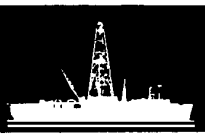
NEWS RELEASE
Ocean Drilling Program



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Leg 109.2

COLLEGE STATION, TX -- Using space-age engineering technology and the type of submersible more often associated with a Jules Verne epic, scientists on board the drilling vessel JOIDES Resolution recovered new, zero-age crustal rock as well as primordial samples originating in Earth's mantle. They also performed downhole experiments to learn more about Earth's crust beneath the seafloor.

The primary scientific objective of the ninth cruise of the internationally sponsored Ocean Drilling Program (ODP) was to deepen a hole at the Kane Fracture Zone of the Mid-Atlantic Ridge which JOIDES Resolution initiated in November 1985.

The Mid-Atlantic Ridge is a nearly continuous chain of underwater mountains. On a globe it looks like the spine of a giant serpent, twisting down the Atlantic from Iceland to the Antarctic. The crest of the ridge is where two of the 10 major tectonic plates making up Earth's surface are moving apart, carrying Africa and Europe away from the Americas at about an inch a year. The drill site, about 1200 miles southeast of Bermuda, is a submarine volcano on the crest of the ridge.

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The tremendous rifting process does not create a great chasm in the earth because molten rock is continually being supplied from deep within Earth's interior. The molten rock erupts onto the ocean floor as lava and forms myriads of volcanoes piled one upon the other. As the plates continue to drift apart, the volcanoes are continually being carried away laterally to either side of the ridge crest as if on a conveyor belt. The most recently formed volcanoes, called zero age because of their extreme youth in geologic time, are at the ridge crest itself.

Scientists drilling at the site during the first expedition in November obtained deep-sea samples of zero-age rocks, the first ever to be retrieved from a drill hole at the Mid-Atlantic Ridge. In May scientists returned to the same site to drill the hole even deeper.

Because of its growth, the ocean floor at the axis of the Mid-Atlantic Ridge does not have the traditional sediment layer on which engineers have depended in the past to provide lateral stability for the flexible drill pipe. During last winter's expedition, the ship lowered a 20-ton, 18-foot-square steel box, called a guide base, to the summit of a submarine volcano, two miles below the ocean's surface. The guide base was locked into place with 100,000 pounds of cement. The cone-shaped hole in the center of the box held the drill bit stable while it started the hole on the bare-rock surface.

Using an advanced satellite navigation system, the ship found the steel box again this spring. The crew used a

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television camera mounted on the end of the 10,000-foot drill pipe to insert the drill bit into the hole once again. The hard, fractured rocks of the volcano were difficult to drill, causing the bottom of the drill pipe to break twice. Tools had to be built on board and, in a manuever called fishing in the oil industry, lowered down the drill pipe to fish the broken pipe from the hole.

The second time, the broken pipe protruded 12 feet above the hole. In a television-monitored operation similar to those performed in outer space, the fishing tool, lowered through two miles of water, locked onto the end of the broken pipe and pulled it clear. The operation is comparable to standing on a drilling derrick and threading the eye of a needle 142 feet below, explained the two co-chief scientists for the cruise.

The hole, which was left at 110 feet (33 meters) after the first expedition, was drilled an additional 40 feet to a total depth of 167 feet (50.5 meters) below the sea floor.

The hole was left open for future drilling. When the ship next returns, she will carry new equipment developed to permit faster penetration into this permanent underseas laboratory.

The ship moved to its second site 70 miles west of the ridge crest to investigate a 2,000-foot-deep hole originally drilled 10 years ago. The drill pipe was used to lower a series of electronic probes into the hole to measure the physical and chemical characteristics of the rocks, mainly basalt lavas formed from molten material. This site is now one of three

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standard crustal sections in the world over which scientists have made these kinds of measurements.

For the ship's third drill site, the crew had to surmount another technological problem. Basalt lavas, which are brittle and difficult to drill into, make up the uppermost layer of crust beneath the ocean. Geologists believe that beneath the lavas the rocks are more crystalline, so to facilitate drilling and recovery of the deeper rocks, a site with no lava or sediment cover was needed.

