# Nanometer size fractionation of metal sulfides over the hydrothermal area in Okinawa Trough

N. NAKAYAMA*[1], T. GAMO[1] AND H. OBATA[1]

[1] Atmosphere and Ocean Research Institute, The University of Tokyo, 5 -1-5 Kashiwanoha, Kashiwa, Chiba 277-8564, Japan.
*correspondence: noriko@aori.u-tokyo.ac.jp

Metal sulfides in the ocean have attracted attention for their role on the speciation of trace metals in seawater. Although hydrothermal system is one of the most important sources of sulfides and trace metals, the behaviour and fate of hydrothermal vent-derived metal sulfides in the ocean are not elucidated yet.

Vertical profiles of acid volatile sulfides (AVS) concentrations in three different size fractions (<30 nm, 30–200 nm, >200 nm) were observed as the concentrations of metal sulfides for the first time over the submarine hydrothermal field of Hatoma and Yonaguni Knoll over Okinawa Trough in the western Pacific. The nanometer size fractionation was carried out immediately after seawater sampling and AVS concentrations in each filtrates were then determined by a purge-trap gas chromatography with an FPD.

The highest concentrations of $AVS_{total}$ (unfiltered AVS) were found at the depth of ~50 m above sea floors in both areas (Hatoma Knoll: 4.0 nmol/kg, Yonaguni Knoll: 5.3 nmol/kg). The nanometer size fractionations of the metal sulfides showed a quite interesting profile. In the depth with lower $AVS_{total}$ (< ~100 pmol/kg), $AVS_{<30\ nm}$ was dominant, while ~70% of metal sulfides existed as $AVS_{>200nm}$ in the depth of $AVS_{total}$ maximum. The high fraction of large particulate metal sulfides (> 200 nm in size) sharply declined at the layers neighbour to the $AVS_{total}$ maximum. The strong dependence of the size fractionation on $AVS_{total}$ concentration suggests that nanoparticle/dissolved metal sulfides may rapidly grow to larger particles under the high $AVS_{total}$ condition after emitted from hydrothermal vent to the ocean environment.