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Experimental study for fluid-flow system in subduction zone; permeability of shallow marine sediments

Kiyofumi Suzuki^{1*}, Eiji Fukami¹, Hideo Narita¹

¹AIST, Methane Hydrate Research Center

Accumulation of gas hydrate in sediments is governed by properties of themselves and their own fluid transmissibility; permeability. Also, the fault and thrust system will affect a greater influence for their fluid flow. To consider the fluid dynamics of hydrocarbon accumulation area more certainly, we should know not relative transmissibility of sediments but their absolute permeability for estimating kitchen and conduit of hydrocarbon.

On this point, we had measured permeability of turbidite samples, which were taken as Off Tokai and Kumanonada research drilling at NE-Nankai Trough. Each measured samples were treated shape as D30xH20 mm because of independent from grading effect in specimen. The results, sandy part of turbidities shows mD-to-Darcy: 10^{-15} - 10^{-12} [m^2] and muddy part shows 10^{-17} - 10^{-15} [m^2] of permeability: the values are smaller than minimum value of the sand. It implies that mud is as impermeable layer on contrast with sand layer until 1000 meter-bsf, though they are still unconsolidated and high porosity. Then, the gas-hydrate crystallization in pores' of sand make their permeability difference smaller or same so that the permeability of sediments near hydrate zone will quite change after the crystallization. This is complete change for conduit path of fluid within shallow-depth sediments, and it is sure that they have been acting as seal for deeper sediments. We will make presentation of effective and absolute permeability around gas hydrate accumulating zone for estimating fluid path system.

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