negative $\delta^{13}C$ excursions at the KTB, while in near-complete sections, gradual fall of $\delta^{13}C$ values predates the KTB. Volcanogenic CO_2 enrichment of the atmosphere during the KTB transition led to large negative $\delta^{13}C$ excursions. O-isotope signals recorded a warming event predating the KTB, likely related to Deccan phase 2, followed by strong cooling at the KTB, probably related to high amounts of SO_2 released to atmosphere by the Deccan phase 2 and accumulated in the KTB transition. Warming events in the early Danian are, perhaps, related to early eruptions of Deccan phase 3. Almost all sections exhibit three Hg spikes. The one which predates the KTB and the spike that coincides with the KTB layer are likely related to Deccan phase 2. A third spike, probably related to the Deccan phase 3, is present in the early Danian in almost all sections. $\delta^{202}Hg$ values for the KTB layer at Stevns Klint, Gubbio and Jagüel Formation (-1 to -2 ‰) lie within the range for volcanogenic Hg. Most of the analyzed samples show small (but significantly higher than analytical precision of 0.04‰) positive $\Delta^{201}Hg$, in favor of long-term atmospheric transport prior to deposition.