The influence of a method of sample preparation on element content in pore waters of sediments of Lake Baikal

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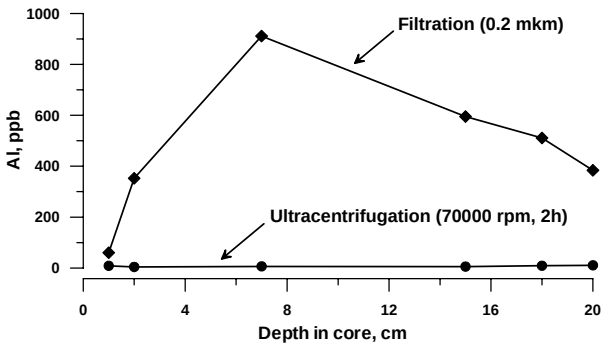
Pore waters always contain a certain quantity of suspensions which cannot be removed by means of usual centrifugation and filtrations. The content of some elements, partially or completely being in colloidal state in pore waters, will depend on quantity of fine dispersed matter. Our purpose was to find what elements are connected with colloidal particles in pore waters of the sediments of Lake Baikal and to estimate what effect will give ultracentrifugation in comparison with filtration. A core (20 cm, depth 1300 m) of Baikal bottom sediments was collected in Southern part of the Lake. Pore waters were separated from six horizons of sediments by centrifugation, filtered through 0,2 μm filters and subjected to ultracentrifugation (70000 rpm, 2h). Experiments were carried out in argon atmosphere to prevent change Red/Ox conditions. The solutions were analyzed by ICP-MS method. The content of Al, a measure of terrigenic matter, in filtered pore waters is significantly higher (in 7-140 times), than in solutions after ultracentrifugation. The content of other terrigenic elements (Be, Ti, Y, Zr, Nb, Pd, REE, Hf, Ta, Th, and Fe, Ga, Ge, Ag, Pb, Bi, U) in filtrates are also increased (2-1200 times). V, Cr, Cu, Se, Ba are less subjected to concentration on the particles – a degree of their enrichment is <2 times. The content of Li, B, C, Na, Mg, Si, P, S, Cl, K, Ca, Sc, Mn, Co, As, Br, Rb, Sr, Mo, Sn, Sb, I, Cs, W, Re, Tl does not change after ultracentrifugation.



Magmatic evolution and crustal accretion in the Northern Oman-U.A.E Ophiolite: New insights from LA-ICP-MS analysis of clinopyroxene

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The exceptionally well preserved Cretaceous Oman-United Arab Emirates (U.A.E.) ophiolite offers an ideal opportunity to study the original structure and composition of oceanic crust constructed by MORB magmas that show an increased role for water in their evolution, more akin to magmas from island arc or back arc basins.

Fieldwork has been conducted in co-operation with the British Geological Survey on the ophiolite sections in the U.A.E. This has led to the generation of geochemical data on basalts, dolerites and gabbros from the crustal section. These data record a complex history for the northernmost sections of the ophiolite. Initial magmatic events exhibit a MORB-like composition, indicating that the early crust formed at a 'normal' mid-ocean ridge. These primary events were followed by successive periods of magmatic activity, localised predominantly along major extensional faults, with each subsequent event exhibiting an increase in the subduction-related component. The northern Oman-U.A.E. ophiolite thus provides geochemical evidence for the transition from spreading- to subduction-related volcanism.

The use of a new LA-ICP-MS analytical technique has enabled trace element analysis of clinopyroxene crystals from individual gabbro units. With these data it has been possible to unlock the signatures of crustal gabbros and match plutonic units to their extrusive counterparts, providing a detailed chronology of crustal accretion events. Specifically two intrusive gabbro units are described, which represent discrete off-axis magma chambers that fractionated to feed upper extrusive units after 'normal' mid-ocean ridge processes had ceased. Geochemical and field characteristics of these units provide important constraints on the influence subduction-related fluids have on the amount of melting, mechanisms of magma fractionation and methods of crustal accretion at a fast-spreading ridge.

With the growing database of clinopyroxene trace element data this new LA-ICP-MS technique also offers significant potential for the identification of the tectonic environment of formation for cumulate rocks.