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Media Release – FOR IMMEDIATE RELEASE

International Ocean Discovery Program
Expedition 402 Tyrrhenian Continent - Ocean Transition

Next week Expedition 402 will depart from Naples to begin its two-month scientific journey.

In a bid to shed light on the enigmatic process of mantle exhumation during lithospheric extension, the International Ocean Discovery Program announces Expedition 402. Initiated in response to the ongoing debate over the nature and genesis of continent-ocean transitions, sparked by the discovery in the 1980's of exposed mantle in the continent–ocean transition (COT) west of Iberia, this expedition aims to address critical questions about the mechanisms of continental break-up, the inception of seafloor spreading, and the nature of COTs.

Over the past 30 years, our understanding of COT processes and the initiation of seafloor spreading has been hindered by the inherent limitations of drilling basement rocks that are typically buried under several kilometers of sediments. Despite the strides made since the initial discovery, the nature and genesis of COTs remains controversial within the scientific community.

Expedition 402 is poised to make significant contributions to this topic. The Tyrrhenian Sea location boasts a thin sediment cover, providing a unique opportunity to sample rocks exposed during the initial stages of continental separation. The expedition will also investigate the variation of rifting models, ranging from magma-rich to magma-deprived scenarios.

Expedition 402 marks a collaborative effort among leading scientists from around the world, polling their expertise to advance our understanding of Earth's geological evolution. The findings from this expedition are anticipated to reshape existing paradigms and contribute significantly to the global body of knowledge in the field of geoscience.

MORE INFORMATION:
About the expedition - IODP JRSO • Expeditions • Tyrrhenian Continent-Ocean Transition
About the research program - www.iodp.org

FURTHER INFORMATION:
There are four main reasons to drill the Tyrrhenian Basin:

1. It is a very young basin, and consequently has a thin sedimentary cover;
2. Backed by more than four decades of academic investigations, the bedrock lithology and stratigraphy of the Tyrrhenian Basin are exceptionally well-documented. This wealth of historical data serves as a solid foundation, enabling scientists to contextualize their findings;
3. A 30 m section of partially serpentinized peridotite representing a segment of exhumed mantle has been already recovered in the center of the basin; and
4. Recent seismic refraction and reflection experiments have provided compelling evidence suggesting that a significant portion of the basement in the central region of the Tyrrhenian Basin is composed of exhumed mantle. Nowadays, drilling technology makes it possible to reach upper mantle rocks in Expedition 402, and sampling these rocks will open the door to a deeper understanding of mantle dynamics and its role in shaping Earth's crust.

Expedition 402 will drill two perpendicular transects. An east–west transect will target the progression from magmatic crust to exposed mantle; a north–south transect will map the fault zone that exhumed mantle. Drilling will sample the mantle, the associated magmas, and the products of syntectonic, and possibly ongoing, fluid-rock interaction to evaluate the geochemical exchange between the lithosphere and the hydrosphere and potential related ecosystems.

The expedition is led by Co-Chief Scientists Nevio Zitellini (Institute of Marine Science, Italy) and Alberto Malinverno (Lamont-Doherty Earth Observatory, USA), and will core at six sites located in water depths ranging from ~2,700 – 3,600 meters. Nevio Zitellini has extensive experience of geological and geophysical investigations focused on understanding the tectonic evolution of the Tyrrhenian Basin, ranging from the hand-made bathymetric map of the Tyrrhenian basin based on the single beam eco-sounder of the early days to the more recent coincident refraction/reflection seismic experiment. Alberto started his scientific career with a thesis on the interpretation of seismic reflection profiles in the Tyrrhenian Sea and he is looking forward to returning to this area and looking at a mantle exhumation process that was not known about at the time.

SCIENTIFIC OBJECTIVES:
The overall objective of the International Ocean Discovery Program (IODP) Expedition 402 is to better understand the early evolution of oceanic lithosphere following continental rifting – a process that took place in the Tyrrhenian area as well as at continent-oceanic transitions globally.

Some of the specific scientific objectives include the following:

1. Expedition 402 aims to rigorously test existing models of continent-ocean formation and rifting. By scrutinizing the Tyrrhenian area and extrapolating findings to global contexts, researchers aim to refine and validate theoretical frameworks.
2. The mission seeks to unravel the intricate details of extensional deformation in both space and time. Understanding the kinematic and geometry of these deformations is critical to comprehending the dynamics of continental rifting.
3. Expedition 402 will delve into the heterogeneity of the mantle source, shedding light on the timing and origin of associated magmatism. This has the potential to further our understanding of mantle dynamics.
4. The timings and patterns of mantle exhumation remain elusive aspects of geological history. This expedition aims to further our understanding of these processes.

