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Gas-Hydrates - A Major Future Fuel Of India

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ABSTRACT

Gas-hydrates have attracted the world-scientific community because of their abundant occurrences in the outer continental margins and permafrost regions, huge potential as a viable major unconventional energy resource for the next generation. Successful test productions in the McKenzie delta in Canada in 2008, in Alaska in USA in 2012 and in the Japan continental margin in 2013 have provided great hopes that gas-hydrates would be produced by 2028. The bathymetry, seafloor temperature, total organic carbon content, sediment-thickness, rate of sedimentation, geothermal gradient imply that the shallow sediments in the deep water along the Indian margin are good hosts for gas-hydrates. The methane within gas-hydrates has been prognosticated to be more than 1500 times of India's present natural gas reserve. Even 10% production from this gigantic reserve can meet India's overwhelming energy requirement for about a century. Thus, it was felt necessary to map the prospective zones of gas-hydrates and evaluate their resource potential. The gas-hydrates stability thickness map along the Indian margin has been prepared. This provides the maximum depth of gas-hydrates occurrences, and helps to identify the bottom simulating reflectors or BSRs, main marker for gas-hydrates, from seismic data. Analysis and scrutinizing available seismic data reveal the signatures of gas-hydrates in Krishna-Godavari (KG), Mahanadi and Andaman basins. Various seismic attributes like the reflection strength, blanking, attenuation and instantaneous frequency have been computed to characterize the gas-hydrate reservoirs. Several approaches based on seismic traveltime tomography, full-waveform inversion, amplitude versus offset modeling, impedance inversion, coupled with rock-physical modeling have been developed, and applied to field data. All these will be presented for the delineation and assessment of gas-hydrates from seismic data in the eastern Indian margin.