Barite Fronts and Duration of Methane Migration, Offshore SW Taiwan

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Accurate identifying timing and duration of methane migration above gas hydrate layer is important in deciphering history of methane venting and associate biogeochemical processes. However, difficulties may arise in determining methane migration due to problem in distinguishing modern and old carbon. Migration of methane through sediments often carried old carbon, which renders the traditional carbon 14 dating methods or planktonic records untrustworthy. Modeling peak concentration of barium sulfate precipitation at the sulfate-methane interface (SMI) has been successfully used to modal calculate the length of methane migration. In this report, detail measurements of barite front were conducted and used in search of present and past methane fluxes in sediments offshore southwestern Taiwan.

A number of cores were taken at sites with various degree of methane flux. Very fine scale of sediments were sampled and analyzed for barium concentrations. Data were used to calculate barite fronts and duration of methane fronts.

The study area has been subjected to variable but active tectonic activities as well massive amounts of terrigeouns sediments from adjacent rivers. Tectonic activities may have significant effect on methane migration and subsequent barium sulfate precipitation at the study area. At some sites, more than one barite peaks were found, indicating multiple stages of methane vents at present and/or in the past. For multiple peaks, one of the peaks was always associated with the SMI, demonstrating bariums is subjecting to anoxic dissolution/migration and later precipitation when sulfate become available. On the other hand, only one or no barite peak was found at some site. Multiple peaks indicated that methane venting my have occurred several times at different geological time at this sites. The reason for various number of barium peaks at the study area indicated that gas venting may not controlled by a general process such as sea level changes but by the local tectonic activities.

Keywords: Barite, Sulfate-methane interface, Gas hydrate, Methane migration.