# Petrology and geochemistry of mafic rocks in the Acasta Gneiss Complex

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Eoarchean crustal records are rare, so that the details of early Earth are not revealed yet. Acasta Gneiss Complex (AGC), located in the western part of the Slave Province, Canada, is one of the Early Archean terranes, and contains the oldest rocks in the world [1]. It is dominated by ca. 3.6-4.0 Ga felsic and layered gneiss suites, but minor mafic to intermediate gneiss occur as rounded to elliptical enclaves and inclusions [2]. The Acasta mafic rocks are composed of variable amounts of hornblende ± plagioclase ± quartz ± chlorite ± epidote ± biotite ± apatite ± sphene ± garnet ± clinopyroxene ± opaque ± cummingtonite, and are classified into hornblendite, garnet-bearing and garnet-free amphibolites. The garnet-free amphibolites can be further subdivided into fine- and coarse-grained amphibolites. Petrological examination and mineral composition demonstrate that all rocks underwent up to upper amphibolite facies metamorphism.

The composition of our studied samples ranges from basalt to basaltic andesite ($SiO_2$ = 43-57 wt%, MgO=4.1-19.1 wt%). Some systematic differences can be seen among each group in terms of major elements and chondrite-normalized REE patterns. The hornblendites have high MgO contents and show strong negative Eu anomaly, reflecting the effect of anatexis. The garnet amphibolites have high FeO contents and slightly fractionated REE patterns ($La_N/Sm_N$=1.2-1.8, $Gd_N/Yb_N$=2.0-2.2). The coarse-grained amphibolites are enriched in $Al_2O_3$ and LREE contents ($La_N/Sm_N$=1.3-5.4) with moderately fractionated MREE to HREE patterns ($Gd_N/Yb_N$=1.2-2.0), whereas the fine-grained amphibolites display flat REE patterns ($La_N/Sm_N$=0.8-1.4, $Gd_N/Yb_N$=1.0-1.2). MORB-normalized trace element patterns show depletion in Nb and Zr relative to Th and LREE for all studied samples. Although variable incompatible trace element patterns were possibly due to alteration during regional metamophism, depletion in Nb and Zr contents suggest subduction zone magmatism for the mafic rock inclusions in the AGC.

[1]Bowring & Williams (1999) *Contrib. Mineral. Petrol.*, **134**, 3-16. [2]Iizuka *et al.* (2007) *Precamb. Res.* **153**, 179–208.

# The heavy metals in Halocynthia aurantium tissues of the Japan Sea

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The problem of concentration of elements of living organisms of the marine environment is of great importance. This problem was first posed VI Vernadsky [1]. Intermediate stage in the cycle of TM in the estuaries of the seas is a planktonic organisms that accumulate TM and send them to the bottom [2]. Ascidians (A), as bottom marine animals, are the final link in the cycle TM of the oceans and seas.

The aim was to determine the selectivity of HM accumulation various tissues ascidian H. aurantium. In addition, ascidians tissue use in medical applications: in recent years, mining H. aurantium is to produce raw materials for the production of biologically active food supplement "Haurantin" (POI FEB RAS) Overseas pharmacists from the body squirts identified cancer drugs ezteinastsidin-743 and ascidin [3]. Individuals of H. aurantium were collected in the Kievka Bay (Sea of Japan) in 2011. For the analysis of seized samples of the following tissues: stomach, digestive gland, gonads, muscle and tunic. Analyses of the composition of animal tissues were determined by atomic absorption spectroscopy.

| Tissue | Fe | Zn | Cu | Mn | Ni | Cd | Pb | Co |
|---|---|---|---|---|---|---|---|---|
| t | 140,6 | 13,9 | 2,7 | 30,8 | 1 | 0,1 | 1 | 0,3 |
| m | 48,6 | 65,3 | 1,4 | 4,9 | 0,1 | 0 | 22,2 | 0,1 |
| dg | 898,3 | 29,5 | 7,1 | 24 | 1,3 | 0,2 | 1,4 | 0,8 |
| g | 41,4 | 202 | 4,3 | 12 | 0,7 | 0 | 34,1 | 0,4 |
| s | 344 | 188,4 | 4,2 | 21,1 | 0,9 | 0 | 344 | 0 |

**Table:** The concentration of heavy metalls in *H. aurantium* tissues (t – tunic, m – muscle, dg – digestive glands, g – gonads, s – stomach, mcg/g.)

Thus, we can judge the selective accumulation of certain tissues purple ascidian TM in large enough quantities that can be explained by their peculiarities of life, the structure of tissues themselves and also, to a large extent, the state of their environment.

[1] Vernadsky V.I. (1965) Moscow: Nauka, 374. [2]Kasatkina A.P. *et al.* (1994) *Biologiya morya 20*, №**4**, 247-251. [3] Dobryakov Y.I. *et al.* (2003) *Intern. J. on Immunorehabilitation 5*, № **2**, 181.

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