

## Arsenic behavior in modern deep sea sediment columns

H. MASUDA<sup>1</sup>, H. YOSHINISHI<sup>1</sup>, T. TOKI<sup>2</sup>

AND IODP SHIPBOARD SCIENTIFIC PARTY EXP. 338

<sup>1</sup>Osaka City University, harue@sci.osaka-cu.ac.jp,

o.harubass.27@gmail.com

<sup>2</sup>University of the Ryukyus, toki@sci.u-ryukyu.ac.jp

In order to understand the process(es) of As concentration and fixation in the marine sediments, As and related elements in the porewater and coexisting sediments were analyzed. Samples were taken from Nankai Trough, which is one of typical modern accretionary prisms, during IODP Expedition 338. Longest sediment core was taken from C0002 site in Kumano basin, at where the sediments were mostly comprised of turbidite sequence including quartz, micas, chlorite, smectite, feldspars, and calcareous materials. Shorter cores were taken from C0021 and C0022 sites at the toe of spray faults. The results of cores from C0002 and C0022 will be documented here.

Arsenic in the porewater varied from 10 to 230 ppb in 200-500 mbsf (meters below seafloor) of C0002 site sediments. The highest concentration was observed at 400 mbsf. Although only one sample was analyzed, the As concentration ~3.5 ppb was recorded at 914 mbsf. Arsenic in the bulk sediments varied within 3 to 10 ppm irrespective of the depths. At C0022 site, the As in porewater peaked at about 150 mbsf (110 ppb), and that in the sediments were from 5 to 7 ppm.

Arsenic concentration in the porewater varied in accordance with that of Pb, most of which were adsorbed on the sediment particles. Also, the As concentration became high when the pH increased >7.8, implying that the released As was adsorbed onto the sediment particles, similar to Pb. Freshwater from methane gas hydrates diluted the porewater at the depths between 300 and 500 mbsf at Site C0002 and 100 and 150 mbsf at Site C0022, implying that the pH were controlled by microbial activity in these sediment columns.

Concentrations of Fe and Mn gave negative correlation to that of As in the porewater, while, positive correlation in the bulk sediments. Thus, the As would be accumulated with Fe and Mn phases, such as Fe-oxyhydroxides and Mn-oxides precipitated from seawater, then dissolved in the porewater via desorption prior to the decomposition of Fe and Mn phases. Microbial activity would affect the redox condition of porewater to control the solubilities of As and related elements. In the deeper part of the sediments, the As would be fixed in newly formed minerals such as pyrite and/or clay minerals resulting low concentration of this element in the porewater.