5. A key focus of the expedition is to determine the complex interactions between fluids and rocks in the peridotite basement. Unraveling these interactions holds significance for understanding the geological composition and evolution of Earth's crust

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 402 will sail with 25 scientists from 9 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.

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:
X (formally known as Twitter) - @TheJR
Instagram - @joides_resolution
Facebook - JOIDES Resolution
Threads - @joides_resolution

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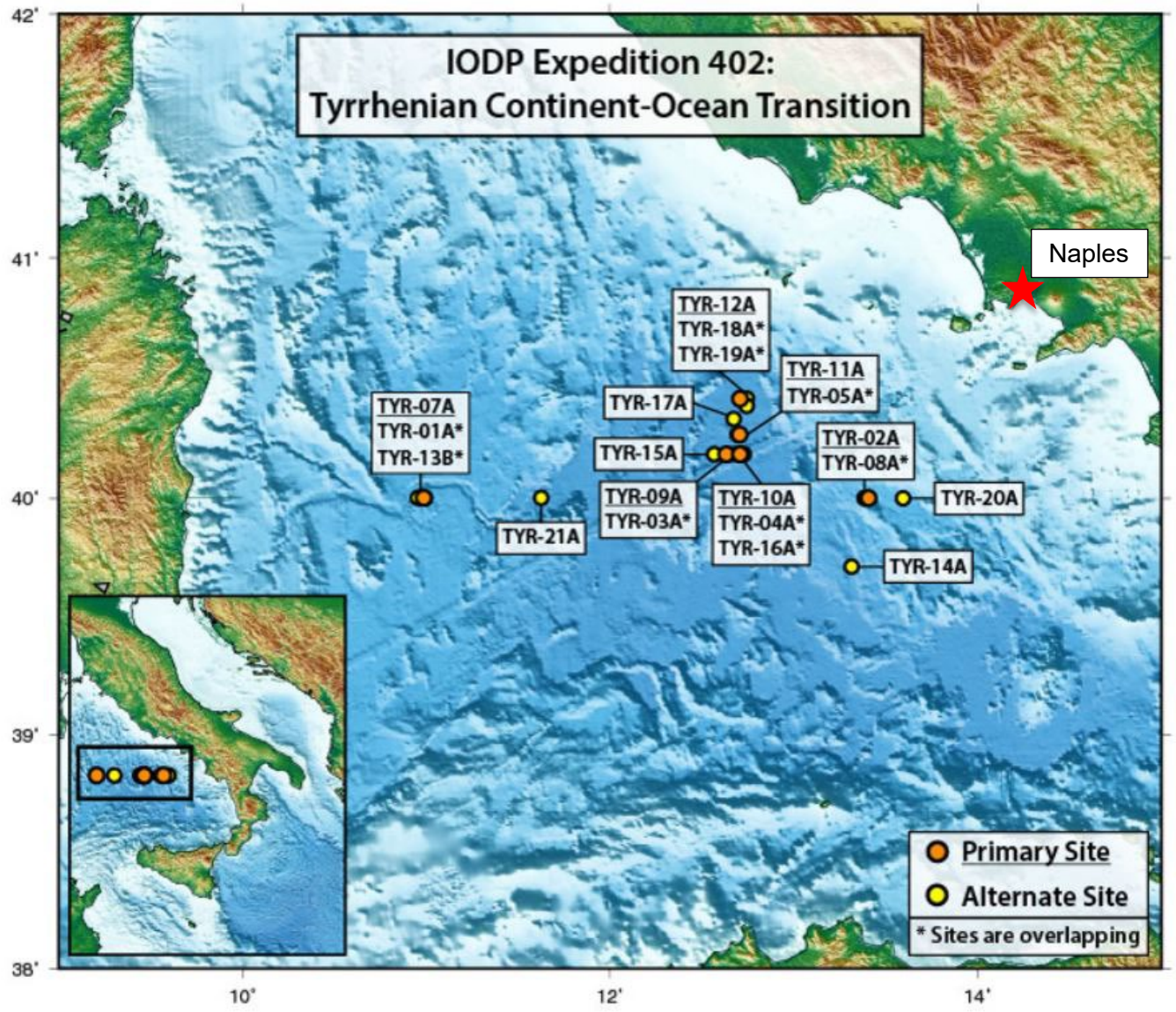
IODP Expedition 402:
Tyrrhenian Continent-Ocean Transition
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TYR-18A*
TYR-19A*
TYR-11A
TYR-05A*
TYR-17A
TYR-07A
TYR-01A*
TYR-13B*
TYR-15A
TYR-02A
TYR-08A*
TYR-09A
TYR-03A*
TYR-10A
TYR-04A*
TYR-16A*
TYR-20A
TYR-21A
TYR-14A
Primary Site
Alternate Site
* Sites are overlapping
42°
41°
40°
39°
38°
10°
12°
14°