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How to cite:

Gilmour, I.; Pearce, C. A.; Jolley, D.; Sephton, M. A.; Widdowson, M. and Gilmour, M. A. (2012). Carbon isotope stratigraphy and palynology of an eastern Tethyan Cretaceous-Paleogene boundary section from Sumbar, Turkmenistan. In: EGU General Assembly 2012, 22-27 Apr 2012, Vienna.

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Version: Version of Record

Link(s) to article on publisher's website:

<http://meetingorganizer.copernicus.org/EGU2012/EGU2012-11298-1.pdf>

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Carbon isotope stratigraphy and palynology of an eastern Tethyan Cretaceous-Paleogene boundary section from Sumbar, Turkmenistan

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A number of marine sequences across the K/Pg boundary have been identified that offer reasonably continuous records and relatively high sedimentation rates, most notably those near Tethyan continental margins. However, few Eastern Tethys K/Pg localities have been studied compared to the well-known North African and Southern European sites. Here we present a high-resolution stable carbon isotope and palynological record of a 2m thick section across the K/Pg boundary from the eastern Tethys at Sumbar in Turkmenistan (38°28'N, 56°14'E). The stratigraphy and inorganic geochemistry of the section used in this study, SM-4, has been described in detail by [1].

A moderately diverse series of palynofloras were recovered from the samples spanning the K/Pg boundary with a late Maastrichtian assemblage comparable to that described from Tunisia [2]. Above the K/Pg boundary a dinocyst assemblage dominated by *Areoligera* is observed, reinforcing the similarity with Tunisia, that we interpret as representing a marine transgression by eutrophic water masses with the levels of *Areoligera* decreasing up section with a decline in nutrient availability.

Carbon isotope stratigraphy of bulk carbonate and bulk organic matter reveal correlated negative carbon isotope excursions (CIEs) across the K/Pg boundary. The extent of the CIE and the concomitant drop in carbonate content parallels that observed for bulk and fine fraction carbonate isotopic analyses from other K/Pg sections. The negative CIE of bulk organic matter is similar in magnitude to CIEs for organic matter that have been observed at only a few other marine K/Pg sections. In contrast, the marked CIE observed in bulk organic matter is not evident in the carbon isotopic compositions of algal lipids. We interpret this as a geochemical signature of post-K/Pg algal blooms.

Recent analysis identified the K/Pg boundary in the Boltysch meteorite crater sediment fill and reported evidence of a marine incursion into the crater during the Tethyan post K-Pg marine transgression [3]. This marine incursion is >1m above the K/Pg boundary and is marked by the same species of *Areoligera* recorded at Sumbar. Consequently, the potential for the existence of either a highly condensed section or a disconformity within at least some Tethyan K/Pg marine sections must be considered.

[1] Alekseev, A.S. et al., (1988) *Int. Geol. Rev.* 30, 121–135; [2] Slimani, H., Louwye, S., Toufiq, A. (2010) *Palynology* 34, 90–124; [3] Jolley, D.W., Gilmour, I., Gurov, E., Kelley, S., Watson, J. (2010) *Geology* 38, 835–838.