

A NEW SMALL IMPACT CRATER IN THE HIGH ATLAS, IN THE AGOUDAL IRON STREWNFIELD. D. A. Sadilenko¹, C. A. Lorenz¹, M. A. Ivanova¹, I. A. Roshina¹, A. V. Korochantsev¹. ¹Vernadsky Institute, Moscow, Russia, e-mail addresses: sadilenko@mail.ru, c-lorenz@yandex.ru.

Introduction: A small eroded impact crater was recognized in the High Atlas Mountains (Morocco) during exploration of the Agoudal iron meteorite strewnfield. The crater is situated in the western part of the strewn field, which is ~1.5 km long, oriented E-W, at 31°59'12.7"N 5°30'57.3"W. We suggest that the crater may be a result of the fall of the main mass of the Agoudal iron.

Results: The impact crater was recognized by D.A. Sadilenko, who found numerous limestone fragments with shatter cone texture in a dry streambed at the bottom of the eastern slope of a ~20 m hill. We also found an outcrop of breccias near the top of the hill. Additional boulders of brecciated rocks 1 m in size were observed at a distance of up to 50 m to the south from the main outcrop, but no boulders occur on top of the hill nor to the north of the main outcrop. The breccia outcrops appear to be relics of the crater that was completely destroyed by intensive erosion of the hill slope. Most of the boulders appear to have travelled from their initial positions on the slope. No traces of the crater rim were observed on satellite images. The crater target rock is a Jurassic dark-grey marl. In the basement of the main crater outcrop, intensively fractured target rock has prominent shatter cones (1-30 cm), grouping into four differently oriented systems. The target rock is covered by medium- to coarse-grained autogenic breccia ~0.5 m thick. The visible contact of the target rock and impact breccia layer is horizontal and relatively straight. The breccia is composed of angular marl fragments (0.1-4 cm) joined by fine-grained matrix with abundant empty pores (~ 60 vol%). Shatter cones occur widely within marl fragments of the breccia from the main outcrop but were not found in the remote breccia boulders. Rare breccia samples from the main outcrop contain oxidized fragments of meteorite iron, ~2-3 cm in size. Rare quartz grains from the residue of HCl dissolution of breccia are free of PDF; together with the presence of shatter cones could indicate low shock loading in the range of 2-5 GPa [1, 2].

Conclusions: The shapelessness of the crater could be a result of intensive erosion of the hill slope. It is also possible that the observed structure is a result of an oblique impact and initially had a rimless shape. In this case the main mass could be distributed to the west from the crater. Meteorite fragments practically are absent in the area of outcropping impactites, as well as within ~100 m from this place. This could indicate that meteorite splinters were ejected from the crater with a high velocity and could be scattered far from the crater in a relatively large area. It is also possible that the main mass of the Agoudal iron could have been collected by local people during the Middle Ages. We propose that the age of the Agoudal crater could be similar to that of well-known small craters of iron meteorites, e.g. ~ 0.01 Myr [3, 4].

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