

PRESENCE OF SHOCKED QUARTZ AT TWO CRETACEOUS/PALEOGENE (K/PG) SITES IN THE NEW JERSEY COASTAL PLAIN.

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Introduction: Several recent studies have identified the K/Pg within the New Jersey Coastal plain, there are discrepancies in the timing of nature of the biotic and physical indicators of the extinction event [1]. At Crosswicks Creek (100m paleodepth), the bio- and chemo-stratigraphic boundaries coincide. The Agony Creek (30m paleodepth) site is of particular interest because the Ir anomaly is found below the bio-stratigraphic boundary separated by a Maastrichtian mollusk assemblage [2]. This “*Pinna* layer” [3] of the Tinton formation was buried in life position in a 20cm interval. Other signs of the Chicxulub impact were identified at these outcrops including enriched Ni and Co in pyrite framboids [4], coincident with the Ir anomaly. Siderophile enrichment at the base of the *Pinna* layer has been attributed to downward diffusion [5]. Discovery of shocked quartz grains in the base of the *Pinna* layer would provide conclusive evidence that Maastrichtian life survived the impact at Agony Creek.

Samples and Analytical Methods: The study material was obtained in box samples at exposed stream banks in both the Crosswicks Creek and Agony Creek localities [2]. The Crosswicks Creek locality was sampled at the siderophile rich biostratigraphic K/Pg boundary [5]. The Agony Creek section was sampled in 1cm intervals for the 20cm between the chemo-stratigraphic boundary and the Danian Hornerstown formation. Quartz grains were present at ~100grains/cm³ [1] and were sieved at 150 μm and 75 μm. The grains were observed in 1.44 refractive index oil under a petrographic scope to search for planar deformation features (PDFs), which are the primary indicators for impact shock in quartz grains [6]. Selected grains were then mounted in epoxy for observation on a universal stage in order to determine the PDF orientations.

Results and Discussion: We have improved our technique relative to earlier work [1]. Prime candidate shocked quartz grains have been found in the boundary layer at Crosswick’s Creek and also at the base of the *Pinna* layer in Agony Creek, at the siderophile rich horizon. The orientations of the PDFs in these grains will be reported. This presence of shocked quartz grains at Agony Creek indicates that Maastrichtian mollusks survived into the Danian at Agony Creek following the Chicxulub impact. This finding enhances our understanding of the effects of the extinction event on a localized population distal to the Chicxulub impact.

References: [1] Aldoroty R. J. et al. 2013. Abstract #1703, 44th Lunar & Planetary Science Conference. [2] Ebel et al. 2008, Abstract #1454. 39th Lunar & Planetary Science Conference. [3] Landman, N. H. et al. 2012 *Acta Palaeontologica Polonica* 57:703-715. [4] Bigolski et al. 2010, Abstract #116-3. Geological Society of America Conference. [5] Miller, K. G. et al. 2010. *Geology* 38:867-870. [6] French, B. M. 1998. *LPI Contribution* #954, 120pp.