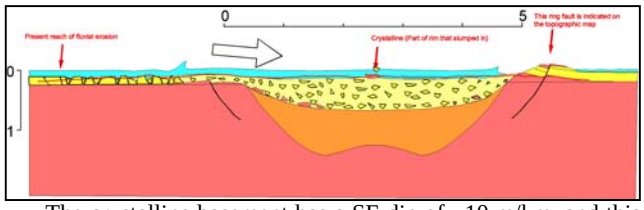
TARGET-AFFECTED MORPHOLOGY OF THE WETUMPKA (MARINE) IMPACT CRATER, USA. D.T. King, Jr.[1], J. Ormö[2], L.W. Petruny[3], J.R. Morrow[4], R.C. Johnson[5], and T.L. Neathery[6]. [1]Dept. Geology, Auburn U., AL 36849 [kingdat@auburn.edu]; [2]Centro de Astrobiología (INTA/CSIC), Madrid, Spain; [3]AstraTerra Research, Auburn, AL 36831-3323; [4]Dept. Earth Sci., Campus Box 100, Univ. Northern Colorado, Greeley, CO 80639; [5]Dept. Geology, Auburn U., AL 36849; [6]1212-H Veteran's Parkway, Tuscaloosa, AL 35404

Introduction: The Late Cretaceous Wetumpka marine-target impact structure is situated in the inner Coastal Plain of Alabama [1, 2]. The ~5-km structure is characterized by (1) a wide, horseshoe-shaped crystalline rim that is open on the SW quadrant, (2) an interior region of broken and disturbed sedimentary formations, and (3) an extra-crater terrain on the south-west composed of structurally disturbed target formations [2].

To understand the influence of target properties on the cratering and modification of Wetumpka, we examined its present state of preservation (i.e., the erosional level *v.* an original crater cross section). This was achieved by comparing present geology and topography with standard parameters for impact craters, but also incorporating observations from simulation studies of marine-target impacts [3], especially those strongly affected by the collapse of a thick sequence of poorly consolidated sediments (e.g., Chesapeake Bay [4]).

Target materials: In reverse stratigraphic order, the target consisted of (1) marine water (which was approximately 30-100 m deep and likely shallowed toward the north where the coeval shoreline was located); (2) poorly consolidated sediment (comprising 30 m of chalky ooze, (3) 30 m of paralic marine sand, and (4) 60 m of terrestrial clayey sand and gravels, and ultimately, weathered crystalline basement.

Cross-section: In this hypothetical cross-section, the parautochthonous breccia lens (orange) is formed by initial collapse of the transient cavity. Overlying slump deposits of sediments from the collapsing rim segment are marked with fragment symbols.



The crystalline basement has a SE dip of ~10 m/km, and this is assumed to play an important role in both cratering and later modification. In fact, selective failure of the SW rim is probably due to deeper target water and dip-related instability in that area and the resurge flow that caused failure of poorly consolidated sediments in that part of the rim. Via this process, Wetumpka's distinctive horseshoe-shape was formed.

References: [1] Neathery T.L. et al. 1976. *Geol. Soc. Amer. Bull*. 87:567-573. [2] King Jr. D.T. et al. 2002. *Earth and Planet. Sci. Letters* 202:541-549. [3] Ormö J. et al 2002. *Jour. Geophys. Res.* 107:E11. [4] Collins G.S. and Wünnemann K. 2005. Abst. #1736. 36th Lunar & Planet. Sci. Conf.