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The Cretaceous-Paleogene boundary unit, Gulf of Mexico: Character, distribution, and relation to the Chicxulub impact

Sanford, J. C.[1], Gulick, S. P. S.[1], Snedden, J. W.[1]
jsanford@ig.utexas.edu
1. Jackson School of Geosciences, The University of Texas at Austin, Austin, TX

Since it was first identified in Italy and Tunisia, the Cretaceous-Paleogene (K-Pg) boundary unit has been interpreted to comprise the stratigraphic record of a catastrophic extraterrestrial impact that occurred off of the coast of the Yucatán Peninsula at the end of the Maastrichtian. As the petroleum industry has investigated deeper objectives in the Gulf of Mexico stratigraphy, well penetrations have revealed a thick (>100-meter) interval that is believed to be the K-Pg boundary unit. Based on well-log data, the K-Pg boundary unit in the deep-water Gulf of Mexico is interpreted to be a micritic mega-breccia that resulted from catastrophic marine and submarine processes in the wake of the Chicxulub impact.

Mapping on two- and three-dimensional seismic reflection data throughout the Gulf of Mexico reveals a widespread distribution for the unit that thickens substantially (up to ~1000 meters) in areas and is representative of deposition in a submarine environment strongly influenced by allochthonous salt movement. For the first time, correlation of the unit from the deep-water Gulf of Mexico to the Chicxulub crater on two-dimensional seismic reflection data supports a causative link to the impact event. As such, results suggests that the K-Pg boundary unit in the Gulf of Mexico is the result of catastrophic marine and submarine processes (e.g., extreme seismogenesis, megatsunami generation, massive slope collapse, and mass sediment flow) that occurred as a result of the Chicxulub impact event, drastically altering seafloor topography for subsequent deposition.

Keywords: Cretaceous-Paleogene boundary unit, Chicxulub crater, seismic stratigraphy, Gulf of Mexico