EVIDENCE OF SHOCK METAMORPHISM IN TAVAN KHAR OVOO CRATER, MONGOLIA

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The impact cratering is one of the most important processes to understand the destruction and construction of planets and planetesimals. Tavan Khar Ovoo crater locates in Southeastern Mongolia and 470 km southeast from Ulaanbaatar. Tavan Khar Ovoo was first recognized in satellite images. The total diameter of the crater is about 1.7 km. It covers an area of 137 hectares and surrounded by a raised rim. The purpose of this study is to solve the controversial problems and about the Tavan Khar Ovoo crater and to determine whether the crater was formed by an impact or not.

In satellite images, the Tavan Khar Ovoo crater displays distinctive circular geometry typical of simple impact craters. The crater is partially filled with sand and evaporites. Mafic and felsic dikes on the western side of the crater appear to be post-impact because they form a geometrically consistent, planar structural array. (Peter Anderson, 2003)

Breccias occur in form of lenses mainly within the inner wall of the crater and are several meters thick. A block of fine-grained, fragment-rich impact melt was found inside the crater. The desert climate has preserved the crater morphology and unvegetated, fresh bedrock outcrops are available for study.

Simple impact craters are circular, bowl-shaped depressions with well defined, raised rims. An interior slope is steepest near the top of the rim and smoothly decreases toward the crater's center. The Tavan Khar Ovoo crater is consistent with these criteria.

Arvisbaatar.N, and Batsukh.G have modeled formation of impact structure of the Tavan Khar Ovoo crater they estimated its size, shape and depth of accumulated deposits using gravimetric, magnetic and resistivity methods.Gravimetric map shows circular negative anomaly. The gravity anomaly reaches to 3m Gal and the highest negative anomaly coincides with the center of the structure. Although the magnetic data shows a weak anomaly, the feature of magnetic data coincides with strike direction of basements. The resistivity and 1D gravity data can explain the original depth 70m

Samples the gathered during the field investigation of the crater and the surrounding area consist of breccias and metamorphic country rock. They can be collected from rim outcrops and the crater center. The high temperature and pressure effects would be greatest at the crater center. Impact could cause unusual rock features: minerals fracturing, planar fractures, planar deformation, and formation of high pressure polymorphs and presence of melt. Impact could produce high pressure and form such minerals as coesite and stishovite. Thin sections of both the breccias and the country rock were used for petrographical observations to seek textural evidence of shock metamorphism.

We are now studying the XRF analysis and to find evidences of impact