THE CRATER "YAMA KORCHAZHIKHA" ON THE WEBSITE "CATALOGUE OF THE EARTH'S IMPACT STRUCTURES"

A.V. Mikheeva[(1)], P. G. Djadkov[(2)], G.M.Ivanova[(2)]

[(1)]*Institute of Computational Mathematics and Mathematical Geophysics, Siberian Branch of the Russian Academy of* Sciences, *pr. Lavrentieva, 6, Novosibirsk 630090, Russia, anna@omzg.sscc.ru*
[(2)]*Institute of Geophysics, Siberian Branch of the Russian Academy of Sciences, pr.Koptyuga, 3, Novosibirsk* 630090, *Russia* djad@uiggm.nsc.ru

INTRODUCTION

For solving problems of comprehensive understanding of the regularities of the internal properties of meteoritic craters, processes of impact crater formations, the composition of crater-forming meteorites, the information about impact structures is needed.

In 1990-1991, a researchers of ICM&MG [1], began to create the computer databank (DB) from a large volume of data, allowing one to carry out estimations of some relations of parameters and analysis of data on the Earth's meteoritic craters, their plotting onto a geographical map.

As an extension of the previous studies, this paper presents the descriptions of the catalogue on the ICM&MG website:

http://omzg.sscc.ru/impact/english.html

(Fig.1); and a convenient control and visualization system for that DB, named "Impact Structures Catalogue" (ISC).

1. THE DESCRIPTION OF THE CATALOGUE

The original table of the catalogue includes 755 records, each being characterized by 41 attributes. As compared to [1], in which there are 125 proven and 110 probable and doubtful structures, the given catalogue is supplemented with 520 new records (among them 72 are proven) [2]. The information sources are both the recent publications, and Internet sites.

The information on attributes is contained in appropriate DB fields, such as: the name of a structure, coordinates, age (relative and absolute), the size and the shape of a structure, a degree of erosion, the structure of rocks, the data on the presence of geophysical (gravitational and magnetic) anomalies, etc. All these features reflect morphological, geological, impact-metamorphic and some other attributes.

By the present time, on the website, there are only fifteen basic fields from the above-mentioned ones, however the descriptive part of each record will be added with a card of the detailed description (Fig.4) with decoding of the coded data (with a view of economy of the volume). The whole information of this card is divided into three basic groups of attributes: shape-structure, mineral-petrographic and geophysical. For anomalies, their values are specified, for the structure of rocks, which have undergone transformations when impacting, a meteoritic substance, diaplect mineral and glass, impactites, breccias are specified.

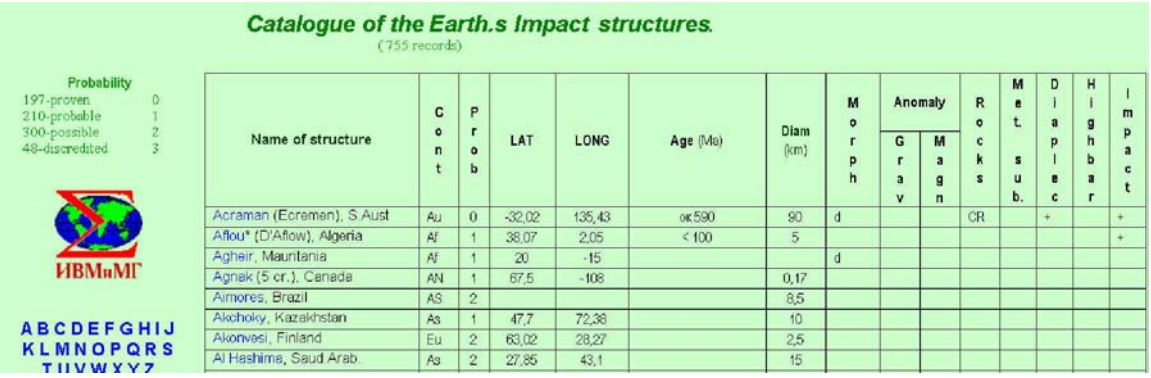

Fig.1. A website view.

The coded data (in Fig.1, Fig.4) means:

For morphology: d – depression; b – bank; cr - center raising; rr – ring raising; rd – ring depression.

