OCEAN ◆ DRILLING ◆ PROGRAM

News Release

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FOR IMMEDIATE RELEASE

Scientists report results from inaugural gas hydrate expedition

College Station, Texas -- Scientists participating in the Ocean Drilling Program's (ODP) first investigation into the amount of natural gas deposits stored in marine sediments have reported results from the seven-week expedition.

Three 700-750 m deep boreholes and four shorter holes (50 m) were drilled in the ocean floor 180 miles off the coast of the Carolinas in water depths of up to 2,800 m. The research team, consisting of 50 scientists and technicians, concluded their studies December 19 when the scientific drill ship *JOIDES Resolution* docked in Miami.

Preliminary results from Leg 164 confirm that significant amounts of methane are contained in gas hydrates in this area. Gas hydrates are solid ice-like crystals that form from water and methane under conditions of high pressure and low temperature. Previous estimates suggested that there is about twice the amount of fossil fuel carbon stored as methane in gas hydrates than exists in all the known oil, coal and gas deposits in the world. Yet these estimates are poorly constrained and difficult to quantify because of the nature of gas hydrates.

Most humans have never seen a natural gas hydrate because of environmental conditions required for formation. The conditions appropriate for gas hydrate formation are common in seafloor sediments.

If gas hydrates in the seafloor sediments constitute the largest methane reservoir on Earth, it has both climate and natural resource implications. Methane is an important greenhouse gas and the potential connection between these geologic deposits and the atmosphere needs to be established. Methane is also an efficient and clean fuel, so the long-term potential of gas hydrates as an energy source merits consideration.

As anticipated, recovery of gas hydrates proved difficult. Cores of sediment that were recovered by drilling released large amounts of gas, but gas hydrates usually were not observed in the cores. Geochemical data indicated that most gas hydrates decomposed before the sediment cores arrived on the ship's deck. However, solid zones of gas hydrates were recovered in horizons that were up to 30 cm thick.

To deal with the ephemeral nature of gas hydrates under surface conditions, scientists and technicians made unprecedented use of downhole sampling and measurement tools to characterize the nature of these deposits. Of special interest was a special coring system that sealed sediments from these great depths into a strong metal chamber and brought them back to the surface under their original pressures. These samples revealed sediments from boreholes containing more than 20 times their volume in gas when allowed to expand out of the pressure chamber in the ship's laboratory.

Data obtained from these boreholes indicate that the sediments in this region contain significant quantities of gas hydrates. Beneath a 200 m- thick layer of hydrate-bearing sediments, gaseous methane is also present. Since geophysical data indicate that similar volumes of gas hydrates occur throughout large regions off the U.S. southeast coast, the total amount of methane stored in gas hydrates is enormous. Moreover, other data indicate gas hydrates are common in many other places in the world. Thus, the preliminary estimates of ODP Leg 164 signify that gas hydrates, while difficult to capture, are in fact a common phase in seafloor sediments.

The Ocean Drilling Program is funded by the U.S. National Science Foundation, Canada, Australia, the European Science Foundation Consortium, Germany, France, Japan, and the United Kingdom to investigate such topics as earth's history and evolution, climate change and formation of the ocean crust.

Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES), an international group of scientists, provides scientific planning and program advice. Joint Oceanographic Institutions, Inc., a nonprofit consortium of 10 major U.S. oceanographic institutions, manages the program.

Texas A&M University, science operator, operates and staffs the drill ship that retrieves core samples from strategic sites in the world's oceans. Lamont-Doherty Earth Observatory of Columbia University is responsible for downhole logging.

Note: U.S. members of JOIDES are: University of California at San Diego, Columbia University; University of Hawaii, University of Miami; Oregon State University; University of Rhode Island, Texas A&M University, University of Texas at Austin; University of Washington, and Woods Hole Oceanographic Institution. The European Science Foundation Consortium consists of Belgium, Denmark, Finland, Iceland, Italy, Greece, The Netherlands, Norway, Spain, Sweden, Switzerland and Turkey.

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