

Chicxulub Impact Tsunami Deposits at the K–Pg Boundary in Northern Louisiana?

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ABSTRACT

Features resembling large-scale dunes with average trough-to-trough length of 600 m (1970 ft) and average trough-to-peak height 16 m (52 ft) exist on a seismic horizon at or near the Cretaceous-Paleogene (K–Pg) boundary over the 200 km² (77 mi²) of a 3D seismic survey from northern Louisiana. We examined the seismic data volume to determine whether or not the features observed in the data represent acquisition or processing artifacts. We conclude that the features are neither due to acquisition footprints nor to other data artifacts and are images of paleotopography as expressed in the distinctive seismic horizon characteristic of the uppermost Cretaceous strata.

Seismic velocities determined from correlation of several well logs with the seismic data and volume of shale calculations performed on the well log data are utilized to investigate the possible lithology of the unit within which the dunes are developed. The results are consistent with the expectation that the uppermost Cretaceous is the Arkadelphia Marl as is common over northern Louisiana. Further investigations are underway to determine the true lithology and paleontology within these dune-like features.

We investigated several possible depositional processes which might explain these dune-like features, including soft-sediment slumping, eolian dune deposition, mega-flood deposits and tsunami-caused subaqueous dunes (in particular those of the 2011 Tohoku-oki tsunami at Kesennuma Bay, Japan). Our hypothesis is that these features represent large-scale, flow-transverse bedforms emplaced by tsunami waves generated by the end-Cretaceous Chicxulub impact event on the Yucatán Peninsula.