CHICXULUB EJECTA BLANKET: NEW INSIGHTS INTO THE KT IMPACT EVENT

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KT rocks from the ejecta blanket of the Chicxulub crater have been found along the boundary of Mexico and Belize. They are the closest impact related rocks cropping out at the surface. Our detailed mapping has revealed, that they can be traced continuously along a NE-SW trending 65 km transect at distances of 320 to 365 km from the impact center. Additionally, several not yet confirmed localities on the Southern Yucatán Peninsula seem to allow to trace the ejecta blanket within a range of 230 to 375 km. Farther south, the blanket probably extends into the Tikal mountain range of northern Guatemala.

The ejecta blanket can be subdivided into two units: a lower approximately 1 m thick spheroid bed and an upper, very heterogeneous diamictite unit. The latter has a thickness of more than 20 m, but probably less than 100 m. The spheroid bed is best exposed within the Albion quarry (Belize). It consists mainly of clay and dolomite spheroids of millimeter to centimeter size within a weakly consolidated clay matrix. Some spheroids reach 6 cm in diameter. They show variable lithologies and often exhibit carbonate or gypsum coatings. The spheroid bed is obtained from primary ejecta from the upper target lithologies. It has overrun all other ejecta material and was deposited first. Spheroids might have been formed by accretion similar to volcanic accretionary lapillis within an early time vapor cloud.

The diamictite unit contains the vast majority of material from the ejecta blanket. It is characterized by a variable amount of altered impact glasses (green or red clay) derived from the vapor plume. Whitish dolomite spheroids and brownish clay spheroids are present. The diamictite is polymict, highly unsorted, non-stratified and very variable in composition and sorting, laterally as well as vertically. Boulders of bedded limestone up to 7 m in diameter and clasts of all sizes are abundant. Clasts are subangular to subrounded, they sometimes display superficial striae, indicating strong particle interactions during transport. They consist mainly of dolomites and limestones of varying lithologies. Crystalline and sandstone clasts from deeper seated target lithologies are very rare. Anhydrite and gypsum clasts were not observed. The overall heterogeneity of the diamictite displays multiple stage mixing. Mixing occured primarily between molten impact glasses and the solid ejecta curtain material, probably induced by atmospheric disturbances within the ejecta curtain (ring vortices). Additionally, the highly variable sorting indicates a turbulent flow. Features like matrix coatings around clasts and large boulders and distinct planar sedimentary surfaces are most likely derived from a secondary ejecta flow, resembling a debris flow. Such characteristics could be observed from distal to proximal localities. This indicates that at distances of 320 km from the impact center the mixed ejecta material has already undergone a significant nonballistic transport path.

The far reaching extent of a continuous ejecta blanket to distances of more than 4 crater radii from the impact center favors either an lobate ejecta flow or radial scour pattern over ballistic sedimentation or rampart type emplacement. Also if finally emplaced by a secondary ejecta flow, the existence of huge amounts of ejecta material in this region contradicts the proposed very low angle impact from the southeast. To draw definite conclusions for the ejecta emplacement process and the impact event, the transition between inner ballistic and outer ejecta flow facies as well as the outer limit of the continuous ejecta blanket should be found in future studies. Within the diamictites the amount of primary crater material and of reworked material from the carbonate plattform should be estimated in order to assess the efficiency of secondary scouring.