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Media Release – FOR IMMEDIATE RELEASE

Iberian Margin Paleoclimate

The International Ocean Discovery Program (IODP) Iberian Margin Paleoclimate Expedition 397 (Oct 11 – Dec 11) will take place off the coast of Portugal, to the southwest of Lisbon. The expedition, carrying 26 international scientists, will investigate areas where marine sediments accumulate rapidly, giving a high-fidelity record of climate change, on timescales of hundreds to thousands of years, extending back to 3 – 6 million years ago. Climate signals from the Iberian margin will be correlated precisely to polar ice cores from both hemispheres, providing a link between oceanic and atmospheric change including the concentration of greenhouse gases. Recovering sedimentary core samples at different water depths (approx. 1300 to 4700 m below sea level) will permit scientists to study how deep-ocean circulation and chemistry changed in the past, including its role in deep-sea carbon storage and atmospheric CO_2 changes. The cores will shed new light on the growth and decay of large ice sheets for the last 3 million years and also provide a glimpse into a warmer world before this time when atmospheric CO_2 was similar to today.

MORE INFORMATION:
About the expedition - IODP JRSO • Expeditions • Iberian Margin Paleoclimate (tamu.edu)
About the research program - www.iodp.org

BACKGROUND:
Most sediments in the deep sea accumulate at relatively slow rates (1 to 2 cm every thousand years). Sediments on the Iberian margin are deposited at nearly ten times this rate (10 to 20 cm every thousand years), permitting climate changes to be detected with a much greater time resolution than is normally possible. Another advantage of the Iberian margin sediment record is the fact that, in a single archive, it contains signals of marine, atmospheric (ice core), and terrestrial (such as pollen and organic biomarkers) changes. It is therefore possible to investigate the relative timing of changes in variables within the ocean-climate system in the same core. These sediments offer scientists the greatest opportunity to reconstruct high-resolution climate signals in the north Atlantic prior to the effects of human activity.

Ice cores from polar regions have become the benchmarks of past climate change because they trap fossil air that records past changes in the greenhouse gas content of the atmosphere. The oldest ice cores only span the last 800,000 years, though with new drilling in Antarctica we hope to extend that record to 1.5 million years ago. The sediment cores from this expedition will provide complementary records that can be matched over the last 800,000 years and beyond, thereby extending the climate change signal back much further. By comparing changes in deep-ocean chemistry and circulation inferred from the marine cores with changes in atmospheric composition recorded in the ice cores, the scientists will study the link between the storage of carbon in the deep-sea and atmospheric CO2 change. Few, if any, places exist in the world's oceans where such detailed marine-ice-terrestrial linkages are possible.

Led by Co-Chief scientists Fátima Abrantes (Portuguese Institute for the Sea and Atmosphere, Portugal) and David Hodell (University of Cambridge, UK), the scientists will core at four primary drill sites, located in water depths ranging from 1,300 – 4,700 m. They will sample sediments to a depth of up to 500m below the seafloor, investigating a geologic history extending as far back as 6 million years ago. Dr Abrantes said "*It is beautiful to have the chance to realize, before retirement, a dream that started in the early years of my career. I am convinced that this Expedition will be an important one for future Paleo studies, and I look forward to being on JR again."*

SCIENTIFIC OBJECTIVES:

The overall objective of the Expedition 397 drilling proposal is to recover a 6 million-year-long sediment archive located in a range of water depths to document past changes in vertical water mass structure and its relation to global climate change. Professor Hodell said "*The effort to drill the Iberian Margin was initiated in 2009 when Fátima Abrantes and I organized a workshop in Lisbon, Portugal. My hope is that the sediment cores recovered will become the marine type sections [*the standard against which other examples are compared*] of Millennial-Scale Climate Variability and will provide the raw material needed for present and future earth scientists to study past climate for decades to come*."

Some of the specific scientific objectives include:

- Document the nature of Millennial Climate Variability (MCV) for glacial cycles of the past 3 million years and beyond
- Derive a marine sediment record equivalent of the Greenland and Antarctic ice cores to examine the amplitude and pacing of MCV during the Quaternary.
- Link the marine and ice core records to understand the role of changing deep-ocean circulation and how ocean circulation modifies deep-sea carbon storage and atmospheric CO_2.
- Study how changes in the tilt and wobble of the Earth's rotational axis, and the shape of its orbit around the sun, affect the character of MCV and, in turn, how MCV interacts with orbital geometry to produce the observed glacial to-interglacial patterns of climate change.
- Investigate climate during past interglacial periods, including the warm Pliocene period (> 3 million years ago) when atmospheric CO2 was similar to today (400 ppm).
- Link terrestrial, marine, and ice core records by analyzing pollen and terrestrial biomarkers that are delivered to the deep-sea environment of the Iberian margin.
- Investigate how vegetation changed with respect to shifts in the climate.

