REE DISTRIBUTION BETWEEN AUTHIGENIC PHASES IN PELAGIC SEDIMENTS OF THE SOUTH BASIN, PACIFIC OCEAN

A. V. DUBININ, V. N. SVAL'NOV

Institute of Oceanology Russian Academy of Sciences, Nahimovskiy prospect 36, Moscow, 117851, Russia

In order to investigate the REE distribution between authigenic phases in pelagic sediments, we analyzed several size fractions of micronodules (50–100, 100–250, 250–500 and > 500 μm), fish-bone apatite (> 50 μm) and zeolite intergrowths (>50 μm). Micronodules, fish-bone apatite and zeolites were hand picked under the binocular microscope from four horizons of zeolitic clays (37–40, 105–110, 165–175 and 189–190 cm), station 35 (29° 36' S, 149° 58' W). The REE were analyzed using the ICP-MS method.

We found that sediments of station 35 below horizon 60–64 cm have some admixture of hydrothermal material, namely Fe and Mn oxyhydroxides (Al/(Al + Mn + Fe) < 0.4). The mass proportion of the fraction >50 μm decreases with depth from 13.2 % (horizon 37–40 cm) to 2.0 % (horizon 189–190 cm) in accord with decreasing occurrence of the zeolite intergrowths. Micronodules from the lower part of the profile have negative Ce anomaly ($Ce\,an = 2 \cdot Ce/Ce^{NASC}/(La/La^{NASC} + Nd/Nd^{NASC}) = 0.8–1.0$) which changes to positive with the decreasing depth and the increasing grain size. Fish–bone apatite in all cases has a negative Ce anomaly (< 0.2) and very high trivalent REE contents. Ce anomaly in zeolites varies from negative (0.23) to slightly positive (1.07) simultaneously with the decrease of REE(III) contents from the lower to the upper parts of the profile.

Due to the quantitative separation of authigenic phases from sediments it is possible to evaluate their influence on REE budget in the bulk sediment. For all horizons, the amount of trivalent REE in micronodules reached only 2 % of bulk REE content in the sediment except for Ce (9.6 %). Despite of the high REE content in fish-bone apatite, its influence on REE budget in the bulk sediment is less than 5 %. The REE content in zeolites (fraction > 50 μm) is in general less than 1 % of bulk sediment REE concentrations. Therefore, REE in pelagic sediments are concentrated in the fraction < 50 μm. This conclusion is very important for understanding of REE control by different authigenic phases in pelagic sediments.