

Cosmic Impact in the Coastal Plain of Mississippi? The Kilmichael Structure

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ABSTRACT

The Kilmichael structure, a probable impact crater in Montgomery County, Mississippi, is a circular, structurally disturbed feature possessing a diameter of approximately 5.6 mi. A refraction seismic survey reveals subsurface characteristics of an impact structure, including a central uplift, annular graben, and concentric inward-dipping faults. A gravity profile like that of some confirmed impact craters is present. In a key core hole at the structure's center, 770 ft of section, consisting mainly of breccias and large intact blocks, was penetrated and sampled. In this paper, we have reinterpreted the sequence of drilled strata as follows (in reverse stratigraphic order): (1) soil and colluvium; (2) post-impact laminated marine sediments; (3) conglomeratic aqueous washback or resurge deposits of mixed provenance; (4) interbedded impact breccias and target rock blocks, *i.e.*, surgeback deposits; (5) large, deformed and rotated blocks of the Upper Cretaceous Ripley Formation; and (6) interbedded impact breccias and target rock blocks, mainly Upper Cretaceous chinks. The stratigraphic age of this structure is probably late early to early late Paleocene, based on the fossil age of material from the youngest recognizable intact block drilled in the key core hole. The Kilmichael area was in a marginal marine to shallow marine setting at the time of deformation and the drilled stratigraphy is consistent with aqueous or "wet-target" impact.