

SEARCH AND RECOVER OF ANTARCTIC METEORITES FROM LOMONOSOV MOUNTAINS, QUEEN MAUD LAND BY THE FIRST RUSSIAN METEORITE EXPEDITION.

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Introduction: Huge areas of the Antarctic glaciers are natural accumulators of cosmic matter for many millions of years. Glaciers are in constant motion, transporting it to the so-called "areas of blue ice", where the meteorites appear on the surface [1]. Dry air and low temperatures provide safe keeping of meteorites over the years. The first findings of meteorites in the Antarctic Queen Maud Land area are well known (Lazarev, Yamato). The blue ice places near the Novolazarevskaya Antarctic station are clearly visible on satellite images, but the attempts of the USSR Meteorites Committee to carry out the field work outside the Soviet Antarctic stations in 1979 - 1981 were unsuccessful.

In December 2015 – January 2016, the Ural Federal University field team as a part of 61 Russian Antarctic Expedition conducted field work in order to find and recover antarctic meteorites on the blue ice fields at Lomonosov Mountains, Queen Maud Land. Specialized field team for searching of meteorites in Antarctica for the first time it was able to gather through long experience in search, collection and study of extraterrestrial matter by Meteorite Expedition of Ural Federal University in different climatic zones. The team consisted of experienced athletes, mountaineers and tourists. All members of the group were well equipped and had a special outfit for the organization of an autonomous field camp for three weeks.

Methodology: Search team consisted of 6 people. Group transfer from Cape Town to the Antarctic station Novolazarevskaya and further to the search area carried out by international company ALCI. In the areas of blue ice and the surrounding mountains and moraines we worked from December 23, 2015 to January 6, 2016. Base camp was organized on a slope near Mount Echo (71,517 °S, 15,521 °E), on which the flat ground was arranged and the tunnel type tent of durable materials was installed. From 25 to 29 December was raging storm, and the wind speed reached 30 m/s, so the active phase of the search began only December 30. Search by pairs of researchers produced at a distance of 8 km from the base camp. Moraine outcrops near the mountains were examined visually and with the metal detector Minelab Explorer SE. Searching on the blue ice fields was carried out with method of visually shuttle scratching to 150-200 m distance with an offset 5-10 m at every turn. Field group moved along the chosen area of the blue ice for 8-10 hours and daily length of route was 20-25 km. Searching was complicated by the presence of large amounts of rock fragments on ice, strong winds up to 10-15 m/s, and the crevasses. Samples that have similarities to meteorites (brown or black color, fusion crust, the lack of lamination, presence of regmaglypts) was collected, numbered, its coordinates was fixed by GPS navigators. We tested the magnetic properties, photographed appearance, then all samples were placed in double zip-lock packets. The major territory of findings was situated near mountain Osechka (71.549°S, 15.489°E). Two blocks of blue ice weighing 30 kg each were sawn from the glacier surface and one block weighing 15 kg was taken from ice crack with a 10 meters' depth for space dust searching on the program of cryoastrobiology laboratory (Petersburg Nuclear Physics Institute).

Results: Within two weeks of field operations about 30 kg of material was found which appearance has similarities to meteorites. Meteoritic nature of two samples was confirmed in the field. One of them has size 2.5×2.5×2.5 cm with dark brown fusion crust, light brown internal structure with the presence of chondrules up to 1 mm size, has strong magnetic properties. Another has the size 5.5×3×3 cm, black fusion crust, light gray inner structure and a very weak magnetic properties.

The collected samples will be delivered to St. Petersburg by the vessel "Academic Fedorov" at 31 May 2016 and transferred to UrFU. The meteorite fragments will be classified and registered by the Nomenclature Committee of the Meteoritical Society. The proposed abbreviation for these findings - LOM №. Thus, as a result of a field work of UrFU squad we discover new areas of meteorites concentration near Wohlthat mountains, we prove the possibility to establish an autonomous field camp near the Novolazarevskaya Antarctic station. According to the experience collected we expect to continue Russian expeditions to Antarctica for meteorites in the next few years.

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References: [1] Folco L. et al.. 2002. Meteoritics & Planetary Science 37: 209–228.