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Foraminiferal transition across the K-P boundary in the Gulf of Mexico and the Chicxulub crater

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The K-P transition of planktic and benthic foraminifers in the Gulf of Mexico and the Chicxulub crater is stratigraphically complicated because of the occurrence of impact-ejecta rich clastic deposits at the K-P boundary. Preservation of foraminifers in all outcrops of the Mexican Gulf coastal plains is poor, although the species richness is high, in particular in the deep water sections like Coxquihui. The Texas coastal plain outcrops near Brazos River (Brazos-1 is studied here) offer a better preservation, but the species richness is low. Large, specialized species like *Gt. stuarti, R. fructicosa, C. contusa* and *A. mayaroensis* are absent. Faunas are dominated by heterohelicids and rugoglobigerinids. Yet the uppermost Maastrichtian can be demonstrated on the basis of nannofossils (Jiang & Gardner, 1986. *Micropaleontology*, *32*: 232-255). The specimen abundance of planktic foraminifers drops spectacularly in the uppermost beds of the clastic deposits, represented by 21cm of graded semi-lithified silt-mudstones in the Brazos-1 section (units F-G of Hansen, 1987. *Cretaceous Research*, *8*: 229-252). These beds contain enhanced abundances of iridium, smeared over the same 21cm. The first (very scarce) Paleocene foraminifers appear about 1.3m above the lithological marker bed F. We could not confirm earlier reports of Paleocene foraminifers occurring in the clastic beds (Montgomery *et al.*, 1992. *EPSL*, *109*: 593-600), or their first occurrence near bed H (Keller, 1989. *Paleoceanography*, *4* (3): 287-332). The sequence of FADs is similar to El Kef (levels from base of bed F, the first iridium enrichment): first *G. minutula* (+1.25m), followed by *G. fringa* (+1.4m), *G. eugubina (var. longiapertura*) and *Eoglobigerina* spp. (+2.1m). Their FADs have been used for a biozonal scheme of the basal Paleocene (Smit & Nederbragt, 1997. *Marine Micropaleontology*, *29*: 94-100).

Benthic foraminifers suddenly change in Bed G. Their abundances decrease dramatically, and species richness is low in units F-I. Infaunal species (*Fursenkoina*) become dominant at three different levels (0.15-0.4m, 1.4m and 2.3m), following a spike of agglutinated foraminifers (0.12m). These three abundance peaks agree very well with three cooling episodes documented in the El Kef section at identical chronostratigraphic levels (Galeotti *et al.,* 2004. *Geology*: 529-532).

The Yaxcopoil-1 core in the Chicxulub crater shows a similar sequence, but a significant portion (upper part of magnetic anomaly 29R) is missing. Also iridium enriched deposits are missing, probably by erosion and dissolution on the seafloor, as shown by stylolite-like horsetail laminations in a thin clay topping a graded and cross-bedded dolomitic sand unit capping the suevitic ejecta. Reports of in situ Maastrichtian foraminifers in the dolomitic sand unit (Keller *et al.*, 2004. *Meteoritics and Planetary Science*, *39* (7):1127–1144) are based on erroneous misidentifications of fortuitous combinations of zoned dolomite crystals (Smit *et al.,* 2005. *Meteoritics and Planetary Science*, *39*:1113-1126), and cannot be used to demonstrate a Maastrichtian age of the Chicxulub impact.

All combined evidence strongly indicates a single impact triggering a massive extinction and radiation event at the K-P boundary.

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