

The new data of “Catalogue of the Earth’s impact structures”

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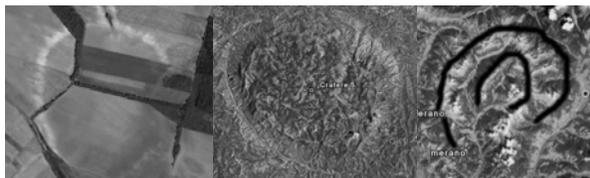
The Description of the Catalogue

The original table of the catalogue includes 822 records, each being characterized by 41 attributes. On the website (omzg.sccc.ru/impact/index1.html) there are only seven of them, however the descriptive part of some records is added with a card of the detailed description with decoding of the coded data. This card information contains mineral-petrographic, impact-metamorphic and geophysical attributes. As compared to [1] the given catalogue is supplemented with 94 new records (among them 5 are proven: Couture, Crawford, Karankas, Ust-Kara, etc.) and a lot of attendant information, especially, bibliographic references and their abstracts, that has increased the site volume into 300 times. The data sources are both the recent publications, and written private messages of researchers.

The New Data

Among the recently added structures are: Bolzano (Fig. 1a), Gropovisdomo, Montecchio Maggiore Italy craters, five Madagascar structures (Fig. 1b), all of them were found out and in part explored by Matteo Chinellato and F. Pezzotta (Venezia, Italy). One of the recently entered into the DB structures is Meggyespuszta (Fig. 1c), discovered by Kakas Kristof (Eotvos Lorand Geophysical Institute of Hungary). It is necessary to note the personal results of Karl Sasse (Bremen) concerning Bogemskaya structure; and James Corbett. (Ireland) concerning Corbett crater.

The data bank consists of 196 proven, 215 probable, 359 possible and 52 discredited cosmogenic structures and is open for extension with new information.



a. b. c.

Figure 1: New impact craters.

[1] Mikheeva *et al.* (2006) Abstr. Vol. Conf. "Impact craters as indicators for planetary environmental evolution and astrobiology", Östersund (Sweden) June 8-14, 2006.

Iron isotope fractionation during Fe(II) sorption to mineral surfaces

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Stable Fe isotopes provide a potential new tool to trace biogeochemical Fe cycling. Many studies revealed kinetic and equilibrium Fe isotope effects in field and laboratory systems. However, the mechanisms controlling the Fe isotope distribution in natural systems are only partially understood. Sorption of Fe(II) to mineral surfaces has been shown to result in Fe isotope fractionation, but the significance and the magnitude of this process are subject to debate. Previous studies used Fe(III) (hydr)oxides as sorbents for Fe(II), where interfacial electron transfer and atom exchange may have obscured the fractionation during sorption. To separate the different contributions to Fe isotope fractionation during Fe(II) sorption, we performed batch and column experiments in which Fe(II) was sorbed to different (hydr)oxide surfaces (goethite, quartz, aluminium oxide).

All experiments were conducted at pH 7.2 ± 0.1 under strictly anoxic conditions in a glovebox. Batch experiments with different Fe(II)/sorbent ratios were performed to study equilibrium Fe isotope fractionation between solution and sorbed species. Column experiments were used to study kinetic and equilibrium Fe isotope effects during sorption and desorption of Fe(II) on different mineral surfaces. Iron isotope ratios were measured by high-resolution MC-ICP-MS (*Nu 1700*, Nu instruments). Experimental data were described with adsorption isotherms and isotope fractionation models.

The batch experiments revealed significant equilibrium isotope fractionation during Fe(II) sorption to goethite and quartz, but not to aluminium oxide. Heavy Fe isotopes were preferentially sorbed, resulting in isotopically lighter solutions. In the goethite system, the sorption-induced isotope effect was superimposed by surface atom exchange, leading to a $\delta^{56}\text{Fe}$ shift in solution towards the isotopic composition of the goethite. A mass balance of the column experiment with goethite-coated quartz suggests that almost the complete goethite surface exchanged isotopically. By comparison of column systems with and without Fe surfaces, we are able to disentangle Fe isotope effects caused by Fe(II) sorption alone (quartz) and by a combination of Fe(II) sorption and atom exchange with surficial Fe (goethite-coated quartz). Our results imply that sorption processes may exert a significant influence on Fe isotope signatures in natural systems.