NEWS RELEASE
Ocean Drilling Program

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COLLEGE STATION -- If all the water were drained from the Indian Ocean, the landscape would feature an inverted Y-shaped mountain range with a huge gash running down its center. The stem of the submarine mountain range begins at the Gulf of Oman and branches to the east and west at a site parallel to the tip of Madagascar.

The westward forking branch, the Southwest Indian Ridge, continues to curve around until it connects with another ridge system in the Atlantic Ocean. The subterranean mountain ranges are called mid-ocean ridge systems and are the site of seafloor spreading, the process which pushes apart large plates of Earth's crust. The seam or gash that runs down the center is the opening in the seafloor through which new crustal material pushes its way up from deep within Earth's mantle.

Scientists on board the drill ship JOIDES Resolution will not have the luxury of a drained ocean basin when they drill on the flanks of the Southwest Indian Ridge during October and November. Instead they must maintain position in almost three miles of water while drilling into a terrain whose topography is so steep and precipitous that its mountain heights, deep valleys and steep cliffs rival the

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Himalayan mountain range at its most spectacular.

The 25 scientists, who are from the United States, Canada, Japan, West Germany, Belgium, France, Sweden and the United Kingdom, are part of the Ocean Drilling Program, an international partnership of scientists and governments who are systematically exploring Earth's structure beneath the seafloor through scientific ocean drilling.

During this two-month expedition, scientists will investigate how Earth's crust originated and evolved. Earth's rigid outer shell of oceanic and continental crust is a relatively thin, cracked surface that rides on a partially molten mass called the mantle, separating Earth's crust from the core. Because it is extremely difficult to drill into the mantle, we must mostly speculate what its true characteristics are. Mantle material can be found, however, on a few places directly at the seafloor, mainly at mid-ocean ridges.

Scientists on this cruise will drill directly into a transform fault which are very deep, parallel fractures that cut across the mid-ocean ridges. On a map they look like stitches that transverse the jagged scar made when the seafloor split apart at the mid-ocean ridges. Because the transform fault is a seam in the seafloor with mantle material rising up to the surface, it is like a window into Earth's interior. And it is into one of these faults that the drill ship will attempt to recover material from Earth's mantle.

The primary objective of the cruise is to drill at least 500 meters (1,650 feet) into the transform fault to recover a type of mantle rock called peridotite. The drill pipe will bring up from beneath the seafloor 10-meter-long (30 feet) cores or cylinders of material retrieved in the hole. Scientists on board will study the recovered peridotite for a better understanding of how other ocean-crust rocks such as basalt are chemically related to mantle material.

Marine geologists have little information about the appearance of the seafloor surface at a fault site or what lies beneath it. The scientists hope to learn what kinds of rocks are on and beneath the seafloor by constructing a three-dimensional view of the fracture zone. They will also investigate how transform faults alter and deform oceanic crust.

Sophisticated instruments lowered down the hole will relay information back to the ship about the nature and thickness of oceanic crust in a fracture zone and its chemical, physical and magnetic properties.

Because the seafloor at this site is so rugged, an engineering system that has been used only once before will be deployed. Traditional drilling methods depend on thick layers of sediment to provide stability for the drill bit before it penetrates hard basement rock. The surface at this site would cause the drill bit to spin off if it tried to drill directly into the hard rock. To solve the problem, ODP engineers manufactured a specially designed guide base that acts as the ballast which sediment normally provides.

The guide base is a 40,000 pound, 17 foot by 17 foot metal box that serves as a base for the reentry cone, the device used to guide the drill bit and drill string into a hole. An additional 100,000 pounds of cement is pumped into bags inside the base to provide further stability.

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The ship's crew will depend on an underwater television system to help them find a relatively flat surface on the ridge system on which to set the hard-rock guide base. The ship boasts 12 powerful thrusters which act as giant propellers. A computer-run system called dynamic positioning allows the 470-foot long ship to hover over a specific site for an indefinite period of time. The television camera, lowered on the drill string, is connected to a sophisticated sonar eye which can see in 360 degrees. The eye beams sounds back to the ship so that the crew can chart the appearance of the seafloor in a 100-meter radius. After the ship locates a suitably flat surface, several test holes will be drilled before the guide base is lowered to the seafloor.

The only other guide base in the world is at the Mid-Atlantic Ridge, left there by ODP in the fall of 1985 as a permanent underseas laboratory for scientists to investigate a mid-ocean ridge system. The guide base to be deployed on this cruise will provide a similar laboratory for the Indian Ocean.

Co-chief scientists for the cruise are Dr. Paul Robinson, Dalhousie University, Halifax, Nova Scotia, Canada, and Dr. Richard P. Von Herzen, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts. Dr. Andrew C. Adamson is the ODP staff scientist, Texas A&M University, College Station.

JOIDES Resolution, registered 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 ODP, France, Japan, West Germany and the United Kingdom.

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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, 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.

"ODP has dedicated 18 months to drilling in the Indian Ocean, the most concentrated scientific drilling ever done in that body of water," said Dr. Philip D. Rabinowitz, director. "For the next several years, scientists will be able to study the Himalayan uplift, development of the circum-Antarctic current and geology of the lithosphere by examining samples of sediment and rock from the Indian Ocean."

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(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.)

ODP Leg 118 Fracture zone drilling on the Southwest Indian Ridge.