

THE SEISMIC CHARACTERISATION OF GAS HYDRATES

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Gas hydrate is ice containing molecules of gas trapped inside the crystalline lattice. Explorationists are concerned primarily with deposits of methane hydrate, as methane is the most common hydrate-forming gas and is valuable in energy terms as a fossil fuel. It is estimated that methane hydrates contain approximately twice as much carbon as all fossil fuels, which illustrates their economic importance as a source of energy. Oceanic methane hydrates are the most common, occurring in sediments underneath the ocean floor at specific combinations of temperature and pressure. Reflection seismology is the principal tool used to image subsurface hydrate-bearing sediment. The methane hydrate signature on seismic data is believed to be an event called the Bottom Simulating Reflector (BSR) that represents the acoustic impedance contrast at the base of the hydrate bearing sediment.

Methane hydrates are a relatively unexplored phenomenon in the exploration industry. The occurrence of BSRs in seismic reflection data is one of the most important indications of the presence of gas hydrates in marine sediments, yet hydrate commonly occurs in areas not exhibiting the BSR. A greater understanding of hydrate formation and the associated BSR is required.