

Leg 130

An underwater plateau yields new evidence about Earth's climate

April 30, 1990 COLLEGE STATION, TX -- Sediment and rocks from an underwater plateau have given scientists new information about changes in global climate and the geologic history of the Pacific Ocean.

Scientists for the Ocean Drilling Program (ODP) highlighted their two month expedition in the western Pacific by--

recording the migration of a segment of the Pacific seafloor--

learning more about changes in the global climate--

retrieving evidence of a catastrophic event in Earth's history

The ODP crew recovered almost three miles of sediment and rock from holes drilled in the giant Ontong-Java Plateau. Straddling the equator due east from New Guinea, the plateau is almost one million square miles or about twice the size of Alaska.

Scientists believe that the plateau originated from voluminous volcanic outpourings that piled onto the ocean floor in the South Pacific more than 100 million years ago. The plateau, riding on the massive Pacific plate, has since migrated north to its present position.

Scientists track the movement of underwater plateaus because these giant bumps on the ocean floor often become building blocks for continental crust. The edges of crustal plates like the Pacific plate eventually duck beneath overriding continental crust. As the leading edge slides under, elevated features like a plateau mash against the continent, adding to it large chunks of ocean crust.

During its 10,000-century trek north, the plateau has accumulated the skeletons of microorganisms that once thrived near the ocean's surface. The resulting fossil-laden sediment

layers chronicle the changes in sea level, sea chemistry, organic productivity, and bottom- and surface-water temperatures. The information from this fossil and sediment record provide a baseline for scientists to learn how global climates have changed through time.

For instance, by studying the sediment record from different perspectives, scientists from many disciplines can use this information to learn if Earth has a cyclical history of global warming.

The scientists also recovered samples from the Cretaceous Tertiary boundary, a geologic event that marks the mass extinction 65 million years ago of dinosaurs, some orders of reptiles and various other forms of animal and plant life. Evidence of this catastrophe has been retrieved from sites around the world. Although they do not know what caused this cataclysm, geologic samples from the time that this event occurred will help scientists learn how one half of Earth's biologic community was annihilated.

Co-chief scientists for the cruise were Dr. Loren Kroenke of the Hawaii Institute of Geophysics, Honolulu, and Dr. Wolfgang Berger of the Universitaet of Bremen, Federal Republic of Germany. Dr. Thomas Janecek of Texas A&M University, College Station, was staff scientist.

The ship departed Guam January 23 and returned March 27. Twenty-nine scientists from Australia, Canada, Denmark, the Federal Republic of Germany, France, Japan, Norway, Sweden, the United Kingdom and the United States participated on the cruise.

JOIDES Resolution, registered as SEDCO/BP 471, is the research vessel for the ODP, which is funded by the United States National Science Foundation, Canada and Australia, the European Science Foundation Consortium for the Ocean Drilling Program, Federal Republic of Germany, France, Japan 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, paleomagnetism 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 and provides logistical and technical support for shipboard scientific teams. On shore, in the Texas A&M University Research Park, the science operator manages post-cruise activities, curates the cores and publishes 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.

"During the next two years, JOIDES Resolution will drill in the western Pacific," said Dr. Philip D. Rabinowitz, director of the ODP. "We will investigate the Pacific's complex tectonic zones, which comprise several oceanic and continental plates."

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.

Non-U.S. members are 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; and the United Kingdom.

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