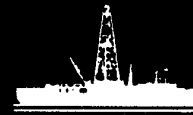


NEWS RELEASE

Ocean Drilling Program



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RESEARCHERS DRILL INTO HOT SEAFLOOR

An international group of earth scientists completed in early September an ambitious program of drilling into scalding rocks of the northern Juan de Fuca Ridge. The scientists took samples from ocean crust permeated in places by water of more than 500 F, the hottest temperatures ever drilled by the internationally funded Ocean Drilling Program.

The scientists on board *JOIDES Resolution*, ODP's research vessel, drilled into an area where new seafloor is being created in the northeast Pacific. They discovered mineral-rich deposits, pockets of extremely hot water and water circulation patterns that will give them new information on how ocean crust forms and evolves.

The sites, located just 150 kilometers northwest of Vancouver Island, hold special interest because sediments pouring off the edge of North America have buried the molten rock that spews from inside Earth. When tectonic forces create new ocean crust, seawater circulating through the fractured rock usually disperses the heat rising from the subterranean volcanoes. At sites along the northern Juan de Fuca Ridge, however, a layer of thick, sticky mud seals the volcanic rocks below, trapping exceedingly hot water beneath the seafloor. During this latest ODP expedition,

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scientists were able

- to measure temperatures in these high-heat zones
- to estimate how quickly fluid was flowing through the sediments and rocks
- to study the chemistry and properties of the water and rocks forming the

young oceanic crust.

ODP drilled 22 holes at four sites during the expedition. One site was along a fault on the eastern edge of the ridge where near-freezing seawater is being drawn into the seafloor to cool the hot rock below. At another site, ODP drilled holes into a large hydrothermal mineral deposit, created by hot water bearing dissolved metals escaping from the seafloor. When the mineral-rich water spewed from the seafloor and mixed with the cool seawater above, the dissolved minerals formed hard particles and built a deposit of metallic ores. At another site, the scientists drilled almost a kilometer (3,250 feet) below the seafloor to explore a fluid reservoir in the fractured rock where hot water circulates through the rock at high temperatures. The scientists and drillers also penetrated a water upflow zone, where hot water pours out into the overlying ocean at temperatures close to 300 C (570 F).

The high temperatures encountered in many of the holes created surprisingly few problems for drilling and measurements of the holes' physical properties. As ODP drilled new holes into the hot rock, cold seawater poured into the open fractures and cracks, creating a natural cooling system. At one hole cold water was naturally drawn into formation at more than 10,000 liters (2,600 gallons) a minute. ODP sealed two of the deepest holes with seafloor plugs. Instruments installed in these plugged holes will record pressures and temperatures for several years. A submersible dive in late

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September of this year will make the first visit to these seafloor observatories.

Scientists hope to learn from these subterranean laboratories more about how ocean crust forms and evolves through time.

Dr. Earl Davis, Pacific Geoscience Centre at the Geological Survey of Canada, Sydney, B.C., and Dr. Michael Mottl, University of Hawaii, were the co-chief scientists. Dr. Andrew Fisher, Texas A&M University was the ODP staff scientist.

JOIDES Resolution, registered as *SEDCO/BP 471*, is the research vessel for the ODP, which is funded by the United States National Science Foundation, the Canada and Australia Consortium, the European Science Foundation Consortium for the Ocean Drilling Program, Federal Republic of Germany, France, Japan, the United Kingdom and the U.S.S.R.

The 470-foot-long drill ships derrick towers 200 feet above the waterline. Seven levels of laboratories provide facilities for on board examination of sediment and hard-rock cores. Texas A&M University, as science operator, operates and staffs the drill ship and retrieves cores from strategic sites around the world.

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.

Note: JOIDES Institutions 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.

Canada and Australia Consortium for the ODP, European Science Foundation Consortium for the ODP: Belgium, Denmark, Finland, Iceland, Italy, Greece, the Netherlands, Norway, Spain, Sweden, Switzerland and Turkey; Federal Republic of Germany; France; Japan; the United Kingdom and the U.S.S.R.

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