CALL FOR APPLICATIONS

JOIDES Resolution Expedition 401:

Mediterranean-Atlantic Gateway Exchange

Amphibious drilling proposal: Investigating Miocene Mediterranean-Atlantic Gateway Exchange (IMMAGE)

10 December 2023 – 9 February 2024

DEADLINE to apply: 1 December 2022

The **European Consortium for Ocean Research Drilling** (ECORD) offers you the unique opportunity to sail on Expedition 401 on-board the *JOIDES Resolution* in the framework of the **International Ocean Discovery Program** (IODP), an international research program for drilling at sea.

Marine gateways play a critical role in the exchange of water, heat, salt and nutrients between oceans and seas. The advection of dense waters helps drive global thermohaline circulation and, since the ocean is the largest of the rapidly exchanging CO2 reservoirs, this advection also affects atmospheric carbon concentration. Changes in gateway geometry can therefore significantly alter both the pattern of global ocean circulation and associated heat transport and climate, as well as having a profound local impact. Today, the volume of dense water supplied by Atlantic-Mediterranean exchange through the Gibraltar Strait is amongst the largest in the global ocean. For the past five million years this overflow has generated a saline plume at intermediate depths in the Atlantic that deposits distinctive contouritic sediments in the Gulf of Cadiz and contributes to the formation of North Atlantic Deep Water. This single gateway configuration only developed in the early Pliocene. During the Miocene, a wide, open seaway linking the Mediterranean and Atlantic evolved into two narrow corridors: one in northern Morocco; the other in southern Spain. Formation of these corridors permitted Mediterranean salinity to rise and a new, distinct, dense water mass to form and overspill into the Atlantic for the first time. Further restriction and closure of these connections resulted in extreme salinity fluctuations in the Mediterranean, leading to the formation of the Messinian Salinity Crisis salt giant.

IODP Expedition 401 is one part of an amphibious drilling proposal that also includes coring on land as part of the **International Continental Drilling Program** (ICDP). The **Investigating Miocene Mediterranean-Atlantic Gateway Exchange** (IMMAGE) drilling proposal is designed to recover a complete record of Atlantic-Mediterranean exchange from its Late Miocene inception to its current configuration. This will be achieved by coring Miocene offshore sediments and borehole logging at three sites on either side of the Gibraltar Strait during IODP Expedition 401 and from the two precursor connections now exposed on land in southern Spain and northern Morocco with ICDP.

IMMAGE has three primary scientific objectives which will be met through drilling the three IODP holes during Expedition 401 and the two ICDP holes:
(1) To document the time at which the Atlantic first started to receive a distinct overflow from the Mediterranean and to evaluate quantitatively its role in Late Miocene global climate and regional environmental change.
(2) To recover a complete record of Atlantic-Mediterranean exchange before, during and after the Messinian Salinity Crisis and to evaluate the causes and consequences of this extreme oceanographic event, locally, regionally and globally.
(3) To test our quantitative understanding of the behavior of ocean plumes during the most extreme exchange in Earth's history.

For more information on Expeditions 401 refer to the Expedition website:
https://iodp.tamu.edu/scienceops/expeditions/mediterranean_atlantic_gateway_exchange.html

WHO SHOULD APPLY: We encourage applications from all qualified scientists. ECORD is committed to a policy of broad participation and inclusion, and to providing a safe, productive, and welcoming environment for all program participants. Opportunities exist for researchers (including graduate students) in all shipboard specialties, including micropaleontologists, sedimentologists, petrologists, igneous geochemists, inorganic and organic geochemists, microbiologists, paleomagnetists, physical properties specialists, and borehole geophysicists. Good working knowledge of the English language is required.

COVID-19 Protocol: The JRSO has created a protocol to safely operate during the COVID-19 pandemic. If pandemic conditions have not improved by summer 2023, the expedition may need to sail with a reduced shipboard contingent. However, all participants will maintain their designation as science party members regardless of whether they sail or not, and will have equal access to all expedition data and core materials. The protocol is available here: http://iodp.tamu.edu/scienceops/JR_COVID-Mitigation-Protocols.pdf.

The Application Process is open to scientists in all ECORD member countries. Please download the *Apply to Sail* general application forms from the ESSAC webpage:

http://www.ecord.org/expeditions/apply-to-sail/

Please, fill out all applicable fields and send the form to the ESSAC office by email (essac@ogs.it) with the following additional documents by the deadline of **1 December 2022**:

1. **A letter of interest** outlining your specific expertise, previous involvement in DSDP/ ODP/ IODP expeditions, research interests, primary research goals of your proposed participation.
2. **CV** and **publication list**.
3. **Early career researchers** must additionally provide a **letter of support** from their host institution, including information on post-cruise science support.

All applications should state how you intend to achieve your proposed scientific objectives, with information on the funding scheme and support from your institution or national funding agencies. More information can be found under: http://www.ecord.org/expeditions/apply-to-sail/

In addition to the ESSAC application, all applicants *must inform their national office or national delegate* and send them a copy of their application documents. The national offices or national delegates can also provide information regarding travel support, post-cruise funding opportunities, etc.
See http://www.ecord.org/about-ecord/about-us/ for a list of the national contact persons.

For further information or questions, please contact the ESSAC Office:

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