# Geology of a shallow cross-section transect of Wetumpka Impact Structure, Alabama

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## Abstract

Access to right of ways for power lines, road, and a gas pipeline and recent core drilling affords the opportunity to construct a shallow geological transect across the ~ 5 km, Late Cretaceous, marine-target impact structure at Wetumpka, Alabama. From northwest to southeast, the transect reveals deformed crystalline rim terrain, vertically stacked sedimentary target mega-blocks, sedimentary target megablocks in impactite matrix, stacked and faulted sedimentary target megablocks, interior polymict impact breccia, resurge chalk deposits, and steeply inclined, deeply weathered (saprolitic) crystalline rim terrain. Core drilling near the transect indicates that sedimentary target megablock deposits are lateral facies equivalents, whereas the resurge chalk deposits and interior impact breccia unit rest upon those facies. The relative age of the resurge chalk deposits and the interior impact breccia is not known at this time. The formative events that generated the units seen in the geological transect are all related to late stage modification of the Wetumpka impact structure and likely represent the last few minutes in Wetumpka's sequence of events.

The surface of the Earth is roughly 70% water, therefore cosmic impacts on Earth most often occur at sea. Current knowledge about impact processes and impact craters is based mainly on dry target laboratory experiments, computer modeling, extraterrestrial examples, and evidence from terrestrial impacts on land (Ormö and Lindstrom, 2000). In general, marine impacts are less well-understood than dry, terrestrial targets. Large craters forming in shallow water will exhibit many of the morphological features indicative of their size (Ormö and Lindstrom, 2000). Additionally, marine-target impacts will show evidence of powerful hydrodynamic erosional forces as well as hydraulic reworking and deposition of extant and/or impact-generated earth materials not found in dry-target impact structures (von Dalwigk and Ormo, 2001; Poag et al., 2004). Complex impact craters are characterized by a central peak, a flat basin floor, and mass-wasting features of significant size within the structure (Melosh, 1989). Marine-target impact structures deviate from morphologies of dry impacts. Wetumpka is large enough to be a complex target crater but the central peak is not evident. Wetumpka, Alabama, USA is the site of a Late Cretaceous, marine-target impact crater structure located on the inner Coastal Plain of Alabama. During Late Cretaceous, Wetumpka was located offshore from a barrier-island shoreline and the impact target area was a submerged continental shelf of the sea that formed the northern reaches of the Gulf of Mexico.