UNDERWATER DEPRESSIONS ON THE BOTTOM OF THE TATARSKY STRAIT, THE SEA OF JAPAN (WESTERN COAST OF THE SAKHALIN ISLAND, RUSSIA): POSSIBLE MARINE IMPACT CRATERS.

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Introduction: Compared to terrestrial continental areas, where 176 astroblemes are currently found (Earth Impact Database, 2009), marine areas of our Planet are practically non-investigated in this aspect. Only three reliable astroblemes: Montagnais (Eastern coast of Northern America [1]), M'olnir (Barents Sea [2]) and Sakhalinka (North-Western part of the Pacific Ocean [3]) are currently known within the areas which occupy ~2/3 part of the Earth surface; one more supposed astrobleme is situated in the Black Sea near the Crimea cost; one can add also here the Pliocene marine impact event Eltanin in the South-Western Pacific, which did not ever form the impact crater on the bottom and is recognized by the geochemical data only [4]. So, the quest and study of marine impact sites is now among the most actual problems of modern "impactology". In connection with the known difficulties in direct studying of the marine impact sites, data on underwater topography of a sea bottom can serve as an important initial tool in their preliminary recognition. These data are obtained by various satellite global watch systems and cover the large areas of world's ocean territory. Below we report the data about two interesting underwater depressions near the western coast of the Sakhalin Island; these depressions are anomalously expressed in the bottom underwater topography and might be very possible young marine impact structures.

Description: Global sea floor topography obtained by a combination of data from the satellite altimetry and other remote sensing methods is now available in some ways, including the "Google Earth" system from the Internet. The features of the topography allow obtaining a number of useful conclusions on the geology and tectonics of the underwater part of the Earth's crust. Preliminary recognition of impact structures with well-preserved crater-like topography is not the exclusion. In particular, two deep round-shape crater-like depressions are observed in the underwater topography of the Okhotsk Sea shelf near the west coast of the Sakhalin Island **(Fig. 1).** These depressions are rather similar in their morphology to the fresh or young-age impact craters. Among them, the Northern depression **(Fig. 2)**, with center coordinates 49°57'35.3" N and 141°23'39.9" E has almost regular circular form of 14.5 × 14.9 km in size. This depression is surrounded by a system of small "hills" similar to the crater rim, which is usually common for the well-preserved impact craters. These "hills" are separated from each other by

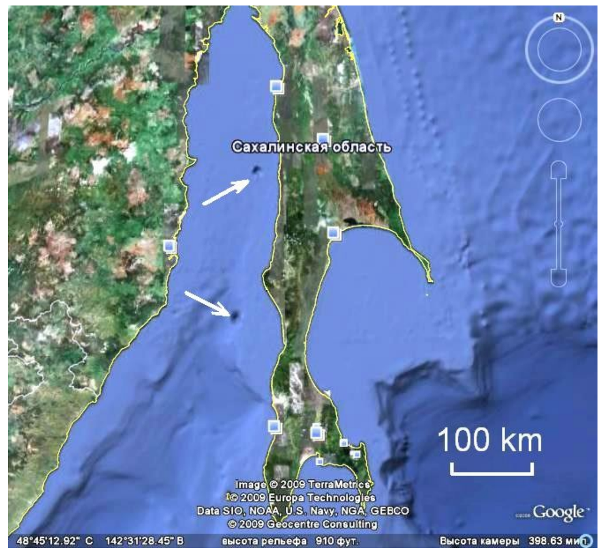

Fig. 1. General view of shelf underwater topography near the western cost of the Sakhalin Island (data are from the "Google Earth" system). Arrow-indicated, are the Northern and Southern deep crater-like depressions, correspondingly.

