ACCRETIONARY LAPILLI (CARBONATE SPHERULES) AT THE CRETACEOUS-PALEOGENE ('KT') BOUNDARY IN BELIZE (CENTRAL AMERICA). D. T. King, Jr.[1] and L. W. Petruny[1], [1]Geology Office, Auburn University, Auburn, Alabama 36849 USA.

Introduction: The Cretaceous-Paleogene (KT) boundary stratigraphy in Belize consists of four main units: (1) a terminal Cretaceous paleosol (< 1 m; exposed at the village of Armenia on the Hummingbird Highway [1, 2]); (2) a fine-grained bed containing accretionary lapilli (~ 1-3 m; exposed at Albion Quarry on Albion Island near the town of San Antonio [3] and on the highway at Armenia [1, 2]); (3) an impactoclastic breccia bed (~ 8-15 m; exposed at Albion Island [1, 3, 4]); and an impactoclastic bed of rounded pebbles (exposed at Progresso Lagoon [2], on the highway at Armenia [1], and in various sites in the Cayo District [5]). Not all these units are found together in the same places. This paper focuses on the accretionary lapilli (i.e., impact-produced carbonate spherules) that occur at Albion Island and Armenia.

Albion Island 'KT' stratigraphy: In a large road materials quarry on Albion Island (a small area surrounded by diverging braches of the Rio Hondo), a basal impactoclastic clay layer, ~ 1-2 m thick, crops out that contains abundant accretionary carbonate spherules. These spherules range in size from a few mm to about 1 cm [3, 4]. Above this layer lies an ejecta diamictite [3] or impactoclastic breccia (the Albion impactoclastic breccia [4]), which is ~8-15 m thick. This impact glass-bearing breccia is characterized by thick sedimentological units or bedding that has been enhanced by horizontal shearing. The unit contains normal and reverse size grading, clast imbrication, flow lamination, and isolated and linked aggregates of clasts (i.e., clast clustering) [4]. In addition, most carbonate clasts within the Albion impactoclastic breccia are compact bladed to compact elongated and have surficial markings consistent with high-velocity particle interactions [4]. The Albion impactoclastic breccia is truncated by a local unconformity, which is overlain by modern soils at Albion Island and micritic Lower Paleogene limestones in an adjacent area of México [1, 4].

Albion Island's spherules: These accretionary lapilli or carbonate spherules range in size from a few mm to ~ 1 cm. These spherules are typically strongly compressed and generally lack distinctive internal structure such as layering. However, a small percent of these spherules have discernable internal layering and a small percent have distinct nuclei as well. These nuclei are small carbonate grains, not glass. All Albion Island carbonate spherules have been subjected to intensive diagenesis and attendant recrystallization. Their present carbonate phase is dolomite [6] and the crystal size is typically micritic (a few microns). Even though impact-produced glass fragments are apparently missing from the Albion Island spherule bed, there are clay spherules that may have been originally glassy impact spherules [6].

Armenia 'KT' stratigraphy: On the north side of the Hummingbird Highway at the village of Armenia, Belize, an outcrop includes the upper beds of the Maastrichtian Barton Creek dolostone, which is overlain by a lateritic clay bed (paleosol) containing dolostone boulders [1]. This is in turn overlain by an accretionary spherule-bearing carbonate-rich clay layer (~ 2-3 m), which contains broken impact glass fragments [1, 7]. Above the spherule-bearing layer lies a limestone conglomerate bed, which contains abundant rounded and polished limestone clasts averaging several cm in diameter [1, 7]. The matrix of this bed has yielded some quartz grains with multiple sets of PDFs [6]. The limestone conglomerate bed is overlain by a local unconformity, which is blanketed by modern soil.

Armenia's spherules: Accretionary lapilli or carbonate spherules from Armenia range in size from less than one mm to ~ 1.5 cm. A typical spherule consists of a core (usually a carbonate grain, but in some instances an angular, impact-produced glass fragment), which is surrounded by concentric layers of clayey calcium carbonate. The surface (or "shell") of each concentric layer is typically harder than the lower part of the layer. Concentric layers range in thickness from < 0.001 mm to > 1 mm and are structureless to vaguely laminated [7]. Some layers are silty. It is likely that the carbonate in each concentric layer was deposited as microcrystalline lime, but has now converted to calcite. Aggradational recystallization among calcite crystals is evident in thin section, and this may have accompanied the lime-to-calcite conversion [7].

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