[JJ] Evening Poster | M (Multidisciplinary and Interdisciplinary) | M-IS Intersection

[M-IS17]Gas hydrates in environmental-resource sciences

convener:Hitoshi Tomaru(Department of Earth Sciences, Chiba University), Akihiro Hachikubo(Kitami Institute of Technology), Atsushi Tani(神戸大学　大学院人間発達環境学研究科, 共同), Shusaku Goto(Institute for Geo-Resources and Environment National Institute of Advanced Industrial Science and Technology)

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An increasing number of researches focusing on natural gas hydrates has recently been conducted from the environmental, material, and resource scientific viewpoints. This session aims to share and discuss the latest research results to understand and examine the nature and potential of gas hydrates in the past-present-future of the Earth. Because the researches on gas hydrates are interdisciplinary, broad topics from field and experimental researches, modeling, etc. will be presented in this session.

[MIS17-P17]Equivalent formation strength of gas hydrates bearing zone

*Yohei Hamada[1], Takehiro Hirose[1], Saneatsu Saito[1], KYAW MOE[1], HungYu Wu[1], Wataru Tanikawa[1], Yoshinori Sanada[1], Yasuyuki Nakamura[1], Yuichi Shimmoto[1], Takamitsu Sugihara[1], Weiren Lin[2], Natsue Abe[1], Lallan Prasad Gupta[1], Masataka Kinoshita[3], Yuka Masaki[1], Shun Nomura[1], Yasuhiro Yamada[1], JAMSTEC Science Team NGHP Expedition 02 (1.Japan Agency for Marine-Earth Science and Technology, 2.Kyoto University, 3.Earthquake Research Institute, The University of Tokyo)

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Gas hydrate-bearing layers are normally identified by a basement simulating reflector (BSR) or well logging because of their high acoustic- and electric impedance compared to surrounding formations. These gas hydrate characteristics can also result in contrasting in-situ formation strengths. Here, we describe gas hydrate-bearing layers based on equivalent strength (EST) in the exploration borehole of the Indian National Gas Hydrate Program (NGHP) Expedition 02. For Site NGHP-02-23, a representative site, the EST shows a constant trend of ~2 MPa, with some strong peaks in the 0–271.4 meter-below-seafloor (mbsf) interval, and a sudden increase up to 4 MPa above the BSR depth (271.4–290.0 mbsf). Below the BSR, the EST stays at ~2 MPa to the bottom of the hole (378 mbsf). Comparing the EST with logging data and a core sample description suggests that the EST depth profiles reflect the formation lithology and gas hydrate content. The EST increases in the sand-rich layer and gas hydrate-bearing zone. In the lower gas hydrate zone in particular, the EST curve shows the same approximate trend with that of P-wave velocity and resistivity measured during downhole logging. These results suggest that the EST, as a proxy for in-situ formation strength, can indicate the location and extent of the gas hydrate layer as well as borehole logging. Although the EST was calculated after drilling, utilizing the recorded surface drilling parameter in this study, the EST can be acquired during drilling using real-time drilling parameters. In addition, the EST only requires drilling performance parameters without any additional tools or measurements, making it a simplified and economical tool for the exploration for gas hydrates.