NEW LiDAR DIGITAL ELEVATION MODEL AND GEOLOGICAL MAP – WETUMPKA IMPACT STRUCTURE, ALABAMA. P. Tabares Rodenas[1], D. T. King, Jr. [1], J. Ormö[2], L. W. Petruny[1], and L. J. Marzen[1]. [1]Geology and Geography, Auburn University, Auburn, AL 36849, USA [pzt0005@auburn.edu], [2]Centro de Astrobiología, INTA-CSIC, 28850 Torrejón de Ardoz, Madrid, Spain [ormoj@cab.inta-csic.es].

Introduction: The Late Cretaceous Wetumpka impact structure (near the town of Wetumpka, Alabama) has a semi-circular crystalline rim that is ~ 5 km in diameter [1, 2, 3]. This well-exposed, marine-target impact structure developed in both poorly consolidated, water-saturated sediments and underlying crystalline basement. Previous studies [1, 2, 3] have described a semi-circular, crystalline rim, an interior structure-filling unit, and an exterior disturbed area developed within the sedimentary target sequence outside the southwestern part of the central, basement crater. Based on field and drill-core observations, we recognize the following specific structural and lithological impact-related terrains: overturned crystalline rim flap; slumped interior megablock terrain; central polymict breccia (originating as near-field ejecta); interior marine chalk deposits and reworked glauconitic sands (formed by resurge and post-impact deposition); and a collapsed southern part of the rim with overturned flap (mainly developed within the sedimentary target rocks).

LiDAR DEM: A new LiDAR (Light Detection And Ranging) dataset was acquired by the Elmore County Revenue Commissioner's office, located in the city of Wetumpka, and was kindly made available to us for study of Wetumpka impact crater. The dataset covered the whole of Elmore County (Figure 1). The resolution of this dataset is about 2 m.

Geological map and related cross-sections: To make the new digital geological map, we used a digitized version of the published geological map made by Tony Neathery and others [4] that accompanied the first published report suggesting that the structure at Wetumpka may be of impact origin. This digital map was placed over the LiDAR DEM (Figure 2). This allowed us to compare the fine details of surface topography with geological formations on the ground. Then, cross sections were made using elevation tools in ArcGIS that show elevation profiles along the cross-section lines. Geology from the digital map plus field observations were synthesized to make interpreted cross sections of the impact structure. An example of one such cross section is shown in Figure 3.

References: [1] King Jr. D. T. et al. (2002) *EPSL* 202, 541-549. [2] King Jr. D. T. (2006) *MAPS* 41, 1625-1631. [3] King D.T. Jr. and Ormö J. (2012) *GSA Spec. Paper 483*, 287-300. [4] Neathery T. L. et al. (1976) *GSA Bull., 87*, 567-573. [5] Petruny L.W. et al. (2011) *LPSC 42*, abst. #2406.

Acknowledgements: NASA grant NNX09AD90G awarded to King and Ormö. We thank the Elmore County Revenue Commissioner's office in Wetumpka for the LiDAR data.

Figure 1. LiDAR DEM of the whole of Elmore County, Alabama. For location of Elmore County within Alabama, see the legend for Figure 2, below. Wetumpka impact structure is encircled in red.

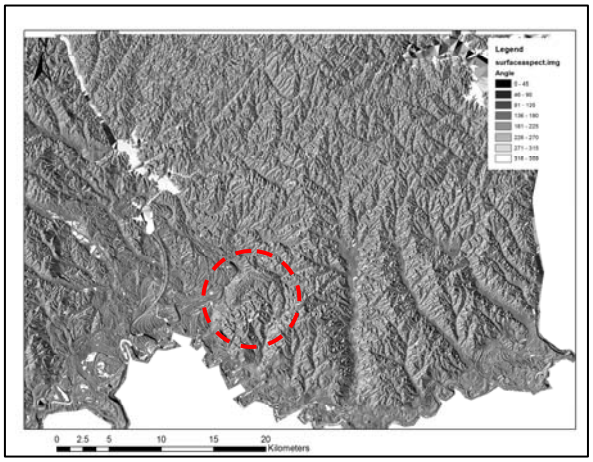
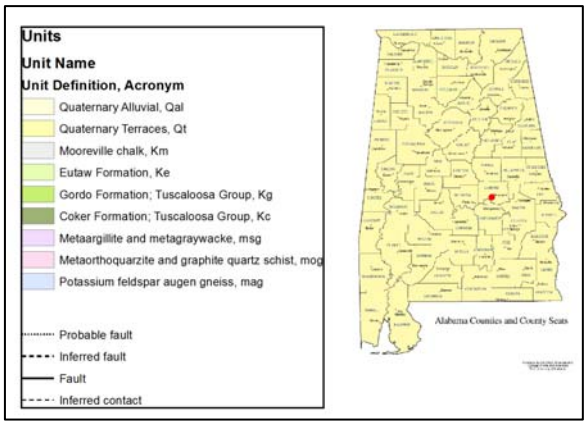


Figure 2. (next page, top) – LiDAR DEM of Wetumpmka impact structure with digital geological map. Units and symbols are given in the following legend:



Note that msg and mag mapped in the central part of the impact structure are actually one unit, the central imact breccia, as noted by [5].

Figure 3. – (At bottom) Geological cross section from northwest to southeast along the section line marked in red on Figure 2.