For mishen (target) rocks characters: CR – crystal; SE - sedimentary; VO – volcanic; MI – mixed.

A complex study of the geophysical data may be of interest for the search and diagnostics of the subsurface structures with the deprived morphological attributes and located under the thickness of deposits, and, also, morphologically inexpressive astroblems at the bottom of the ocean and in the coastal zones (in our DB, there are about 60), their names on the website list are marked with * (Fig.1). In the tsunami database [3,4], there are events of presumably a cosmogenic origin.

Among the recently added structures more widespread are such, which were detected by indirect attributes, on the basis of results of seismic investigations or other geophysical methods. One of the recently entered in the DB structures is the Korchazh crater in the Selenga river delta (Fig.2 a).

Fig.2a. The structure "Yama Korchazhikha" (near the village of Bykovo, Baikal lake)

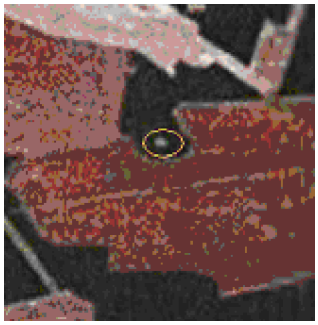

Fig.2b. View from space, the crater is marked with the yellow ellipse.

2. THE IMPACT STRUCTURE "YAMA KORCHAZHIKHA"

This paper presents one of new records of the "Catalogue of the Earth's impact structures" that was discovered by scientists of Siberian Division.

This structure looks like a funnel with a small lake in the center (see the snapshot from space in Fig.2b) and is named by natives as "Yama Korchazhikha", its diameter - ca 200-300 m, coordinates: 52,183°N, 106,767°E. The depth of structure about 20 m (see the topography map in Fig.3). Not far from it (< 1 km), the second smaller funnel locates (d ~ 20m) that has more clear and expressive section profile. Its cosmic origin was confirmed by a special Moscow meteoritic commission headed by Dr. U. V. Kestlane of the Estonian Academy of Sciences in the 80-s years, but for a long time those materials were forgotten.

According to spoken message of U. V. Kestlane, the age of this structure can be supposed about 80-100 thousands years and its origin is purely of impact. His assumptions are based on the geomorphology of structure. The more exact age will be determined by the end of this spring with the radiocarbon method. By the present time, this record is marked in the catalogue as a possible structure (probability >50%).

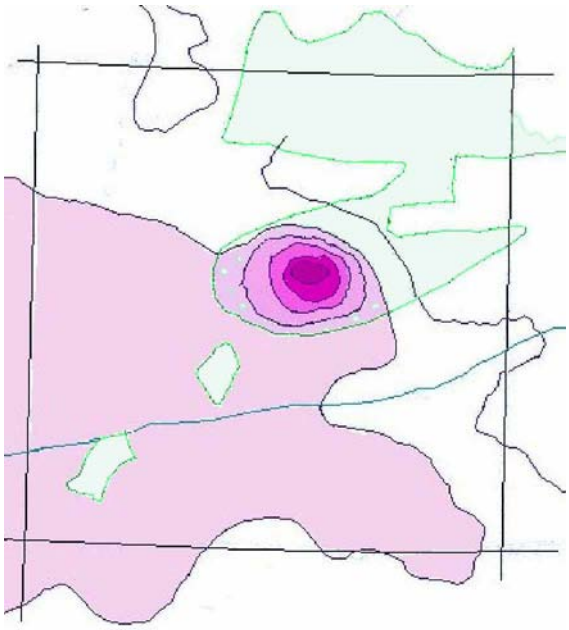

Fig.3. The crater's topography map. M 1:25000, the isolines - in 5m.

3. THE DESCRIPTION OF THE DATA MANAGER SHELL.

Also, we present the data manager system ISC as supplement to the Impact Structures databank [2]. This software was created specially to collect all those materials and was written in C++ Builder 5. It can be used for the utilization in scientific research and for information purposes. The shell ISC is supported by the operational systems MS Windows beginning with version 98 and further. The data are kept in tables MS Access standard.

