

Distribution of ammonium-bearing clay minerals and their $\delta^{15}\text{N}$ values occurred in shallow-seafloor hydrothermal system in Kagoshima Bay, Southern Kyushu, Japan

J.G. JO^{1*}, T. YAMANAKA¹, Y. MIYOSHI², J.-I. ISHIBASHI³, Y. KUWAHARA³ AND H. CHIBA¹

¹Okayama University, 1-1, Naka 3-chome, Tsushima, Kita-ku, Okayama, 700-8530, Japan
(*correspondence: pae44em@s.okayama-u.ac.jp)

²AIST, Tsukuba, 305-8560, Japan

³Kyushu University, Fukuoka, 819-0395, Japan

In the nitrogen cycling processes seafloor hydrothermal systems driven by magma activity are expected to act as a source of nitrogen. The seafloor hydrothermal fluids occurred in the arc-backarc systems where are often covered with thick sediments contained organic matter are rich in ammonium derived almost from the sedimentary organic matter. Such high ammonium flux may support abundant vent community relying on the chemosynthetic production around there and contribute to enhance releasing inorganic nitrogen from sediment. In this study, we measured ammonium concentration and its $\delta^{15}\text{N}$ values in the venting hydrothermal fluids and hydrothermal clay minerals occurred in the sediment-covered shallow-water hydrothermal system in Kagoshima Bay, Southern Kyushu, Japan.

The ammonium concentration in the endmember hydrothermal fluid was reached *c.* 17 mM and its $\delta^{15}\text{N}$ values were ranging from -1.5 to +1.6 ‰. Two short sediment cores sampled from the different hydrothermal shimmering sites (SWS and SES sites) were separated clay fraction ($\leq 2\mu\text{m}$), and after removing organic nitrogen their total inorganic nitrogen (TIN) contents and its $\delta^{15}\text{N}$ values were estimated. As a result, TIN contents were 0.4 - 20.9 $\mu\text{g/g}$ and their $\delta^{15}\text{N}$ values were -4.5 - +0.6 ‰ for the SES site, and 6.5 - 114 $\mu\text{g/g}$ and 0 - +2.4 ‰ for the SWS site. The almost nitrogen was plausibly present as ammonium in the clay minerals, mainly smectites.