

GEOLOGY AND PETROGRAPHY OF TABUN KHARA OBO CRATER. Tsolmon Amгаа and Christian Koeberl, Department of Lithospheric Research, University of Vienna, Althanstrasse 14, A-1090 Vienna, Austria (tsolmon@gmx.net, christian.koeberl@univie.ac.at)

Introduction: Tabun Khara Obo (TKO) is a 1.3 km diameter crater structure centered at 44°17'50"N, 109°39'20"E in South East Mongolia. Previous researchers suggested that the structure is of its impact origin [1-3]. However no direct mineralogical shock evidence has been found to date. Here we present the results of our 2007 mapping and laboratory work, as well as first results of a 208 drilling project.

Methods: Detailed geological mapping has been carried out in the area using high resolution, SPOT 2.5m resolution, satellite image for topographic reference. The mapping area was extended to about one crater diameter out of crater rim. Lithology, foliation, faults, and fractures were recorded. Around 70 hand samples were collected from regional lithology and breccias. 55 thin section samples were prepared and analyzed under petrographic microscope. For geochemistry 29 samples were analyzed by INAA.

Results and discussions: The crater is located on an uplifted Proterozoic intrusive metamorphic rock block surrounded by basins filled with Cretaceous sediments. The dominant regional structure is the North Zuunbayan left lateral strike slip fault, the shear zone of which is dominated by steeply dipping NE trending foliations. Crater formation the outer wall collapsed preferentially along NE regional foliation planes, resulting in slightly oval shape of the final crater. A fragmented line of concentric basement rock outcropping in the NW and SE sectors of the crater is possibly due to this reason. The dominating strike of the bedding and foliation is NE50, but the dip is near vertical. No structural impact feature, such as overturned bedding at the rim, was found. Breccias occur along the NE-E crater rim. Monomict breccias form narrow lenses, whereas polymict breccias form layers outside of the E rim of the crater. The bedding plane for the breccia sheet is irregular, which may imply its deposition on a paleo-surface. No ejecta blanket has been preserved. The basement rocks are schist, gneisses, and amphibolites. Breccias contain clasts of these rocks, cemented by carbonates. No evidence of shock metamorphism was yet found in these breccias. The geochemistry has not yet revealed any contribution of extraterrestrial material to the breccia composition.

Conclusions: While geophysics [1] and morphological data consistent with impact origin [2,3] the surface mapping and sampling did not reveal structural, mineralogical and geochemical evidence of an impact origin. For small craters like TKO it is very difficult to confirm an impact origin from surface studies; thus we carried out a drilling project in the fall of geophysical and drilling work in 2008, in which core was retrieved to a depth of xxx m in the center of the structure. The investigations of the core samples are currently ongoing.

References: [1] Bayaraa T., Arvisbaatar N., Khosbayar P. 2005, 5th Russian-Mongolian Conf., 111-112. [2] Shkerin L. M., 35: 97-102. [3] Suetenko, O. D., Shkerin, L. M., 1970, *Astronomicheskii Vestnik*, 4:261-263.

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