

Characterization of grain-size distribution and mineral composition of hydrate-bearing sediments in the Nankai Trough

MINAGAWA, Hideki^{1*} ; ITO, Takuma¹ ; EGAWA, Kosuke¹ ; KANEKO, Hiroaki¹ ; NODA, Shohei¹ ; FUJII, Tetsuya² ; NAGAO, Jiro¹

¹MHRC/ AIST, ²JOGMEC

Gas hydrate-bearing sediments taken by a hybrid pressure coring system (Hybrid PCS corer) were recovered from the eastern Nankai Trough region at the AT-1 well during the 2012 JOGEMC/JAPEX Pressure coring operation using D/V Chikyu. The recovered sediments are mainly composed of the unconsolidated sand and mud alternation layers, which can be interpreted as turbidite and hemi-pelagic mud, respectively. Gas hydrates accumulated in unconsolidated sands as a pore-filling morphology. The purpose of our study is to prepare the standard samples, which represent the sedimentary features such as grain size and mineral composition in the eastern Nankai Trough sediments. For preparing the standard sample appears to be important for laboratory experimental studies such as physical properties from the engineering point of view.

Using the gas hydrate-bearing sediments, the sedimentary features such as gain size and mineral composition were analyzed systematically. Based on this grain size distribution data, we categorized typical three kinds of standards samples: silty sand, sandy silt, and clayey silt, respectively. As a result of mineral composition analysis of sediment measured by X-ray diffraction (XRD), the bulk mineral compositions are characterized by 10 compositions, i.e., the quartz, hornblende, feldspars (orthoclase, Plagioclase), pyrite, smectite, kaolinite, calcium carbonate, chlorite, and mica. These mineral compositions are strongly correlated with grain size features such as median or means sizes. According to the above results, we prepared typical three kinds of standard samples, and measured pore-size distribution and permeability features using the nuclear magnetic resonance (NMR) method. In the presentation, we will compare with those physical features between standard samples and natural sediments from the eastern Nankai Trough.

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