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Development of pressurized subsampling system for structural imaging of pressured methane hydrate bearing sediments

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Gas clathrate hydrates (gas hydrates, GHs) are ice- like crystalline compounds consisting of gas and water molecules, in which the gas molecules are stored in a framework of water. GHs exist in oceanic and permafrost sediments; because they are a primary means of storing methane (CH_4), natural GHs are of interest as a potential new energy resource. On March 12, 2013, the first offshore gas production test from the sandy GH layer in the eastern NT area; CH_4 gas productions were produced from the offshore hydrate layer. Here, porosity of GH bearing sediment is a key of gas production efficient from natural gas-hydrate reservoir. Developable natural GHs by conventional gas/oil production apparatus almost exist in unconsolidated sedimental layer. Because sand matrix in GH sediments could have been changed by freezing water in pores in the case of quenched sample, porosity discussed using quenched GH bearing sediment may be over estimated comparing with nature of sediments at in situ condition. Therefore, we developed in situ sub-sampling system for pressured natural GH sediments due to in situ porosity estimation. In this study, we demonstrated sub-sampling from an artificial GH sediment and confirmed sub-sampling results through micro-imaging.

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