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The Cretaceous-Paleogene boundary in the Brazos River area (Texas): new sections and revised interpretations

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The Brazos River area of Texas is famous for outcrops of the K/Pg transition and lowermost Paleocene strata. A number of new, un-described sections have been investigated and they provide biostratigraphical and sedimentological information on the events preceding, during and following the Chixculub impact event. The mudstones of the Corsicana Formation (Maastrichtian) contain a number of very thin volcanic ashes, including the yellow/white gypsum-rich horizon incorrectly regarded by some workers as evidence of a pre-K/Pg boundary impact.

The mudstones of the Corsicana Mudstone Fm (uppermost Maastrichtian) were significantly eroded by the end-Cretaceous tsunami and the surficial unconsolidated muds as well as a thickness of lithified mudstone eroded and put into suspension, thereby providing the reworked Cretaceous assemblages of microfossils recorded by a number of authors. Erosional relief on the 75–100 m deep sea floor is visible in Cottonmouth Creek and the new River Bank South section as a series of ridges and erosional troughs, trending NW-SE. Trough lows are in-filled with mud-matrix mass flow deposits containing large blocks of Maastrichtian mudstones and transported concretions. These are overlain with granular shell-rich sediments containing spherules, fish teeth, bone fragments and re-worked foraminifera and hummocky cross-stratified storm sands with mudstone inter-beds. Sea floor ridges remained exposed to open marine waters and were colonized with a thin oyster pavement before burial by Kincaid Formation mudstones and siltstones. A return to quiet water conditions during the earliest Paleocene is recorded in a new 3–6 m section of foraminifera-rich mudstones, siltstones and sandstones bounded above and below with zones of carbonate and pyrite concretions, best seen in the River bank South section. The foraminiferal sand unit contains steinkerns and phosphatic concretions indicative of a condensed deposit. The P1a/P1b zonal boundary lies near the top of these foraminiferal sands.

Our investigations for the foraminifera and other microfossils from these successions are on-going and the newly discovered volcanic ashes are being investigated and dated. The timing of the events at the K/Pg boundary in Texas can be correlated with the successions in Denmark (Stevns Klint) and the Atlantic Ocean (e.g., Demerara Rise), thereby giving an holistic picture of the end-Cretaceous events.