IODP Scientists Acquire "Treasure Trove" of Climate Records off Tahiti Coast

Investigators Retrieve Textbook-Quality Coral Fossil Sampling to Document History of Paleoclimatic Change

Bremen, Germany—An international team of scientists, supported by the Integrated Ocean Drilling Program, reunited at the University of Bremen to analyze a trove of coral fossil samples retrieved from Tahitian waters during October and November 2005. Two weeks ago, led by chief scientists from France and Japan, the science party started their year-long analysis of 632 meters of fossil material retrieved from 37 boreholes drilled beneath the seafloor. The initial conclusion is that the IODP Tahiti Sea Level Expedition has assembled the most accurate physical evidence available today of changes in sea level during the last deglaciation, including a full record of temperature and salinity changes in the southern Pacific.

Co-chief scientist Gilbert Camoin, of CEREGE, a geoscience research center in France, summarized the expedition's success: "Tahiti has given us a treasure of records that archive sea level change over approximately the last 20,000 years. Because corals are ultra-sensitive to environmental change, we have been able—by splitting lengths of coral reef cores we acquired— to get better, more accurate descriptions of reef growth during the sea level rise that occurred after the last glacial maximum, 23000 years ago." Camoin explains that Tahiti was chosen for this expedition because of its unique geology and its location: a relatively stable, volcanic island, Tahiti is subsiding at a rate of just .025 mm per year, in the southern Pacific far away from the previously glaciated regions. "Tahiti presents a microcosm of what's happening globally in paleoclimatology today," he says.

Japanese co-chief scientist Yasufumi Iryu, of Tohoku University, praises the quality of the cores obtained. "The longest continuous coral core we collected is 3.5 meters long," he confirms. "It represents 350 years of coral growth." Providing a reliable climate record with no gaps, massive coral samples—just five percent of the samples obtained—are highly valued by scientific investigators as they reconstruct climate variability and piece together frequency and amplitude of climatic anomalies such as El Niño.

"Our goal to acquire high-resolution archival paleoclimate records has been met," says Camoin. "Examining the massive coral cores retrieved from 40 to 120 meters below sea level, we identified grooved pairs of light and dark bands, each pair measuring a centimeter in width, and each representing one year of growth." According to Camoin, the coral fossils record age in their grooves. "Using radiometric methods, we are able to determine a coral fossil's age within 30 years."

Iryu, who specializes in El Niño anomalies, agrees that the age and water depth information found archived in the coral reef cores is simple, but crucial. In addition, “we measured live microbes (bacteria) living in the spaces within the deep fossil reefs. These samples,” he confirmed, “have been collected and frozen for DNA sequencing.”

“Coral reefs comprise the richest ecosystem on Earth,” says Camoin, “and the most fragile.” But coral reefs are diminishing, he notes: half of all reefs are expected to disappear in the next few decades. “Coral reefs are playing a prominent role in global matter cycles,” Camoin asserts.

IODP Expedition 310 was conducted by the European Consortium for Ocean Research Drilling (ECORD), through ESO, one of IODP’s three regional drilling operators and the program’s specialist in mission-specific platform operations. ECORD represents 17 nations and provides support to IODP as a contributing member. A list of participants and their contact information is available at www.ecord.org/exp/tahiti/310.html.

The Integrated Ocean Drilling Program is an international ocean research program that promotes scientific advancement of the Earth through monitoring and sampling subseafloor environments. IODP receives its primary funding from the U.S. and Japan, through the National Science Foundation and the Ministry of Science, Education, Culture, Sports, Science and Technology, respectively. For photos or more program information, visit www.iodp.org.

<u>For more information, contact:</u>

Albert Gerdes, ECORD/ESO: +49-421-218-65540, agerdes@marum.de
Nancy Light, IODP Management International: +1-202-361-3325, nlight@iodp.org
Alan Stevenson, ECORD/ESO: +44-131-650-0376, agst@bgs.ac.uk