The Chicxulub impact origin ejecta sedimentary sequence: Albion Formation in Belize

Shoichi Kiyokawa

Department of Earth & Planetary Science, Kyushu University
kiyokawa@geo.kyushu-u.ac.jp

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The Albion Formation, which is located in the southeastern region of the Yucatan Peninsula, is the nearest on-land exposure of the K/T boundary from the Chicxulub crater. It is identified as the outer portion to the continuous ejecta blanket of the Chicxulub impact (Pope et al., 1999). The Albion Formation is preserved above the uppermost Cretaceous shallow dolomite sequence (Barton Creek Formation) and comprise of two sequences: spheroid and diamictite beds. The spheroid bed consists of 0.5 ~ 1.5 cm in diameter dolomite and clay spheroids and smectite clay fragments with in a fine carbonate matrix. The diamictite bed is characterized by accreted boulder-size dolomite blocks and a coarse-grained calcareous matrix containing altered glass, striated, polished cobbles, and shocked quartz. Three locations are identified in this sequence; 1) the Quintana Roo to Ramonal region along the eastern border of Mexico, 2) the Albion region of northwestern Belize and 3) the Armenia region of central Belize. The stratigraphic characteristics of the Albion Formation indicate that the formation is formed by impact-related ballistic sedimentation from the Chicxulub crater.

Fig. 1. Overview of the Albion Formation in the Albion Island quarry, and geological outline of Belize. Orange layer shows the 1 ~ 2 m thick spheroid bed and more than 15 m thick diamictite bed to the top.

Fig. 2. A section of the Albion Formation in the Albion Island quarry. Dark greenish muddy veins (arrows in 2.a) are intruded in the diamictite bed. Low-angle cross-beddings in the spheroid bed indicate a high flow regime with a paleocurrent NNW to SSE trend (flow from right to left in 2.b).

Fig. 3. View of a diamictite block in the diamictite bed in the Albion Island quarry. More than 3 m in diameter dolomite block contains the 15 cm wide accreted calcite crystals. It is attributed to carbonate accretion occurring during the impact eruption.

Fig. 4. Homogeneous spheroid bed of the Albion Formation in the Armenia area. (4.a) The 7 m thick spheroid bed, covered by the river pebble rock. Most rocks are strongly altered. (4.b) Close up view of highly altered spheroids in the spheroid bed. Each spheroid is preserved with pink colored core and white altered rim.

Fig. 5. Highly altered Albion Formation in the Ramonal area. The 1 m thick spheroid bed and more than 18 m thick diamictite bed are identified. More than 2 m in diameter rounded diamictite blocks are preserved in the diamictite bed.

Reference

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