

HYDROGEOLOGICAL EVIDENCE FOR A POSSIBLE 200 KM DIAMETER K/T  
IMPACT CRATER IN YUCATAN, MEXICO, Pope, K.O., Geo Eco Arc Research  
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A ring of sink holes, known locally as cenotes, was recently identified in northwestern Yucatan, Mexico using Landsat Thematic Mapper imagery (1). The cenotes form a nearly perfect 170 km diameter ring, which demarcates a boundary between unfractured limestones within the ring, and fractured limestones outside. This boundary is a barrier to lateral ground water flow, resulting in increased flow, dissolution, and collapse along the boundary (2).

This Cenote Ring correlates with circular gravimetric and magnetic highs near the ring's center, and concentric gravimetric and magnetic lows just outside the ring, which have been interpreted as evidence for a buried comet or meteor impact feature (3,4). Subsurface data from exploratory oil wells drilled by Petroleos Mexicanos (Pemex) confirm that the anomalies at the center of the Cenote Ring are partly caused by the presence of a large body of andesitic rock 1.5 km below the surface, which is possibly impact melt (3,5). The anomalies outside the ring correspond with a zone of offset strata recorded in the Pemex bore holes (6), which we interpret as normal faults.

We propose that these normal faults are ring faults from a buried crater, and that post-impact slumping in the rim of the crater has caused the fracture pattern that formed the Cenote Ring. Gradual subsidence of crater rims due to gravity is well established (7), especially in semi-viscous material such as the weakly consolidated shallow marine sediments of the Yucatan shelf. The ring corresponds with the floor of the proposed crater; the actual rim diameter is over 200 km, which if confirmed would make the Yucatan impact the largest known terrestrial impact.

The Cenote Ring correlates with a 1 km deep Late Cretaceous basin, which is consistent with the depth of known large craters in sedimentary rock. The lithology of the Late Cretaceous rocks (6) is also consistent with an impact. Overlying the zone of proposed ring faults is a 500-700 m thick layer of conglomerates and breccia interpreted as reworked impact ejecta. Shocked quartz, indicative of impacts, has been reported from the ejecta (8). Over 500 m of breccia, sandstone, shale, and marl overlie the andesitic rock in the center of the proposed crater, which are interpreted as impact breccia and reworked ejecta deposits.

The exact age of the proposed impact is not known, but it is possibly terminal Cretaceous. The proposed impact ejecta, and the sequence of crater fill deposits, contain Upper Cretaceous (Maastrichtian) fossils (6). This crater fill was possibly deposited by displaced sea water immediately after impact. The proposed ejecta appears to be reworked, possibly also by the action of displaced sea water. If these deposits do represent reworking immediately after impact, then the impact would date to the Cretaceous/Tertiary (K/T) boundary, since subsequent deposits are Tertiary and there is no evidence of a depositional hiatus.

## YUCATAN K/T IMPACT: Pope, K.O., Ocampo, A.C., Duller, C.E.

Over a decade of research has provided abundant evidence that a major comet or meteor impact occurred at the K/T boundary and that this impact is largely responsible for the mass extinctions that mark the end of the Cretaceous (e.g. 9). Recent research has pointed to the Caribbean region as the most likely location of the K/T impact (10). The apparent age, location, and size of the proposed Yucatan impact make it one of the best candidates for the global K/T catastrophic event, although multiple K/T impacts remain a possibility. Regardless, the Yucatan impact alone would have had a devastating impact on the climate and biota of the Earth.

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