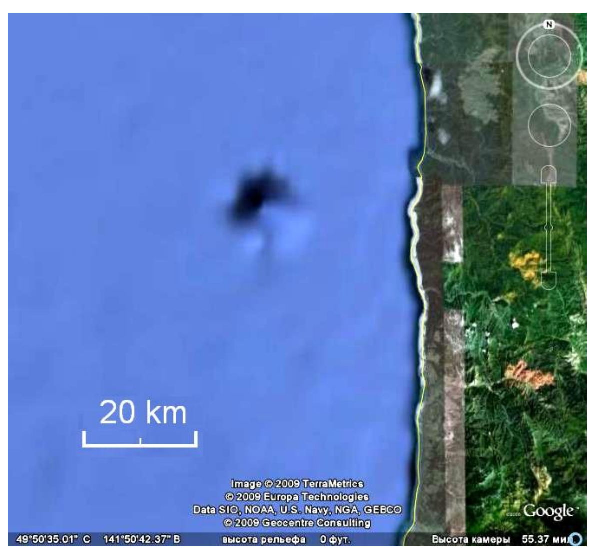

Fig. 2. Northern crater-like underwater depression with the elements of bordering rim

radial troughs. The Southern depression **(Fig. 3),** with center coordinates 48°17'38.7" N and 141°23'39.9" E, has an elliptical form of 16.5 × 21.6 km in size. Poorly-expressed in photo-tone, there is a low rim around the depression also.

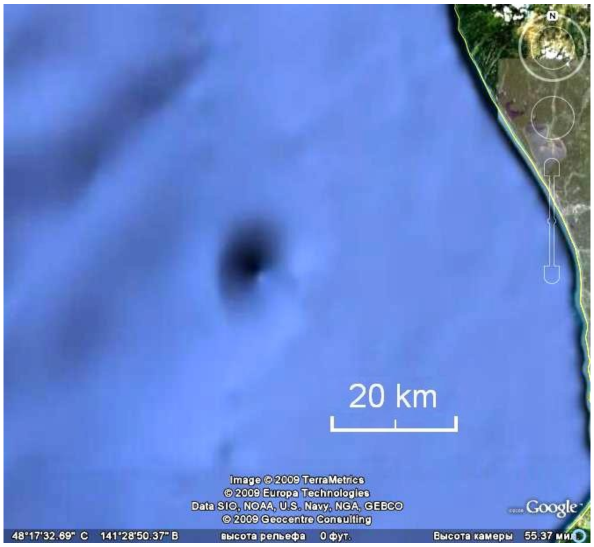

Fig. 3. Southern crater-like underwater depression with the traces of poor-expressed rim.

Discussion and conclusion: Intensity of photo-color presented on the “Google Earth” pictures clearly reflects a number of underwater bottom relief features such as shelf shallow-water areas, continental shelf slopes, local “watersheds” of underwater ridges, deep basins and other features, which are well known for the Seas of Okhotsk and Japan. So, one has no need to be in doubt whether the Northern and Southern depressions mentioned above, are really present, although it looks like a kind of a paradox why the depressions are still absent on the current hydrography maps.

Local geology of the western part of the Sakhalin Island, adjacent to the depressions described, is interpreted as a group of anticlinal and synslinal structures of sub-meridional strike. These structures are made up of sedimentary-volcanic sequences of Cretaceous, Paleogene and Neogene systems. The folded strata are cross-cut by a number of faults, including the deep-seated West-Sakhalin fault. Among the Neogene volcanic rocks one can name the Pliocene and Miocene basalts, andesite-basalts, lava-breccias and tuffs, including Orlov suite volcanites of N_2-Q_1 (?) age. All the effusive volcanic rocks are known as tuff/lava sheets and lava streams. Among the Neogene intrusive rocks one can name small injections of gabbroid rocks, diorites and sienites, as well as extrusive domes of Q_1 (?) dacites. Usually, the intrusion bodies are exhumed by erosion to form the highest points of the local topography. So, all the igneous rock manifestations of the region are equal to the usual forms of effusive and intrusive activity and do not form a kind of some giant explosive crater or caldera-like structures which can serve as the cause for the origin of the Northern and Southern depressions described above.

That is why based upon regional geologic data, an impact origin of the structures considered is the most possible. However, only the detail geophysical, as well as geological and mineralogical (by means of direct rock sampling from the rims and inner slopes of the depressions) studies can provide the final answer on the origin of the structures. Such a complex investigation of the depressions is an interesting problem for "impactology" which might be of great scientific concern. One can hope this task is able to be carried out by means of Institute of Marine Geology and Geophysics, FEB RAS, and by efforts of other scientific organizations as well.

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