Pore fluid chemistry of active hydrothermal fields in the mid-Okinawa Trough

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Since hydrothermal fields in the Okinawa Trough develop within sediment-rich geologic setting of a backarc rifting in the continental margin, significant fluid mineral interactions and fluid migrations are expected to occur within sediment layer. In order to obtain constraints on these subseafloor processes, we investigated pore fluid chemistry of sediment cores collected during scientific drilling campaigns conducted employing D/V *Chikyu* under the framework of the Next-generation Technology for Ocean Resources Exploration Project. Hydrothermal fields in the Iheya North Knoll and Iznea Hole in the mid-Okinawa Trough were targeted, where some holes were drilled just beside active vent fields or on active hydrothermal mounds. In addition to major elements, we analyzed minor alkali elements (Rb, Cs) using ICP-QMS and boron isotope ratio using MC-ICP-MS.

Our study revealed that pore fluid chemistiry in the vicinity of active vents were represented by two distinctive components. One is seawater-derived component which has basically identical chemical composition to that of the seawater. The other is hydrothermal component that shows a significant resemblance in chemical composition to the vent fluid, which is characterized by significant enrichment in alkali elements. Boron isotopic composition is another useful indicator; the hydrothermal component showed significantly ^{11}B-depleted signature compared with that of seawater. Vertical profiles of the pore fluid chemistry in these sites indicated entrainment of the seawater-derived component down to 20 mbsf (meters below the seafloor), whereas occupation of the hydrothermal component was common below 40 or 60 mbsf. Encounterment of these two components are interested, because it could be related to sulfide/sulfate mineralization process beneath the seafloor.