SCIENTIFIC OPERATIONS:
The expedition is conducted by the *JOIDES Resolution* Science Operator (JRSO) as part of the IODP. The IODP is a multidecadal, international research program supported by 22 nations, with the goal of exploring Earth's history and structure recorded in seafloor sediments and rocks and monitoring sub-seafloor environments. Expedition 397 will sail with 26 scientists from 11 countries, with expertise in a range of geoscience disciplines. While at sea, the *JOIDES Resolution* laboratory infrastructure will be utilized for intensive sampling and investigation of the cores retrieved. This includes splitting, describing, and analyzing the cores, which will be made available to non-expedition scientists after a one-year moratorium. Data from these core samples will be used by scientists all over the world.

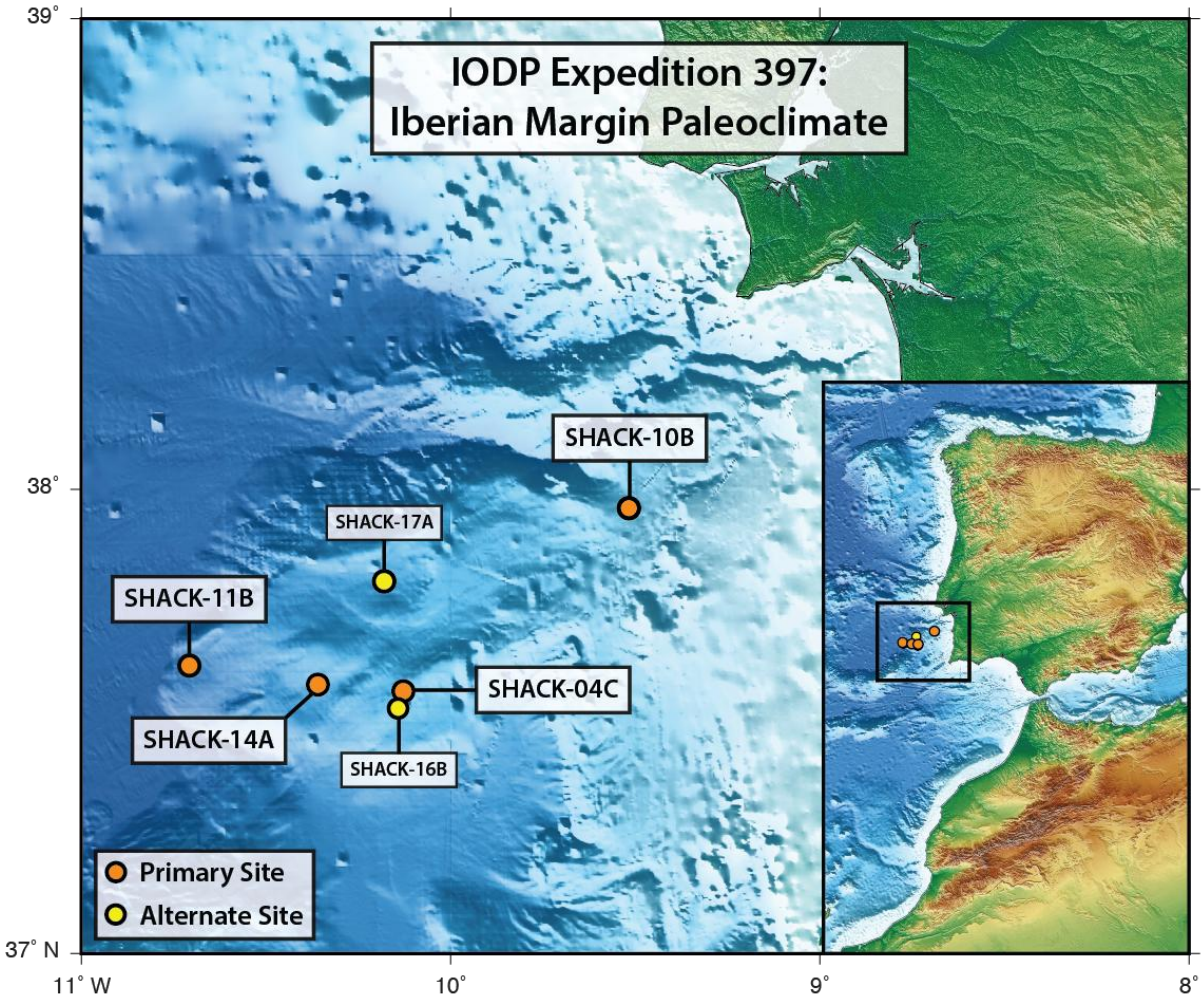
While at sea, the *JOIDES Resolution* can provide personalized ship-to-shore live broadcasts to schools, community and museum groups and media. Interested parties should contact thejoidesresolution@gmail.com for more information.

Get involved:
Twitter - @TheJR
Instagram - joides_resolution
Facebook - JOIDES Resolution

Contact / Interviews / Images:
Amy Mayer – offshore
Maya Pincus - onshore
Exp 397 Onboard Outreach Officers
Email: thejoidesresolution@gmail.com

Carol Cotterill
Assistant Director, Education and Outreach
US Science Support Program
Email: ccotterill@ldeo.columbia.edu

Carlos Alvarez Zarikian
Expedition Project Manager 397
JOIDES Resolution Science Operator
Email: zarikian@iodp.tamu.edu OR jr_zarikian@ship.iodp.tamu.edu



Location map showing the four primary and two alternate coring sites for Expedition 397.