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**Physical Properties of Sediment Containing Natural and Laboratory-Formed Gas Hydrate**

The U.S. Geological Survey (USGS) has been involved in a number of pioneering gas-hydrate expeditions with the objective of achieving a better understanding of the relationship between the occurrence of natural gas hydrate and the physical properties of the surrounding sediments. USGS geotechnical engineers and scientists are also conducting laboratory experiments, at simulated in situ conditions, on: (a) natural samples recovered from drill wells in the Canadian Arctic and offshore, and (b) reconstituted sediment samples.

Although gas hydrate can occur in a wide range of sediment types, the properties of the host material influence the type and quantity of hydrate formed and, therefore, dictate whether the deposits in a particular area may be economically recoverable in the future. In addition to determining index, acoustic velocity, shear strength, and permeability properties of natural sediments which contain gas hydrate, we are also analyzing different laboratory techniques to create hydrates and are using natural surfactants to catalyze gas-hydrate formation.

Recently, giant piston cores, up to 38-m long, were recovered in the northern Gulf of Mexico to determine the lateral and subbottom extent of gas hydrate in different geologic settings. The sediments immediately adjacent to the recovered gas hydrates are visually similar to surrounding sediments and, therefore, are unlike cores recovered from the Mackenzie Delta, NWT, Canada where primary lithologic differences appeared to control the distribution of the gas hydrates in the Canadian arctic.