Trace Metal Accumulation in Deep-sea Sediments at Cold Seep Sites, Nankai Trough

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Concentrations of sulfur, carbon and trace elements which are sensitive to redox conditions of sediments have been studied systematically to restore environments of deposition. However, geochemistry of sediments at cold seep sites has not been considered sufficiently. Here we present chemical composition of cold seep sediments and discuss behavior of elements. Sediment cores were recovered from cold seep sites during dives of *Shinkai-6500*, a manned submersible, at the Nankai Trough. These samples were analyzed for major and trace elements.

Sulfur content of cold seep site sediments (up to 1.21 wt. %) is several times higher than that of normal sediments (<0.29 wt. %), and correlation between sulfur and organic carbon contents is not observed. Sulfate has been simultaneously reduced to form pyrite during anaerobic oxidation of methane (AOM).

In addition to sulfur enrichment, some trace metals such as molybdenum (up to 31 ppm), uranium (<8.9 ppm) and copper (<70 ppm) are clearly accumulated in cold seep sediments. Particularly, Mo content is very high, up to 15 times of normal sediments. Similar accumulation of Mo is also observed at other methane-hydrate site [1].

Global cycle of Mo is still controversial. Based on mass balance calculation for Mo isotope, Mo budget is not balanced at sea floor [2]. The result of this study suggests that accumulation of Mo in cold seep site should be taken as an additional sink in the global cycle of Mo.

Keywords: Cold seep; trace metals; anaerobic oxidation of methane (AOM)

References

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