B101-024 **Room: Function Room A** **Time: May 18 15:00-15:15**

Trioctahedral smectite formed within sedimentary layer around the active hydrothermal vent, in Kagoshima Bay, South Kyushu, Japan

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The Wakamiko submarine volcano in Kagoshima Bay has a crater of 4 x 2 km in size. High temperature fluid venting (T = 200 degC) from chimney-like structures was discovered at the northwest part of the crater seafloor of 200 meters water depth (31_40.07'N, 130_45.68'E) (Yamanaka et al, 2008). Since the Wakamiko crater is covered with unconsolidated volcanic sediment, intense fluid-sediment interaction is expected to occur as reported by previous studies (Nakaseama et al., 2008). During KT08-9 expedition using R/V Tansei-maru, we collected successfully a piston core (up to 330 cm below the surface) in the vicinity of the high temperature vent. We studied mineralogy of the sediment together with geochemistry of the pore fluid, to discuss hydrothermal alterations within sediment around the vent.

After the piston core sampling, sub-samples were collected at 5 to 10 cm intervals. Pore fluid is extracted from the sediment within 24 hours. Mineralogy of the sediment was determined by XRD in Kyushu university. In addition to bulk analysis, clay-size fraction was sorted by elutriation from the sediment and analyzed in detail. Oriented samples were measured on air-dried conditions, after saturation with ethylene-glycol and after HCl treatment for clay minerals identification. Randomly oriented samples were measured in order to identify di- or trioctahedral clay minerals based on the 060 reflection.

All over the core except for the surface, smectite is dominant while the primary minerals were rare. The core sediment is classified into four units according to type of the smectite, as follows.

Unit (A) (0 to 70 cm bsf) : Plagioclase and quartz were obvious only in this unit. Smectite is not found.

Unit (B) (70 to 270 cm bsf) : Dioctahedral smectite was dominant. Stibnite was found. Pore fluid chemistry was similar to seawater.

Unit (C) (270 to 300 cm bsf) : Trioctahedral smectite was dominant. Dioctahedral smectite and mica was found slightly. Pore fluid could not be extracted from the sediment, because the sediment was very indurate.

Unit (D) (300 to 330 cm bsf) : Dioctahedral smectite was dominant. Pore fluid chemistry indicated mixing between the hydrothermal component and seawater.

It is noteworthy that trioctahedral smectite was found only in Unit (C) which is the boundary between Unit (B) occupied with pore fluid of seawater composition and Unit (D) occupied with pore fluid of the hydrothermal component. Occurrence of trioctahedral smectite was found in sediment of an active hydrothermal field, and considered to be formed due to mixing of the hydrothermal component and seawater (e.g. Dekov et al., 2008). In similar to the previous examples, the trioctahedral smectite in Unit (C) is attributed to have formed under the condition where high temperature was supported by the hydrothermal component intrusion and Mg was supplied by seawater.

Distribution of the dioctaheral smectite all over the core suggests that trioctahedral smectite is transformed from dioctahedral smectite which had been formed earlier, by substitution of Mg for octahedral Al in dioctahedral smectite. This idea is supported by relative amount of dioctahetral and trioctahedral smectite within Unit (C), where the dioctahedral smectite gradually decreases toward Unit (D) in replacement of the trioctahedral smectite increase. The occurrence of mica within Unit (C) would be another evidence for the dioctahedral- tioctahedral transformation, since Al released from the diocatahetral smectite could promote mica formation.

An experimental study by Fiore et al (2001) reported that increase of Mg content in an octahedral site of smectite promotes growth of the smectite particles. The dioctahedral- trioctahedral transformation of smectite would be responsible for the induration of the sediment of Unit (C). Moreover, the induration could prevent ascent of the hydrothermal fluid and enhance lateral migration within sedimentary layer.