



May 29, 2024

Media Release – FOR IMMEDIATE RELEASE

International Ocean Discovery Program Expedition 403 Eastern Fram Strait Paleo-Archive

Next week Expedition 403 will depart from Amsterdam to begin its two-month scientific journey working off the western coast of Svalbard. By investigating modern and ancient currents in the Greenland Sea, Expedition 403 will collect crucial data to ground-truth climate models of projected future CO₂, temperature, ocean temperature, sea ice, and present Earth ice sheet stability. Less than 500 miles from the North pole, the Expedition will core at six sites located in water depths ranging from ~1,200 – 1,800 meters.

Sitting between Greenland and Svalbard, the Fram Strait is the only deep-water passage connecting the Arctic Ocean with the Northern Atlantic to the south. Today this passage is best defined by the presence of a warm northward flowing current west of Spitsbergen (WSC) and the cool southward flowing East Greenland Current (EGC). By looking at the northward flowing current, which moves heat, salt, and moisture into the Arctic region, Expedition 403 Eastern Fram Strait Paleo-Archive will collect crucial data from an area where profound changes in Earth's climate history are stored in the sedimentary record.

Expedition 403 stands out in significance not only because it will return with data to better understand some of the most pressing details of our changing climate, but also for its historic role as the last expedition of the *JOIDES Resolution* within the International Ocean Discovery Program.

MORE INFORMATION:

About the expedition - [IODP JRSO • Expeditions • Eastern Fram Strait Paleo-Archive](#)

About the research program - www.iodp.org

FURTHER INFORMATION:

Over millions of years, sediment has collected under the influence of marine sedimentological and biological activity, advancing and retreating glaciers on the continental margin, and the warm current moving along the seafloor in the eastern Fram Strait. The climate proxies contained in these sediment drifts hold clues of key climate transitions, useful climate proxies of the past which can be used as analogs for future climate transitions. Through a more detailed reconstruction of the West Spitsbergen Current transporting the warm North Atlantic Water to the Arctic, researchers will be better able to inform the climate models that guide our future in a warming world.

While the Arctic and North Atlantic Oceans play a significant role in the climatic evolution of the Northern Hemisphere, the findings of this expedition also shine a light on the future of the South Pole. One particularly influential aspect of Expedition 403 is what can be learned from the depositional history of this region as it is applied to onshore geology, including the dynamics of the paleo Svalbard-Barents Sea Ice Sheet (SBSIS) complex. The marine-based paleo SBSIS is considered the best analog for the modern West Antarctic Ice Sheet (WAIS). Easier to access than the Antarctic ice sheet, the paleo SBSIS record becomes an ideal laboratory to explore the effects of ice-atmosphere-ocean interactions under fast, warm climatic change. With an increasingly warming climate, the loss of stability of the WAIS is a significant concern for future global projections of sea level rise.

The expedition is led by Co-Chief Scientists Renata Giulia Lucchi (National Institute of Oceanography and Applied Geophysics-OGS, Italy) and Kristen St John (James Madison University, USA). Dr Lucchi is “honored to co-lead this expedition under the flag of the historically most important program of ocean drilling for Earth exploration. IODP Exp-403 will specifically target expanded sediment records that have a high potential to contain the information that is still needed to better understand how the atmosphere-cryosphere-ocean system has interacted in the past and the mutual response to paleoclimate. This information is urgently needed to better constrain numerical prediction models of ice sheet behavior and sea level rise under current global warming. This is the last expedition in this program. We are sad about it, but we also want it to be worthwhile.” Dr St John adds “I’m excited and honored to work with the international science team, as well as the highly skilled technical staff and crew. We are well positioned to achieve the science objectives because of the collaborative efforts leading up to the expedition and while at sea. We expect core recovery to be high, which will provide the science team—and other scientists from around the world—with the needed materials to learn how this sensitive area of climate change has behaved in the past. The research that comes from Expedition 403 will inform predictive climate and ocean circulation models of the future.”

SCIENTIFIC OBJECTIVES:

The overall objective of the International Ocean Discovery Program (IODP) Expedition 403 is to better understand the variability of the West Spitsbergen Current and its influence on climate changes, particularly during key climate transitions.

Some of the specific scientific objectives include the following:

1. To reconstruct the West Spitsbergen Current variability transporting warm North Atlantic Water to the Arctic Ocean,
2. To understand the influence that its past variability had on climate changes particularly during key climate transitions (late Miocene–Pliocene transition, late Pliocene–Pleistocene transition, MPT, mid-Brunhes transition, and suborbital Heinrich-like events),
3. To measure the impact of the oceanic configuration on the Arctic glaciations, ice shelf development and stability, and sea ice distribution,
4. To investigate the response of microbial communities to freshwater input during glacial termination events, and fluctuating levels of organic carbon input between glacial and interglacial periods.

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 403 will sail with 25 scientists and two ice navigators 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.

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 (formerly Twitter) - [@TheJR](https://twitter.com/TheJR)

Instagram - [@joides_resolution](https://www.instagram.com/joides_resolution)

Facebook - [JOIDES Resolution](https://www.facebook.com/JOIDESResolution)

Threads - [@joides_resolution](https://www.threads.net/@joides_resolution)

Contact / Interviews / Images:

Tim Lyons

Expedition 403 Onboard Outreach Officer

Email: thejoidesresolution@gmail.com

Maya Pincus

Science Communications Officer

US Science Support Program

Email: mpincus@ldeo.columbia.edu

Thomas Ronge

Expedition 403 Project Manager

JOIDES Resolution Science Operator

Email: ronge@iodp.tamu.edu OR jr_ronge@ship.iodp.tamu.edu



IODP Expedition 403: Eastern Fram Strait Paleo-Archive Site Map

