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Benthic foraminifera across the K/Pg boundary in the Brazos River area (Texas) and Stevns Klint (Denmark): sequence stratigraphy, sea level change and extinctions.

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While the majority of micropalaeontologists have concentrated on the planktic foraminifera of the Brazos River succession (in order to define the position of the K/T boundary), there are relatively few studies of the benthic foraminifera published. There are a number of sites available for study, including the Brazos River itself and the tributaries of Cottonmouth Creek and Darting Minnow Creek. There have also been a number of drill cores recovered from the area including the Mullinax – 1 core which we have studied. Almost all of the benthic foraminifera recovered from the Mullinax – 1 core were described by Joseph Cushman (1946) in his monograph.

The Corsicana Formation (Kemp Formation of the State Geological Map) of latest Maastrichtian age is overlain by the Littig Member of the Kincaid Formation which includes, at its base, the so-called "Event Bed". The base of this unit is the "impact-defined K/T boundary" of many authors (e.g., Yancey, 1996). The "Event Bed" contains a number of discreet (but thin) sedimentary units including spherule-rich layers, shell lags and a number of hummocky sandstone beds (Gale, 2006). In a recent paper, Keller et al. (2009) have identified an "impact" layer below the "Event Bed" and a K/T boundary higher in the succession that most other authors.

In the Mullinax – 1 core, there is a diverse fauna of benthic foraminifera, although the species count is much less than that described by Cushman (1946). This is almost certainly the result of the small sample size available in the small diameter core. There is a distinctive assemblage of mid–outer shelf taxa, including agglutinated foramininfera (Tritaxia, Verneuilina, Plectina, etc.) and aragonitic taxa (Epistomina). The numbers of agglutinated taxa in the Mullinax – 1 core are much reduced at the level of the "Event Bed" and this, coupled with the changes in the planktic fauna, indicates a (fairly) marked drop in sea level. Both Yancey (1996) and Gale (2006) argue that this brings the sea floor into the range of storm wave base and that this is what is indicated by the "Event Bed".

There are a number of water-depth changes in the famous Stevns Klint succession in Denmark, although the majority of the benthic taxa are different. All belong to the normal Chalk Sea assemblage of North West Europe. The planktic assemblage in Denmark is limited and there are no aragonitic taxa (preservation problems). Benthic foraminifera are rare, though generally more abundant in the chalks immediately below the K/T boundary.

Work on material from Denmark and the Brazos River successions is on-going including a more detailed assessment of the various morphogroups represented. The presence of an unusual "foraminiferal sand" within the lowermost Paleocene of the Cottonmouth Creek succession has yet to be fully described and its presence is not fully understood (environmental control or re-deposition?).

A sequence stratigraphical interpretation of the successions in Texas and Denmark has shown parallel changes in sea level (of the same magnitude in both areas) that are coincident with the major lithological changes. The most

significant feature is a fall in sea level some tens of thousands of years before the K/Pg boundary.

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