



Terrestrial temperature changes during the Cretaceous-Paleogene transition interval in North China and their link to pre-boundary extinctions

Laiming Zhang (1), Chengshan Wang (1), Paul Wignall (2), Xiaoqiao Wan (1), Qian Wang (1), and Yuan Gao (1)

(1) State Key Laboratory of Biogeology and Environmental Geology, School of Earth Sciences and Resources, China University of Geosciences (Beijing), Beijing 100083, China (lmzhang@cugb.edu.cn), (2) School of Earth and Environment, University of Leeds, Leeds LS2 9JT, UK

Evaluating the terrestrial temperature record provides a critical test of the roles of Chicxulub impact, Deccan volcanism, and other geological events during the Cretaceous-Paleogene (K-Pg) mass extinction. Hitherto most evidence has come from North America but our new clumped isotopes data from paleosol carbonates in the Songliao Basin provides a terrestrial climate history from East Asia. The temperature changes in North China were very similar to other terrestrial/marine records. In the vicinity of the K-Pg boundary, there was a cooling with glacioeustatic regression, then a pre-impact warming caused by Deccan volcanism followed by a short-term cooling likely caused by Chicxulub impact. Comparison with biotic data from the Songliao Basin suggest that pre-impact Deccan volcanism links to losses amongst the lacustrine algae whereas extinctions of lacustrine ostracodes coincides with the brief cooling caused by Chicxulub impact. Thus, the onset Deccan volcanism during the Latest Cretaceous had already destabilized the ecosystem and caused extinctions prior to the devastation caused by Chicxulub impact.