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

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

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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-P16]In-situ strength of sediments from a hydrate deposit in the Krishna–Godavari Basin on the eastern margin of India

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Formation strength of sediments overlying sub-seafloor gas-hydrate deposits is significant for estimating the stability of borehole and seafloor during hydrate extraction. Ideally, sediment strength should be determined along a borehole from the seafloor to the hydrate reservoir; yet few such profiles have been reported. In this study we collected cores at Site NGHP-02-23 in the Krishna–Godavari Basin during National Gas Hydrate Program Expedition 02 to conduct unconfined penetration tests on split core surface and triaxial deformation experiments on hydrate-free sediment samples under in situ pressure conditions. Based on strength measurements by penetrometer, relatively low strength ranging between 70 and 250 kPa due to hydrate dissociation is identified in the hydrate-bearing interval 90 – 300 mbsf, except for the intervals 140 – 150 mbsf and 250 – 270 mbsf, where the strength exceeds 300 kPa. These high-strength intervals lie just above a zone of high gas-hydrate concentration. Triaxial strength of hydrate-free sediments increases with depth from ~0.3 MPa at 48 mbsf to ~1.8 MPa at 332 mbsf, following the depth trend of strength defined by internal frictional coefficient of ~0.3. An exception to this trend was in fine sands from 280 mbsf in the deeper high gas-hydrate zone, where strength was greater than 2.2 MPa. Previously reported pressure-core measurements of the strength of hydrate-bearing sediments in the deeper gas-hydrate zone by Yoneda et al. (2017) also lie on that depth–strength trend. Distribution of the high strength intervals confirmed by both penetrometer and triaxial experiment can be intrinsically related to the hydrate concentrated zones. Because high strength layers commonly exhibit low permeability, they may act as a seal to assist precipitation of hydrate below the layers.