

PRELIMINARY RESULTS OF THE LUT DESERT 2017 JOINT ITALIAN - IRANIAN EXPEDITION FOR METEORITE RECOVERY.

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Introduction: Lut Desert is a desertic area with peculiar climatic conditions. The high temperatures, very low precipitation rate (less than 50mm/year) and high amounts of evaporation allow to consider this area remarkably suitable for meteorite preservation and, consequently, recovery, as confirmed by the previous expeditions [1-3]. In the northern part of the desert (Gandom Beriyan), characterized by the presence of a basaltic plateau, the highest temperatures on the Earth (max. 70°C) have been registered. The Lut Desert area is located in the south – eastern part of Iran, across the regions of Southern Khorasan, Kerman and Sistan and Baluchistan, and extends for about 270 km in longitude and 190 km in latitude. According to the international agreement signed between the University of Firenze and the Shahid Bahonar University of Kerman, a first field trip to Lut Desert and related fieldwork for searching and collecting meteorites has been carried out from 10 to 25 march 2017.

Geographical context description: Three distinct geomorphologic contexts are present in this area: the northern, western and southern borders, as well as the central part of the area show the typical features of a rocky desert, with very large flat and hard surfaces with several terrestrial stones of different sizes and origin and a predominance of black stones, mostly cherts. This deflation area, potentially suitable for meteorite recovery, has such a remarkably high fluvial deposition rate that discourages searches for meteorites.

In the central-western and central-eastern portions of the Lut desert there are two other contexts that have represented the main goal for the previous meteorite recovery expeditions. Most of the meteorite finds of the last years, in fact, concentrated in these areas. The eastern portion is characterized by a typical erg context, with very high dunes (more than 300 meters). Although this can not be usually considered a meteorite recovery suitable area, several finds have been recovered here, especially at the western border of the area. The central western portion, named Kalut desert (Figure 1) is characterized by the presence of 50-100 meters high ridges consisting of loess deposits. These ridges have been modeled by the action of the wind forming long channels oriented north-west to south-east. The soil surface is consisting of hardened sand, chalk, halite and dried mud. This substrate is particularly suitable for meteorite recovery, because the mean granulometry is in the millimetric range. Several black, non magnetic rounded stones, with a maximum diameter of 1 cm, are present but larger stones are undoubtedly meteorites, clearly distinguishable by their external features and magnetic properties.

Experimental results: During the 10 days field expedition 45 specimens of meteorites (Figure 2) and other doubtful stones have been recovered. The weight of the samples ranges from few grams to one kilo with a total amount of 3670 grams.



Figure 1: image of the Kalut desert landscape; in the bottom-right corner the field trip trail



Figure 2: one of the largest meteorite specimens recovered

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References: [1] J. Gattacceca et al. 2011. *Meteoritics & Planetary Science* 46:1276–1287; [2] H. Pourkhorsandi et al. 2016. *Journal of the Earth and Space Physics* 41:125–130. [3] H. Pourkhorsandi et al. 2016. 79th Annual Meeting of the Meteoritical Society, abs. 6195.