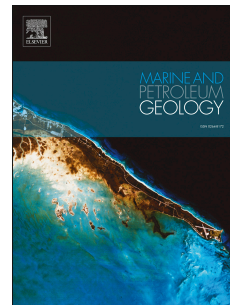


Accepted Manuscript

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PII: S0264-8172(17)30445-2

DOI: [10.1016/j.marpetgeo.2017.11.011](https://doi.org/10.1016/j.marpetgeo.2017.11.011)

Reference: JMPG 3136

To appear in: *Marine and Petroleum Geology*

Received Date: 13 June 2017

Revised Date: 5 November 2017

Accepted Date: 8 November 2017

Please cite this article as: Lorenson, T.D., Collett, T.S., National Gas Hydrate Program Expedition 01 offshore India; gas hydrate systems as revealed by hydrocarbon gas geochemistry, *Marine and Petroleum Geology* (2017), doi: 10.1016/j.marpetgeo.2017.11.011.

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National Gas Hydrate Program Expedition 01 Offshore India; Gas Hydrate Systems As Revealed By Hydrocarbon Gas Geochemistry

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Abstract

The National Gas Hydrate Program Expedition 01 (NGHP-01) targeted gas hydrate accumulations offshore of the Indian Peninsula and along the Andaman convergent margin. The primary objectives of coring were to understand the geologic and geochemical controls on the accumulation of methane hydrate and their linkages to underlying petroleum systems. Four areas were investigated: 1) the Kerala-Konkan Basin in the eastern Arabian Sea, 2) the Mahanadi and 3) Krishna-Godavari Basins in the western Bay of Bengal, and 4) the Andaman forearc Basin in the Andaman Sea.

Upward flux of methane at three of the four of the sites cored during NGHP-01 is apparent from the presence of seafloor mounds, seismic evidence for upward gas migration, shallow sub-seafloor geochemical evidence of methane oxidation, and near-seafloor gas composition that resembles gas from depth.

The Kerala-Konkan Basin well contained only CO₂ with no detectable hydrocarbons suggesting there is no gas hydrate system here. Gas and gas hydrate from the Krishna-Godavari Basin is mainly microbial methane with $\delta^{13}\text{C}$ values ranging from -58.9 to -78.9‰, with small contributions from microbial ethane (-52.1‰) and CO₂. Gas from the Mahanadi Basin was mainly methane with lower concentrations of C₂-C₅ hydrocarbons (C₁/C₂ ratios typically >1000) and CO₂. Carbon isotopic compositions that ranged from -70.7 to -86.6‰ for methane and -62.9 to -63.7‰ for ethane are consistent with a microbial gas source; however deeper cores contained higher molecular weight

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