

# RUSSIAN-MONGOLIAN METEORITE EXPEDITION TO THE GOBI DESERT

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**Introduction:** The arid climate of hot deserts make them ideal for the accumulation and preservation of extraterrestrial matter. Deserts located in Oman, Chile and North-West Africa feature numerous dense collection areas (DCA) of meteorite specimens. The Gobi Desert in Mongolia is the third largest hot desert covers the area of 1,300,000 km<sup>2</sup>. However, the Meteoritical Bulletin Database currently contains only 10 records of meteorites found in Mongolia. In addition, no DCA has thus far been found in the Gobi Desert. In 2018, the first Russian-Mongolian expedition to the Gobi Desert was undertaken with the purpose of searching for meteorites and studying the mechanisms of their accumulation.

**Methods:** To the best of our knowledge, the only large-scale targeted expedition to search for meteorites and study the Tabun-Khara-Obo crater was organized in 1993 by Addi Bishoff [1]. However, due to an abnormally rainy period preceding Bishoff's expedition, the search for meteoritic matter yielded no results. When preparing for the expedition, we relied on our own experience of organizing search works in hot [2,3,4] and cold [5] deserts.

Our research team consisted of six Ural Federal University employees (Russia) and one Institute of Astronomy and Geophysics, MAS, employee (Mongolia). Two off-road vehicles were used to search for meteorites across different zones of the desert. Fieldwork was carried out from 23rd August to 6th September, 2018. The total length of the expedition route was about 3000 km.

A visual search was carried out both on foot and from the vehicles at a speed of 10-15 km/h with stops to inspect specimens resembling meteorites. A visual search on foot was performed either across plateau areas or elevations of light shades or in places with difficult topography. The key criteria for selecting the material were a black or dark brown colour (as a possible indication of rust traces), the presence of fusion crusts and magnetic properties. The presence of magnetic properties was verified with the help of permanent magnets attached to telescopic holders, which were used by each member of the expedition. The search was hampered by a large amount of vegetation, which had appeared as a result of extreme precipitation in the first half of August, 2018.

**Results and discussion:** The expedition yielded 5 meteorite samples with a total weight of about 1.5 kg. A fragment of a stone meteorite weighing 800 g was found 50 km east of the Noion somon in a mountain stony desert area consisted mainly of sedimentary rocks of a white or light-gray colour (1500 m above sea level). The second group of finds comprised fragments of meteorite rain having disintegrated in the atmosphere. This is evidenced by the similarity of the fragments found 10 km north-west of the Shinejinst somon at a distance of 100-500 meters from each other. The terrain was characterized by sloping hills covered with scattered stones of light shades. Some fragments fitted together perfectly at chipped sides. It should be noted that not all the fragments of this meteorite were found.

According to their cleavage structure and magnetic susceptibility parameters, the discovered fragments correspond to chondrites. The meteorites exhibit various degrees of weathering, which is likely to be determined both by their different terrestrial age and different environmental conditions during their terrestrial residency.

Unfortunately, we have failed to find any DCA in this large desert, which maintains the urgency of organizing new expeditions to the Gobi Desert.

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