IS THE "MID-CRETACEOUS UNCONFORMITY" IN THE GULF OF MEXICO A CRETACEOUS-TERTIARY BOUNDARY IMPACT-WAVE EROSION SURFACE?

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Several discoveries point to the Gulf of Mexico-Caribbean region as the site of a large-body impact at the Cretaceous-Tertiary (KT) boundary. These include (1) discovery of tsunami deposits at the KT boundary on the U.S. Gulf Coastal Plain and probably in nearby Mexico [1], (2) the finding of altered tektites with glassy cores in the KT boundary in Haiti [2, 3], (3) recognition of the Chicxulub structure in Yucatan as a probable impact crater 150-200 km in diameter of at least approximately KT age [4], (4) discovery of KT boundary turbidites in DSDP sites 151 and 153 in the Caribbean [5], and (5) current-sorted sands probably due to proximal KT impact-wave effects in Gulf of Mexico DSDP sites 540 and 536 [6].

If the north coast of Yucatan was the site of a large-body impact at KT boundary time, one would expect major disturbances of the stratigraphy in the Gulf of Mexico as a result of waves generated by the impact itself and by the dumping of large volumes of ejecta into the Gulf. The disturbances might be particularly intense in a small, closed basin like the Gulf, where the wave trains would not quickly attenuate. We thus call attention to the most prominent feature of Gulf of Mexico seismic stratigraphy as a candidate for this KT boundary disturbance.

The feature known as the Mid-Cretaceous Unconformity (MCU) is very prominent on seismic profiles of the continental margin of northern and eastern Yucatan and southwest Florida [7-9]. Its character varies from place to place, but includes both truncation of the underlying reflectors and onlap of the overlying reflectors [9]. The MCU has been traced as a reflector continuing through the sedimentary sequence of the deep Gulf of Mexico and up onto the continental margin of the southern U.S., but in these areas it is not as prominent a discordance as it is off Yucatan and southwestern Florida. The MCU has been attributed both to sea-level fall and sea-level rise [9], but its localized development in the Gulf suggests that it may be the result of local rather than global causes.

A direct way to date the MCU is to identify its intersection of a well with biostratigraphic age control. The mid-Cretaceous age of the MCU was apparently confirmed in DSDP 540 [8, 9], where there is an absence of

identified biostratigraphic zones between the Cenomanian and the Maastrichtian. The 45-m interval between Cenomanian and Maastrichtian includes pebbly mudstones containing Cenomanian forams, and indicative of bottom instability. This situation is compatible with a broadly "mid" Cretaceous event. This age call for the MCU must be reconsidered on the basis of a re-evaluation of DSDP 540 [6], which indicates that the 5 m interval between the Cenomanian pebbly mudstones and the Paleocene is composed of current-bedded glass-rich sands that are well explained as the result of a KT boundary impact either at Chicxulub, on the north coast of Yucatan, or at a nearby oceanic site. If this is correct, the prominent stratigraphic discontinuity and disturbance in DSDP 540 is of KT boundary age, and the MCU, which passes through this part of the drill hole, is therefore almost surely of KT boundary age. Faust [9] cited Exxon Destin well no.3 in the western Florida offshore as supporting the Cenomanian age for the MCU. This conclusion may be doubted because (a) the discontinuity in this well identified as the MCU places Early Cenomanian on top of Albian, which indicates a very minor stratigraphic gap, if any, and (b) the MCU on seismic lines loses its distinctiveness between its characteristic area (including DSDP 540) and the Gulf Coast of the U.S., so it is not clear that the seismic discordance has been correctly traced to the north.

If this redating of the Mid-Cretaceous Unconformity as of KT boundary age turns out to be correct, we suggest that the well established initials MCU (which are marked on many published seismic lines) be retained, but that they now be considered an abbreviation for "Mesozoic-Cenozoic Unconformity"!

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