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## **Faunal and environmental changes through the Cretaceous-Paleogene boundary (K-Pg) linked with Deccan Volcanism: evidence from the Neo-Tethys, Turkey**

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Recent multi-disciplinary efforts demonstrate a correlation between continental flood basalt (CFB) volcanism and major environmental catastrophes associated with four out of the five largest Phanerozoic mass extinctions. Unique among these is the end-Cretaceous mass extinction, which is potentially coincident with both the Chicxulub bolide impact and the Deccan volcanism. Among these two drivers, the role of the Deccan volcanism is crucial in order to decipher if there is a causal relationship between volcanism and environmental stress, and if so, how stressed the environment was during the latest Maastrichtian. To assess the cause-and-effect relationship between Deccan volcanism and climate change and mass extinctions, high-resolution biostratigraphy, quantitative species analysis coupled with geochemical measurements have been performed on complete sections of Mudurnu-Göynük and Haymana basins (Turkey).

In both basins Maastrichtian sedimentation is characterized by monotonous mudstones, which sharply in turn to marl-calcareous mudstone alternations in the earliest Danian. Detailed quantitative study on planktonic foraminifera of the Haymana Basin revealed that planktonic foraminiferal community in the latest Maastrichtian is dominated by ecological generalists with small, simple morphologies (e.g., *Heterohelix*, *Globigerinelloides*, *Guembelitra*). Among them low oxygen tolerant *Heterohelix globulosa* is the most dominant taxa and their abundance changing with the presence of stress marker *Guembelitra cretacea*. In all sections, the K/Pg boundary itself is characterized by 2-3 mm thick reddish oxidized layer which corresponds to sudden annihilation of large, ornamented ecological specialists (e.g., *Globotruncana*, *Rugoglobigerina*, *Racemiguembelina*). Right after the boundary, there is an acme of calcareous dinoflagellate cysts (*Thoracosphaera*) and a surge of *Guembelitra cretacea* indicate ecosystem collapse in post-K/Pg environment.

On the other hand, detailed quantitative analysis shows a systematic reduction in the species richness throughout the *Plummerita hantkeninoides* Zone corresponding to the final 150 kyr of the Cretaceous. Proliferations of the *Guembelitra cretacea* through late Maastrichtian is known as an indicator of high terrigenous influx; therefore, enhanced food resources. The high

sedimentation rates observed in all the studied sections might be linked to increased greenhouse conditions due to Deccan volcanism leading to enhanced weathering. Overall, our multiproxy approach including quantitative biostratigraphy and geochemical analyses highlights the influence of the Deccan volcanism by releasing high amounts of atmospheric CO<sub>2</sub> and SO<sub>2</sub>, leading to the climatic changes and associated biotic stress, which predisposed faunas to eventual extinction at the K/Pg boundary.