

DISCOVERY OF *IN SITU* IMPACT GLASS IN UPPER EOCENE COASTAL PLAIN STRATA, JEFFERSON COUNTY, GEORGIA. R. S. Harris^{1,2}, M. S. Duncan³, Michael F. Roden⁴, and Paul A. Schroeder⁴, ¹Dept. of Geosciences, Georgia State University, Atlanta, GA 30302 (rsharris@gsu.edu), ²Dept. of Geological Sciences, Brown University, Providence, RI 02912, ³2600 Lexington Road, Athens, GA 30605, ⁴Dept. of Geology, University of Georgia, Athens, GA 30602.

Background: We previously [1] reported the occurrence of shocked quartz grains at the base of the upper Eocene Dry Branch Formation in the Coastal Plain of east-central Georgia and proposed that the horizon represents the likely source stratum from which 35.5 Ma Georgia tektites have eroded. However, no pristine glass was found *in situ*. Subsequently, Stephens et al. [2] speculated that glass shards in the Ocmulgee and Sandersville Limestones might be connected to the tektites and the Chesapeake Bay impact, but no detailed chemistry was presented to confirm an association. Pusz et al. [3] reported microtektites in upper Eocene strata from southwestern Alabama, but the authors later showed that the enigmatic spherules are crystalline and occur in sediments older than the Chesapeake Bay event [4].

Microtektite Fragments: More recently we have discovered glass fragments (Fig. 1) in a new exposure of the shocked quartz horizon at the Bracewell kaolin mine in eastern Jefferson County, Georgia. Impact ejecta, including quartz containing 1 to 4 sets of planar deformation features (Fig. 2), are found there in a 3 cm-thick gray clay layer that occurs beneath a 10 cm-thick transgressive lag. The glasses are clear to yellowish-brown vesicular shards 0.3 to 1.2 mm long. Major element compositions* and ratios are most similar to low-silica North American microtektites from the southern Caribbean and DSDP Site 612. However, they contain very high Na₂O (~6 wt %), possibly reflecting incorporation of seawater in the melt. We suggest that Bracewell glasses represent the most proximal, downrange *in situ* glasses analyzed from the North American strewn field. As such, they may yield important details about the genesis of distal melts ejected from the Chesapeake Bay crater and provide better chronostratigraphic constraints to Coastal Plain sediments.

* Representative EMP/WDS analysis of glass fragments (wt%): SiO₂=63.8, Al₂O₃=15.4, TiO₂= 1.1, FeO=4.6, MgO=2.0, CaO=4.4 Na₂O=5.7, K₂O=2.9 (Total=99.9). Trace element analyses are pending.

References: [1] Harris, R. S. et al. (2004) *Geology*, 32, 717-720. [2] Stephens, E. et al. (2005) *Geol. Soc. Am., Abstracts with Programs*, 37(2), 44. [3] Pusz, A. E. et al. (2006) *Geol. Soc. Am., Abstracts with Programs*, 38(7), 120. [4] Pusz, A. E. (2007) M. S. Thesis, Rutgers University, 149 pp.

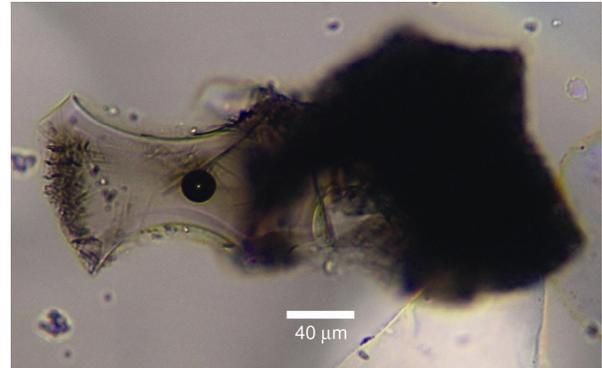


Figure 1. Photomicrograph (PPL) of a microtektite fragment found within an upper Eocene ejecta horizon in Jefferson County, Georgia.

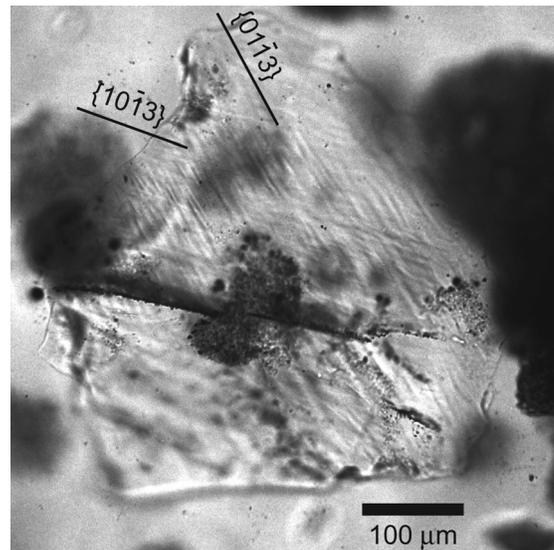


Figure 2. Photomicrograph (plane-polarized light) of a shocked quartz grain from the upper Eocene ejecta horizon in Jefferson County, Georgia, exhibiting two sets of planar deformation features (PDFs).