



Timing and duration of biotic extinction and recovery at the Cretaceous/Paleogene boundary in Texas and Alabama

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The Cretaceous/Paleogene boundary successions in Texas and Alabama provide a sedimentary record of events relatively close to the Chicxulub impact site. Recent work in both areas has shown that there was a single 'impact' event that is coincident with extinctions of planktic foraminifera and calcareous nannofossil, although the dinoflagellate cyst community was little affected. The benthic foraminifera in the Texas successions are, remarkably, little affected with many taxa being found in both the Corsicana Mudstone Formation (uppermost Maastrichtian) and the Kincaid Mudstone Formation (lowermost Paleocene). In the sediments just above the erosive surface that marks the 'impact' event (and the K/Pg boundary) there are large benthic foraminifera, including nodosariids <1.5 mm in length and lenticulinids <1.5 mm in diameter. This assemblage is rather unusual, and we have been unable to determine any modern, or fossil, equivalent. As *Lenticulina rotulata* Lamarck occurs throughout the succession, this taxon has been used for stable isotope analysis ($\delta^{18}\text{O}$ and $\delta^{13}\text{C}$) of a range of different size fractions. The results show both a variation in oxygen and carbon isotope values with size as well as a distinct cyclicity which, almost certainly, reflects astronomical tuning. It is possible, therefore, to use this cyclicity to determine the possible duration of zones P0 and P α (80–100 kyrs), and the timing of biotic recovery following the 'impact' event. The size of the stable isotope excursions (close to the base of zone P1a) is indicative of the Dan-C2 and the Lower 29n hyperthermal events, allowing direct correlation with the two other locations where these have been described: most notably in the Gubbio succession where there is also a good record of the magnetostratigraphy and biostratigraphy.