A METEORITE IMPACT CRATER IN CENTRAL TIBET?

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Introduction: Only a few impact structures have been recognized in Central Asia to date. Apart from the recent discovery of the Xiuyan impact structure in eastern China [1], no meteorite craters are known in this part of Asia. Satellite images reveal a distinct crater-like depression on a fluvial plain on the Tibetan Plateau, ~630 km NW of the Tibetan capital of Lhasa.

Remote Sensing and Geology: An apparently well-preserved crater 27 m in diameter (31°59'39"N, 85°9'14"E) is located on the active fluvial plain of the Shialzu River, at ~4,550 m above sea level. The recent fluvial sediments overlie Cretaceous (Aptian-Albian) limestones of the northern Lhasa Terrane [2]. The 'Shialzu crater' exhibits a simple bowl shape and a slightly polygonal outline (Fig. 1A-B). The crater rim seemingly consists of smaller, up to meter-sized, cliffs of disrupted rocks and slump blocks. A man-made structure resembling a stone paddock and a local vehicle track lie 400 m south of the crater; a cluster of circular pingos and pingo scars lies ~2-3 km to the southwest.

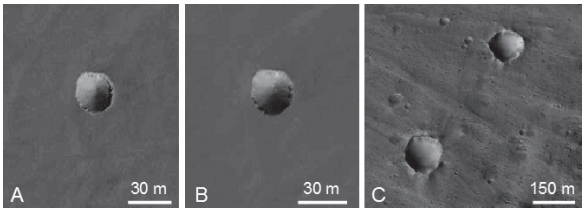

Fig. 1: Satellite images of the 'Shialzu crater' on the Tibetan Plateau (**A**: 18/03/2004; **B**: 29/12/2005; mapabc.com images implemented in Google Earth) and two simple impact craters of similar appearance on an alluvial plain on Mars (**C**; HiRISE image ESP_020323_2050_RED).

Interpretation and Outlook: Although we cannot rule out an anthropogenic origin (e.g., a bomb explosion crater) based on remote sensing alone, the Shialzu crater bears a striking morphological resemblance to small simple impact craters on Earth and Mars (Fig. 1C). The polygonal outline might be in structural analogy to, e.g., the Henbury main crater (Australia), Kamil crater (Egypt), or Meteor crater (USA), where the final crater shape is an expression of both oblique impact and the physical target rock properties during crater excavation and modification [3]. Assuming a possible impact origin of the Shialzu crater, the fluvial host sediments suggest a fairly young, probably Quaternary, impact age; the satellite data prove that the crater is older than March 2004. Importantly, the Shialzu crater might provide unique insights into the formation of impact craters in (seasonally) active fluvial systems and permafrost settings on Earth, and therefore also serve as an analog for impact craters on Mars. The high altitude of the Tibetan Plateau would make this crater the topographically highest meteorite crater known on our planet. A field trip and a focused search for meteorites and impactites inside and around the crater will be desirable to confirm or disprove the suspected impact origin.

References: [1] Chen M. et al. 2011. *Meteoritics Planet. Sci.* 46:729-736. [2] Kapp P. et al. 2005. *GSA Bull.* 117:867-878. [3] Öhman T. et al. 2010. *GSA Spec. Pap.* 465:51-65.