THE CHICXULUB EJECTA BLANKET AND ITS BEARING ON SAMPLE RETURN MISSIONS TO MARS. F. Schönian[1], T. Kenkmann[1,2] and D. Stöffler[1], [1]Museum für Naturkunde, Leibniz-Institute for Research on Evolution and Biodiversity at the Humboldt University Berlin, Invalidenstr. 43, D-10115 Berlin, Germany, frank.schoenian@mfn-berlin.de, [2]Institute of Geosciences, University of Freiburg, Alberstr. 23-b, D-79104 Freiburg, Germany, thomas.kenkmann@geologie.uni-freiburg.de.

Introduction: The ejecta blanket of the Chicxulub crater (Ø 180 km, 65 Ma) is one of the few examples for a well preserved ejecta blanket of large impact structures on Earth. It extends up to 5 crater radii from the center [1,2]. Due to this large runout it has been considered since its recognition as a primary example for comparative studies with Martian impact craters [2, 3, 4].

Distribution and characteristics: The Chicxulub ejecta blanket is widely distributed over the Yucatán Peninsula. While it is covered with Cenozoic deposits close to the crater, it crops out at the surface on the Central and Southeastern Peninsula (Fig. 1). It can be subdivided into three radial zones [5]. *The inner ejecta blanket* is represented by breccias recovered from the UNAM 7 drill core, 105 km from the impact center (Fig. 1). It is characterized by a two-fold succession of a thick sedimentary megabreccia with rare melt particles overlain by melt-rich suevites with abundant basement clasts [5]. The contact between these units is transitional. *The intermediate ejecta blanket* is typically composed of locally eroded bedrock material. Altered impact melt is very rare and basement clasts and shocked minerals are absent. Some abraded clasts and rarely shear planes do occur in its lower parts [5]. *The outer ejecta blanket* again contains mainly components eroded from the subsurface. However, altered impact melt and crystalline basement clasts are present and occur together with shocked quartz mixed with the local material. Clasts do often display abrasion features and subhorizontal shear planes with slickensides are abundant [2].

Discussion: These characteristics have been explained by a combination of the two processes involved in the ejecta emplacement on planets with an atmosphere and subsurface volatiles: The lower inner and the intermediate ejecta have been deposited by *Ballistic Sedimentation*, while in the outer part *Atmospheric Ring Vortices* overrode the ejecta curtain and deposited crater material that later became eroded by the secondary ejecta flow (Fig. 1, [5]). In order to assess these processes on Mars a “double layer ejecta” (DLE) or “multiple layer ejecta” (MLE) crater preferably on sedimentary terrain should be sampled from its proximal to its distal ejecta blanket.

References: [1] Ocampo A. C. et al. (1997) *LPS XXVII*, Abstract #1861. [2] Kenkmann T. and Schönian F. (2006) *MAPS. 41(10)*, 1587-1603. [3] Pope, K. O. and Ocampo A. C. (1999) *LPS XXX*, Abstract #1380. [4] Schönian F. et al. (2004) *LPS XXXV*, Abstract 1848. [5] Schönian F. et al. (2008) *LMI IV*, Abstract 3100.

Fig. 1: Sketch of the Yucatán-Peninsula during the final stage of ejecta emplacement (elevation not to scale).