Tarragona, Spain, December 9, 2022

Media Release – FOR IMMEDIATE RELEASE

Hellenic Arc Volcanic Field

Three volcanic centers in the Aegean Sea of Greece—Santorini, Christiana, and Kolumbo—compose one of the most active volcanic regions in Europe. These volcanoes have exploded many times, and a Late Bronze Age eruption in Santorini may have played a role in the decline of the Minoan civilization on Crete. The International Ocean Discovery Program (IODP) Hellenic Arc Volcanic Field Expedition 398 (Dec 11, 2022 – Feb 10, 2023) will investigate these volcanic centers—including the Santorini caldera which collapsed as a result of volcanic explosions—looking at the volcanoes' associated marine basins, which contain muds and volcanic products up to several hundred meters thick. Drilling these locations will provide a rich record of volcanic activity much older than that known on land, extending the knowledge of eruptive history back 3 million years or more. Assessing the potential for future events, and the likelihood for generation of eruption-associated tsunamis, could assist in mitigating any threat to these islands that have a year-round population and more than 2 million visitors a year. These records will also reveal a history of regional sea-level change and how life deep within the sediments responds to volcanic activity. In addition, learning about this arc volcano system could help scientists better understand arc volcano systems around the world.

MORE INFORMATION:
About the expedition - IODP JRSO • Expeditions • Hellenic Arc Volcanic Field (tamu.edu)
About the research program - www.iodp.org

BACKGROUND:
About 800 million people are threatened by volcanic eruptions around the globe: high plumes of ash, ground-hugging flows of hot ash and rock, earthquakes, and associated tsunamis can all pose a significant hazard. The Christiana, Santorini, and Kolumbo volcanic group in the Aegean Sea of Greece is particularly hazardous because the volcanoes have produced many eruptions in the past, and some of them were highly explosive. The Late Bronze Age eruption of Santorini may have played a role in the decline of the Minoan civilization of Crete.

The drilling conducted on IODP Expedition 398 will access a rich archive of sediments and volcanic layers that will enable the scientists to reconstruct the volcanic history of the region back 3 million years or more. By analyzing the sediments and rocks on the flanks of the submarine Kameni and Kolumbo volcanoes, as well as those in nearby basins, scientists hope to reconstruct their eruptive histories as well as those of the long-lived

Santorini volcanic complex and ancient Christiana volcano. This will help scientists better assess the risk posed by hazards such as earthquakes, submarine eruptions and tsunamis. Scientists also plan to investigate microbial life in these sediments, as well as analyze records of sea level change that reflect the history of subsidence in the Aegean region.

Led by Co-Chief Scientists Tim Druitt (Clermont-Auvergne University, France) and Steffen Kutterolf (GEOMAR Helmholtz Center for Ocean Research, Germany), the scientists will core at six drill sites located in water depths ranging from 300 – 700 m. They will sample sediments and volcanic material to a depth of up to 900 m below the seafloor. The Co-Chiefs commented "*After six years of planning, we are now finally going to deep drill the sea floor around these volcanoes and inside Santorini caldera. Santorini is an iconic site in volcanology, and drilling will enable us to learn a huge amount about the volcanism there and to deduce general principles governing volcanic activity at other island arcs worldwide. Although we have already learned a great deal about the volcanoes from onland studies and from volcanic layers preserved in the topmost few meters of the seafloor muds, drilling to a depth of several hundred meters will enable us to extrapolate our findings way back in time to the very beginnings of volcanic activity in the region. We may even be able to sample the products of volcanoes that do not exist anymore. The beauty of this and other IODP expeditions is its multidisciplinary approach where volcanologists meet structural geologists, geophysicists, biologists, geochemists, and paleontologists, learning from each other and creating new synergies. It is exciting that a new generation of young scientists from all over the globe will now focus their different research techniques on these volcanoes*."

SCIENTIFIC OBJECTIVES:

The overall objective of IODP Expedition 398 is to better understand island arc volcanism, and how these volcanoes interact with their surroundings.

