

Geochemistry of dissolved gas around gas chimney structures in the Mogami Trough, Japan

*Ryohei Kameda¹, Hirose Natsumi¹, Hitoshi Tomaru¹, Ryo Matsumoto²

1.Faculty of Science, Chiba University, 2.Organization for the Strategic Laboratory of Research and Intellectual Properties, Meiji University

In the Mogami Trough, eastern margin of the Japan Sea, active gas venting has not been observed on the seafloor, however, distribution of mounds and pockmarks on the gas chimney structure (vertical acoustic blanking zone of shallow sediment) indicates the strong flux of gas-rich fluid from deep sediments and formation of gas hydrates near the seafloor. Concentrations and isotopic compositions of headspace gases collected inside and outside the well-developed gas chimneys were analyzed in order to characterize geochemical structure across the gas chimney and surrounding sediments. Distributions of methane (C1) and ethane (C2) concentrations and C1/C2 ratios show gradual increase toward the center of gas chimney particularly in shallow sections, reflecting higher biogenic methane production in the higher gas migration zone within the chimney. The stable carbon isotopic compositions of methane are also high in the center of the chimney due to higher contribution of thermogenic gas derived from deep section. The higher concentration and upward flux of gas are observed in the mound area rather than pockmark area, reflecting that the activity of gas chimney may control the distribution of gas hydrate responsible for shallow topographic anomalies.