An example of this shell visual card is shown in Fig.4. The fotos, schemes, maps of gravity and magnetic anomalies are kept on page "fotos". Bibliographic and http references are contained on

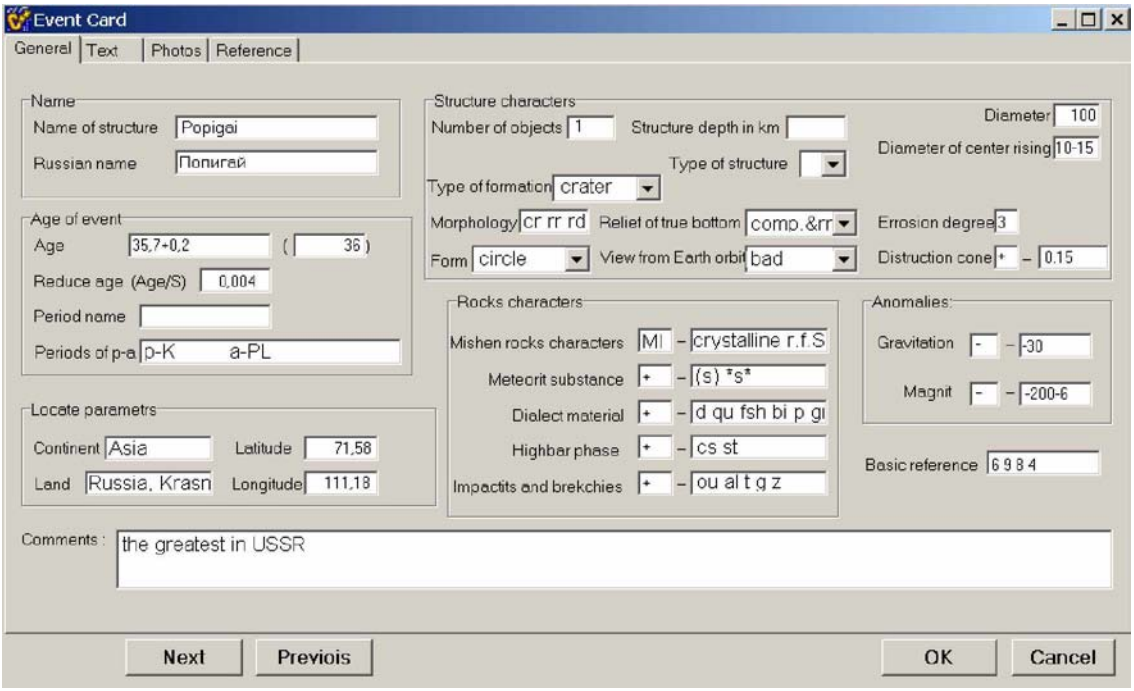

Fig.4. A record card window containing detailed parameters, textual descriptions and the photos of the allocated structure.

page 'Reference' (Fig.4) and, also, bibliographic records are kept in a separate table representing the common list of literature. This program shell can be installed on any personal computer and used for information collecting.

4. SUMMARY

The database consists of 197 proven, 210 probable, 300 possible (expected) and 48 discredited cosmogenic structures and is open for extension with new information

REFERENCES

1. [1] *Alekseev A. C., Petrenko V.E., Lyapidevskaya Z.A.* An estimation of frequency of falling of celestial bodies onto the Earth, research into a possibility of their preliminary detection and change of trajectories // Report of SR, AS USSR, CC, Novosibirsk, 1991. 128p.

2. Alekseev A.C., Mikheeva A.V., Lyskovskaya E.V., Lyapidevskaya Z.A., Petrenko V.E. Database "Catalog of impact structures on the Earth". All-Russian conference "Asteroid-Comet Hazard – 2005", 3-7 Oct.2005, St. Petersburg, p. 11-14.

3. *Gusyakov V.K., Marchuk An.G., Osipova (Micheeva) A.V.* From expert tsunami database (ETDB) toward expert system for tsunami risk assessment // IAMAS-IAPSO Joint Assemblies, Melbourne, Australia, 1997.

4. *Gusyakov V.K., Lyskovskaya E.V.* HTDB/PDM (Historical tsunami database /parametric data manager), Version 1.3, CD ROM // Tsunami Laboratory, ICMMG SD RAS, Novosibirsk, 2002.