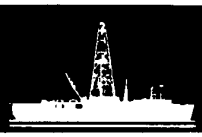
NEWS RELEASE
Ocean Drilling Program



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COLLEGE STATION, TX -- The deepest hole ever drilled into the oceanic crust -- the basaltic layer beneath the sediment of the seafloor -- lies off the west coast of South America and northeast of the Galapagos Islands. The hole, called 504B, has long fascinated scientists who have returned this month on board JOIDES Resolution to drill even deeper into Earth's crust.

This part of the world, the coasts and portions of the mountains along the Pacific side of Central and South America, is a hotbed of geologic activity expressed by extremes in terrain, and punctuated by still-active volcanoes and some of the largest earthquakes ever recorded.

What occurs on land can be attributed to a history of turbulent subterranean activity beneath the Pacific Ocean. The East Pacific Rise, a chain of underwater volcanoes arching upward from the southeastern Pacific Ocean and ducking under land at the Gulf of California, is part of the mid-ocean ridge system, a region where seafloor spreading occurs. Hot magma wells up from chambers deep within Earth's interior as crustal plates move apart. In some parts of the world, such as the

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west coast of South America, oceanic crust moving away from the rise descends, or subducts, beneath the more buoyant continent.

Hole 504B is located on the southern flanks of the Costa Rica Rift which runs roughly west from the East Pacific Rise, snaking upward toward Panama and Costa Rica. The Rift is separating the Cocos and Nazca tectonic plates which are located to the east of the East Pacific Rise. Composed of oceanic crust, these two plates are being subducted beneath the coasts of Mexico and Central and South America.

Scientists have been interested in Hole 504B since it was first drilled in 1979 because its geological structure is remarkably similar to a rock formation found on land known as an ophiolite suite. On land, as at Hole 504B, ophiolite suites are composed of four main layers of igneous rocks overlain by a thick layer of sediment. The uppermost layer is pillow lava -- bulbous-looking basalt piles that form when the cold seawater quenches the hot lava bubbling up from volcanos at mid-ocean ridges. Beneath the pillow lava is a layer called sheeted dikes -- vertical ribbons of dense volcanic material sealed beneath the first layer.

The third is composed of extremely coarse-grained rocks called gabbros which are formed in cooling magma chambers. Finally, underneath is a fourth layer of rocks called peridotites which form the uppermost layer of Earth's mantle.

Although Hole 504B is composed of 6-million-year-old

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oceanic crust, it is considered young in geologic time. The hole at present is 1,350 meters (4,455 feet) deep and scientists hope to drill an additional 300 to 500 meters. (One meter equals 3.3 feet. The new penetration will make the hole well over a mile deep.)

Before drilling, scientists will log the hole, a process in which sensitive instruments are lowered down the hole to test a variety of conditions including temperature, porosity and permeability. An instrument will also record the direction of Earth's magnetic field as recorded in the rocks, which reveals the age of the hole at different levels.

After logging, the drill rig will deepen the hole and retrieve cores from the sheeted dikes, and, scientists hope, from the gabbros.

From these cores, scientists hope to learn more about the structure of the ocean crust. Physical properties measurements will investigate the thermal conductivity, grain and bulk density, velocity and shear strength of the rocks.

Chemical experiments on the water found in the rocks' pores will help scientists understand how circulating seawater reacts with the surrounding rocks at different temperatures.

In addition to investigating the chemical and physical properties of this particular hole, paleontologists and sedimentologists will look at the sediment layer that covers the ocean crust in this area of the Pacific by drilling several new holes nearby. This particular region of young

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ocean crust is marked by high rates of sedimentation, and paleontologists, by examining the fossils in the sediment, hope to learn more about the history of upwelling and downwelling of deep ocean and surface water.

Scientists will also be looking at how the sediment changes with depth, specifically the age at different levels and the effects of the hot crust on the lowermost layers of sediment.

Co-chief scientists for the cruise are Dr. Keir Becker of the Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, and Dr. Hitoshi Sakai, Ocean Research Institute, University of Tokyo, Japan. Dr. Russell B. Merrill is the Texas A&M University staff scientist.

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

Texas A&M University, as science operator, operates and

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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.

This eleventh cruise marks the Ocean Drilling Program's first venture into the Pacific Ocean, explained Dr. Philip D. Rabinowitz, director. "In November and December, the ship will drill off the coast of Peru to study the record of changes in the ocean climate through time. We will also be looking at the processes of subduction by examining how the Nazca tectonic plate is sliding under South America.

"The ship will drill in the Weddell Sea the first two months of 1987. Scientists will study the Antarctic's history of glaciation and circumpolar currents. A third area of investigation is the tectonic history of the region, specifically the processes which separated the South American and Anarctic continents," Rabinowitz said.