

SHALLOW SUBSURFACE STRATIGRAPHY OF THE WETUMPKA IMPACT STRUCTURE, ALABAMA USA.

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Introduction: The Wetumpka impact structure is a Late Cretaceous marine target impact feature located in central Alabama USA (32deg 31min N; 86deg 10min W). The total structural diameter is c. 6 km, but the inner crystalline rim has a diameter of c. 5 km. Wetumpka's submarine target formations included (in reverse age order): a few m of lower Mooreville Chalk, the clastic paralic Eutaw Formation, the clastic fluvial Tuscaloosa Formation, and basal weathered crystalline Piedmont metamorphic rocks. Wetumpka's geochronological age (based on (U-Th)/He dating method) is 84.4 plus or minus 1.4 m.y., which is near the Santonian-Campanian boundary. Wetumpka impact structure consists of three surficial terrains, including crystalline rim, interior (intracrater sediments and broken formations), and exterior (structurally disturbed target formations).

Drilling results: To date, eight shallow core holes have penetrated the upper ~ 200 m at Wetumpka. In the shallow subsurface, core drilling has revealed several facies, including crystalline blocks in sand matrix, impactite sands with sedimentary megablocks, slumped sedimentary megablocks (of target formations Eutaw and Tuscaloosa), polymict impact breccia, glauconitic chalk (resurge facies), and crystalline blocks. Of these facies, impactite sands, polymict impact breccias, and glauconitic chalk contain shocked grains. The variety of shallow subsurface facies within Wetumpka impact structure is perhaps to be expected considering the target stratigraphy and the marine target nature of the structure's origin. It should be noted that the wells drilled so far penetrate only the upper 15 to 20 percent of the potential crater-filling sequence. The figure below shows a simple correlation among the core holes drilled at Wetumpka.