The deep-sea submersible ship Alvin and her parent ship, Atlantis II, aided JOIDES Resolution in finding the ideal drill site. Scurrying along the ocean floor, the reconnaissance vehicle Alvin discovered the site about 20 miles north of where JOIDES Resolution had begun drilling. A hole was rapidly drilled at this new location to a depth of more than 300 feet (92.5 meters).

The core of material collected contained a kind of crystalline rock called peridotite. Peridotite is believed to have formed more than 20 miles beneath the seafloor, in the crustal zone called the mantle. Below the Mid-Atlantic Ridge, the mantle flows slowly upward to more shallow levels. JOIDES Resolution recovered peridotite that had reacted with seawater, converting some of it to a soft rock, similar to soapstone, with thick veins of natural asbestos. The seawater transformation made the rocks much lighter than surrounding ones. Scientists surmise that these rocks became buoyant and pushed their way up through the lavas onto the ocean floor.

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This is the first time that mantle rocks have been recovered by drilling at the crest of the mid-ocean ridge. This achievement is an incentive to drill at bare rock outcrops more extensively and retrieve these fascinating samples of Earth's deep interior.

Co-chief scientists for the cruise were Wilfred B. Bryan, Woods Hole Oceanographic Institution, Woods Hole, Mass., and Thierry Juteau, Universite de Bretagne Occidentale, Brest, France. ODP staff scientist was Andrew C. Adamson, Texas A&M University.

During this ninth cruise of the program, the ship's scientific party had 17 members from the U.S., Canada, France, Japan, West Germany and the United Kingdom. Twenty-three technicians and support personnel and 65 ship's crew also sailed. The ship left Dakar, Senegal, April 23 and arrived in Barbados on June 19.

JOIDES Resolution, registered as SEDCO/BP 471, is the research vessel for ODP which is funded by the United States National Science Foundation, Canada, the European Science Foundation Consortium for the Ocean Drilling Program, France, Japan, West Germany and the United Kingdom.

The 470-foot-long drill ship's derrick towers 200 feet above the waterline. A seven-story laboratory stack provides facilities for on board examination of sediment and hard-rock cores. Laboratories contain space and equipment for studies in chemical, gas and physical properties, paleontology, petrology,

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paleomagnetics and sedimentology. Marine geophysics research is conducted while the ship is under way.

Texas A&M University, as science operator, operates and staffs the drill ship and retrieves cores from strategic sites around the world. The science operator also ensures that adequate scientific analyses are performed on the cores. To do this, Texas A&M maintains shipboard scientific labs, provides logistical and technical support for shipboard scientific teams, manages post-cruise activities, is curator for the cores and of the scientific results.

Lamont-Doherty Geological Observatory of Columbia University is responsible for downhole logging.

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

Plans for the remainder of the summer and next fall include drilling off Barbados and in the Pacific Ocean, announced Dr. Philip D. Rabinowitz, director of ODP.

The upcoming cruise is in the Lesser Antilles off Barbados and surrounding islands whose shape makes up what is called an island arc. In this region, the North American tectonic plate is being subducted beneath the Caribbean plate.

"After drilling in the Caribbean, the ship will sail through the Panama Canal into the Pacific," Rabinowitz, said.

(Note: JOIDES institutions are: University of California at San Diego, Scripps Institution of Oceanography; Columbia University, Lamont-Doherty Geological Observatory; University of Hawaii, Hawaii Institute of Geophysics; University of Miami, Rosenstiel School of Marine and Atmospheric Science; Oregon State University, College of Oceanography; University of Rhode Island, Graduate School of Oceanography; Texas A&M University, Department of Oceanography; University of Texas at Austin, Institute of Geophysics; University of Washington, College of Ocean and Fishery Sciences; and Woods Hole Oceanographic Institution.

Non-U.S. members are Department of Energy, Mines, and Resources, Earth Sciences Sector, Canada; European Science Foundation Consortium for the Ocean Drilling Program, Belgium, Denmark, Finland, Iceland, Italy, Greece, the Netherlands, Norway, Spain, Sweden, Switzerland and Turkey; Bundesanstalt fur Geowissenschaften und Rohstoffe, Federal Republic of Germany; Institut Francais de Recherche pour l'Exploitation de la Mer, France; University of Tokyo, Ocean Research Institute, Japan; and Natural Environment Research Council, United Kingdom.)

The scientific party for Leg 109:

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