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Media Release – FOR IMMEDIATE RELEASE

International Ocean Discovery Program Expedition 395
Reykjanes Mantle Convection and Climate

Large amounts of hot material rise up from deep inside Earth's mantle beneath Iceland, forming a giant plume. This mantle plume is thought to pulse every 3 to 8 million years, changing the chemistry of basalts erupted on the Mid-Atlantic ridge, and causing the North Atlantic region around Iceland to go up and down by hundreds of meters. This vertical motion controls the height the Iceland-Faroe Ridge and the Denmark Strait, which are two oceanic gateways that regulate the supply of cold deep-water from the Norvegian Sea north of Iceland into North-Atlantic Ocean, and likely influenced global climate in the past. This expedition will collect rocks and data on the flanks of the Reykjanes Ridge, where the Mid-Atlantic spreading center, the Iceland mantle plume, and deep-water currents interact. The expedition will provide insights into how convection deep inside Earth's interior can influence oceanic gateways, deep-water currents, and past climate.

MORE INFORMATION:
About the expedition - IODP JRSO • Expeditions • Reykjanes Mantle Convection and Climate (tamu.edu)
About the research program - www.iodp.org

BACKGROUND:
Although mantle plumes, such as the one beneath Hawai'i, are relatively common, intersecting plume-ridge systems are unusual. One such intersecting system is found in the North Atlantic Ocean, where the Iceland plume is bisected by the Mid-Atlantic Ridge. The Reykjanes Ridge is the offshore extension of the onshore Southwest Rift Zone, extending ~900 km in a southwesterly direction from the Reykjanes Peninsula. It is part of the mid-ocean ridge system and is unusual because of a series of time-transgressive V-shaped ridges and troughs.

The flanks of the Reykjanes Ridge are blanketed by rapidly accumulating sediments that record the oceanographic conditions under the influence of nearby deep-water gateways. This configuration provides an ideal natural laboratory to test a diverse range of hypotheses about mantle dynamics, crustal accretion, paleoceanography and climate.

The expedition is led by Co-Chief Scientists Anne Briais (CNRS, France) and Ross Parnell-Turner (Scripps Institution of Oceanography, USA), and will core at three of the six primary sites of the

program, located in water depths ranging from 1,415 to 2,209 meters. They will sample contourite drift sediments for an expanded paleoclimate record, as well as oceanic crust. The other three main drilling sites have been cored to basement in 2021 during Expedition 395C, which sailed without the science party.

The co-chiefs are looking forward to sailing on the JOIDES Resolution for the final phase of drilling, after 3 years of postponement of the original expedition due to the COVID-19 pandemic.
"*We have a great science team whose diversity is a fantastic opportunity to decipher the relationships between deep earth processes and the oceanic currents*." said Anne Briais.

SCIENTIFIC OBJECTIVES:
The overall objective of IODP Expedition 395 is to better understand the composition and dynamics of the Earth's upper mantle, to explore the possible connection between plume dynamics and ocean circulation, and to understand how oceanic crust is altered over geologic time.

Some of the specific scientific objectives include the following:

- Test competing hypotheses about the origins of the V-shaped ridges and troughs that straddle either side of the Reykjanes Ridge
- Quantify how deep-water oceanic circulation in the North Atlantic has varied over the last 33 million years.
- Evaluate the extent to which the behavior of the Icelandic mantle plume is a cause of subsequent uplift and subsidence of two major gateways in the North Atlantic, the Iceland-Faroe Ridge and the Denmark Strait, which themselves control oceanic circulation.
- Quantify the timing and extent of hydrothermal fluid-rock exchange over millions of years of alteration along a transect of sites up to 32 My old.

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 21 nations, with the goal of exploring Earth's history and structure recorded in seafloor sediments and rocks and monitoring sub-seafloor environments. Expedition 395 will sail with 30 scientists from 9 countries, with expertise in a range of geoscience disciplines. While at sea, the *JOIDES Resolution* laboratory infrastructure will enable intensive sampling and investigation of the cores retrieved. These analyses include splitting, describing, and measuring the physical properties of 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.

Throughout the expedition, the *JOIDES Resolution* can provide personalized ship-to-shore live broadcasts to school, community, and museum groups, the media and the general public. Interested parties should contact thejoidesresolution@gmail.com for more information.

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

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