Some of the specific scientific objectives include the following:

- Establish the development of the three volcanic centers in space and time, and so further refine existing models for explosive volcanic eruptions in marine settings.
- Establish the link between active faulting and volcanism in a rift setting, assessing the links between major tectonic activity (such as earthquakes and faulting) and volcanic eruptions.
- Investigate whether sea level fluctuations alter the frequency and magnitudes of volcanic eruptions, and if so, how.
- Investigate the production of volcanic material from the Late Bronze Age, or 'Minoan', eruption of Santorini, and how large the resulting pyroclastic flows could have been.
- Investigate the potential risk to inhabitants from future eruptions of the Kameni and Kolumbo submarine volcanoes, based on events recorded in the sediments.
- Reconstruct the evolution of the marine basins to ascertain the transition from terrestrial to marine environments, based on the interplay between uplift and subsidence of the continental crust.
- Investigate how microbiological communities react to eruptive phases and acidification of seawater.

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 Earths

history and structure recorded in seafloor sediments and rocks and monitoring sub-seafloor environments. Expedition 398 will sail with 32 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:
Twitter - @TheJR
Instagram - joides_resolution
Facebook - JOIDES Resolution

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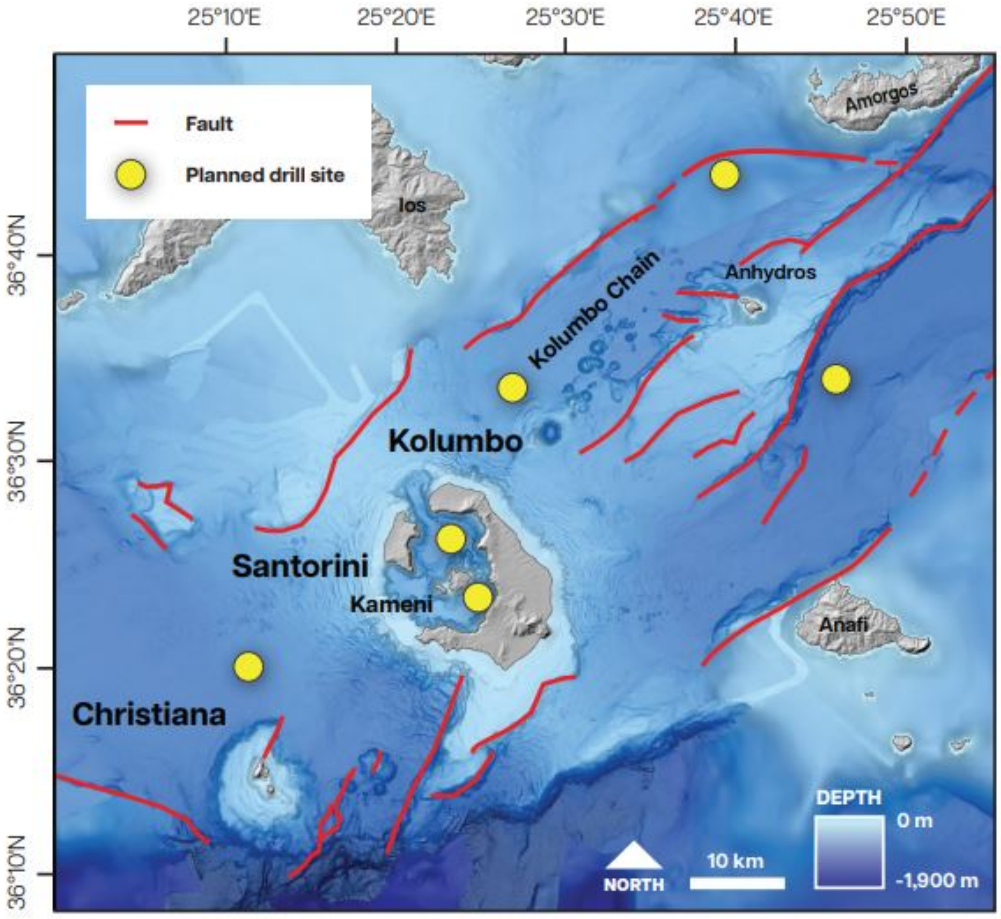
25°10'E
25°20'E
25°30'E
25°40'E
25°50'E
36°40'N
36°30'N
36°20'N
36°10'N
Fault
Planned drill site
Amorgos
Ios
Anhydros
Kolumbo Chain
Kolumbo
Santorini
Kameni
Anafi
Christiana
NORTH
10 km
DEPTH
0 m
-1,900 m