Intratest oxygen isotope variability in planktonic foraminifera: New insights from *in situ* measurements by ion microprobe

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Intratest oxygen isotope variations in the planktonic foraminifera *Neogloboquadrina pachyderma* sinistral (left coiling) from North Atlantic core top and multi-net samples were assessed by ion microprobe analysis using a primary beam size of approximately 2x3 μm. In the core top sample comprising both ontogenetic and gametogenic calcite, $\delta^{18}O$ varies from 0.32‰ to 3.45‰ [PDB] (2 SD = 0.76), exceeding the range of equilibrium $\delta^{18}O$ [1] in the specimens' habitat by a factor of three. The isotopic difference between the ontogenetic and gametogenic calcite averages to 1.7‰. None of the two phases of foraminiferal calcite precipitates in equilibrium with ambient seawater. The ontogenetic calcite exhibits a negative fractionation of 0.5 to 1‰ relative to the lowest equilibrium $\delta^{18}O$ values during peak summer temperatures in the euphotic zone. In contrast, a positive fractionation of about 0.5‰ was observed in the gametogenic calcite crust with respect to the heaviest equilibrium $\delta^{18}O$ values at water depth below 200 m. Hence two counterbalancing vital effects are effective within a single foraminiferal test, indicating that 'whole test' values of this species are highly sensitive to the degree of gametogenic encrustation. The preferential incorporation of ^{16}O into ontogenetic calcite was verified by ion microprobe analysis of four nonencrusted net samples reflecting three different depth intervals. Intra-ontogenetic $\delta^{18}O$ ranges from 0.41 to 2.74‰ (2 SD = 0.55) and exhibits a negative fractionation similar to that observed in core top samples. Stable isotope microanalysis in single foraminiferal tests is a promising approach for paleoceanographic reconstructions and contributes to our understanding of the organisms' life cycle and its vital effects.

[1] O'Neil, J. R. *et al.* (1969) *J. Chem. Phys.* **15**(12) 5547–5558.

The general criterions of difference of the convergent rocks

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In geological understanding convergence is a formation of products of similar type from various sources and various ways. A subject of our studying - mountain rocks-hydrolysates, i.e. products of natural hydrolysis, them metamorphosed analogues - metahydrolysates. Some of these rocks have dual convergence the nature: they can be formed both in eluvial, and in endogenic hydrothermal-metasomatic processes. There are some diagnostic attributes of genesis metahydrolysates [2]. *Formation attribute*: the finding metahydrolysates in structure of lepigenic sedimentary formations is their important certificate hypergenic (instead of hydrothermal-metasomatic) the primary nature. This attribute testifies in favour of the eluvial-crust of the nature of ours rocks. *Substratum-formation attribute*: gravitation metasomatic hydrolysates (type of secondary quartzites and argillizites) to volcanogenous strata. In our case we observe gravitation of such rocks, as diasporites, to sour vulcanites. *Zonal-morphological criterion:* presence of symmetric ash value - the good attribute of the hydrothermal nature hydrolysates - is not characteristic for eluvial-soil columns. In the sections studied by us about any ash value to speak very difficultly. *Mineralogical attributes*. At the exogenous (low-temperature) metasomatosis there are many metastable phases while for high-temperature endogenic metasomatite fast course of process is characteristic, therefore metastable phases are short-lived. Besides for exogenous process are rather characteristic pseudomorphes whereas for endogenic they are uncharacteristic as the period pseudomorphism very much short. Such picture is observed in ours metamorphic slates for rare earth phosphates, arsenates, etc. Most likely, these minerals were formed in a Cambrian crust of weathering. At the same time in diasporites there are the minerals absolutely unusual for crust of weathering: for example, euclase, ardennite, chernovite and gasparite. *Geochemical attributes:* to number of attributes hydrothermal-metasomatic hydrolysates it is possible to carry their sour composition. Metasomatic hydrolysates it is possible to consider as other characteristic attribute deep division of aluminium and iron with formation of spatially isolated mineral congestions. Such division is precisely shown in our rocks. Thus, the studied metahydrolysates, from our point of view, are products metasomatism [1].

[1] Kozyreva, Judovich, Shvetsova *et al.* (2003) *Ekaterinburg,* 102 pp. [2] Judovich Ja.E. & Ketris M.P. (2000) *SPb: the Science*, 479 pp.