

## **IODP Expedition 400: NW Greenland Glaciated Margin**

### **Week 1 Report (12–19 August 2023)**

#### **Operations**

##### *Port Call Activities*

IODP Expedition 400 began in Reykjavík, Iceland at Skarfabakki Harbour at 0815 h on 12 August 2023. The Expedition 395 science party departed the vessel on 12 August and on 13 August the crew, staff, and science party of Expedition 400 boarded the vessel with the oncoming *JOIDES Resolution* Science Operator (JRSO) technical staff arriving at 0900 h and the science party at 1445 h. Immigration checks for those sailing were performed dockside in the afternoon and completed by 1600 h. The science party began expedition preparation, received orientations including life at sea and safety training, along with introductions to the laboratories during the rest of the port call. The two ice navigators were set up with internet access and the ice analysis and reporting routine was initiated.

Freight was completed throughout the port call and included offgoing shipments of core and refrigerated and frozen samples as well as the loading of sepiolite (drilling mud), drilling equipment, and fresh and frozen foods. On 16 August fuel was bunkered and a boat drill was conducted.

The vessel was readied for departure and the pilot came onboard at 0745 h on 17 August. The tugs were secured shortly after and the last line was released at 0806 h, marking the official start of the initial transit. By 0822 h the tugboats were released, the pilot departed, and our sea passage to proposed Site MB-23A (Site U1603) began at 0824 h. The vessel remained underway for the remainder of the week, with an average speed of 11.1 kt and completing 716 nmi of the 1,773 nmi to the first site. COVID-19 mitigation protocols were in place all week.

#### **Scientific Objectives**

Expedition 400 will address current knowledge gaps in the evolution and variability of the northern Greenland Ice Sheet by analyzing sedimentary archives of warm and cold periods of the last ~30 million years (My), including times when the greenhouse gas content of the atmosphere was higher than it is today. Sediment archives will be obtained by drilling at seven sites to depths of 300–1000 meters below seafloor (mbsf) along a transect crossing the northwest Greenland margin into Baffin Bay. The seven sites will provide a composite stratigraphic succession that includes preglacial settings, a record of first growth of the northern Greenland Ice Sheet, and glacial and interglacial cycles when the ice sheet grew to its maximum positions at the shelf edge and retreated toward land, possibly melting nearly completely.

## Science Results

The Expedition 400 science party includes scientists from 10 IODP member countries and two Outreach Officers from the USA. The first week onboard included presentations from curation, operations, publications, and the Expedition Project Manager (EPM) to introduce the science party to onboard resources and expectations for the expedition. Members of the science party provided presentations on their planned postcruise research. Additional training and orientations were provided in each of the laboratories and all groups worked on the Methods sections for the expedition *Proceedings* volume that will be published postcruise.

### *Lithostratigraphy*

The Lithostratigraphy team received training from technical staff on data entry into the core description software (GEODESC) and core flow. The team held several discussions to develop the methodology, protocols, and templates to be used during the expedition. Data capture templates were tested and a draft of the Methods chapter was prepared.

### *Biostratigraphy*

The scientists completed orientation and training in core flow, description software (GEODESC), microscopes and imaging. Processing methods for each microfossil group were reviewed and an inventory of laboratory equipment was completed.

### *Paleomagnetism*

The scientists completed training in the operation of the superconducting rock magnetometer (SRM) and special laboratory software. The technician introduced the scientists to equipment and instruments for the measurement of discrete samples, including the spinner magnetometer, magnetic susceptibility (MS) (including anisotropy), and the alternating field (AF) demagnetizer. Laboratory standards calibrated in the shore-based laboratories of the scientists were measured on the shipboard instruments to ensure that orientation systems were clear and that the proper calibration constants were in use in the shipboard software.

### *Geochemistry*

The Geochemists began planning strategies for shipboard sampling of interstitial water (IW), headspace gas, and sediments. Additional training in the use of laboratory equipment and software was provided by the technicians, including sample collection, preparation, and analytical methods. In preparation for sedimentary ancient DNA (sedaDNA) sampling, an introduction to laboratory safety and a dedicated laboratory space (cold room with an ultraviolet (UV) working station in the Microbiology Laboratory) was provided by the technicians. Specialized materials were brought to the cold room and the scientist began setting up the space.

### *Physical Properties, Downhole Measurements, and Stratigraphic Correlation*

The four scientists from the Physical Properties (2) and Stratigraphic Correlation (2) teams received onboard training in the laboratory safety and procedures, including a detailed introduction to the Whole-Round Multisensor Logger (WRMSL), Natural Gamma Radiation Logger (NGRL), Thermal Conductivity Meter, and the X-Ray system. The teams also were trained to use the *P*-wave velocity caliper and the shear strength tools. Sampling procedures for discrete measurements, such as moisture and density (MAD), were also addressed. Measurement resolutions and general core flow within the laboratory have been discussed with the science party and a draft of the Methods chapter is in preparation.

### **Education and Outreach**

The following outreach activities took place during Week 1.

The Expedition 400 page went live on the [joidesresolution.org](http://joidesresolution.org) homepage. The Outreach Officers gave a presentation to the science party about outreach and began meeting individually with science party members to learn more about their specific outreach needs. The Outreach Officers sent ship-to-shore invitations to schools in Greenland, and developed routines and schedules for outreach tasks including blogs, reports, and social media. Email templates were created to ensure consistent communication with requests for ship-to-shore broadcasts.

### *Social Media*

<b>Group</b>	<b>No. of posts</b>	<b>Analytics</b>	<b>Notes</b>
<a href="#">Facebook</a>	2	15 new followers Post reach: 9,500 Post reactions & likes: 250 Avg Post engagement: 8.37% Post shares: 33	Expedition 400 video trailer post received the highest engagement, with 2 comments and 22 shares
<a href="#">Instagram</a>	2	21 new followers Post Reach: 1,400 Post Impressions: 1,600 Post reactions & likes: 241 Avg Post engagement: 18.36%	
<a href="#">Twitter</a>	2	13 new followers Post impressions: 13,000 Post reactions & likes: 174 Avg Post engagement: 6.01% Retweets: 43	

### *Ship-to-shore broadcasts*

- No broadcasts were conducted this week.

### **Technical Support and HSE Activities**

The following technical support activities took place during Week 1.

#### *Laboratory Port Call and Transit Activities*

- Crossover with offgoing IODP JRSO technical staff completed on 13 August.
- Loaded Expedition 400 freight and updated the inventory.
- Offloaded remaining Expedition 395 freight.
- Preparation of laboratories by the technical staff is ongoing.
- Science party participants were introduced to their respective laboratories. Training and preparations are ongoing.
- Thin section training for a new staff member was conducted during the port call and practice is ongoing.
- Installed an UV light in the laminar flow hood in the Microbiology Laboratory as part of setting up for sedaDNA sampling.
- Two Carver presses in the Chemistry Laboratory were rebuilt due to leaking oil.
- Tracer pumps were primed and made ready for testing with Rigwatch once communication issues between the pumps and software are resolved.
- Reconfigured scanning electron microscope energy dispersive spectrometry (SEM-EDS) isolation dampening stand with new materials.
- Installed two new SPOT microscope cameras; setup and testing are ongoing.

#### *Application Support Activities*

- Performed BOX (Beginning of Expedition) activities.
- Resolved issue with TpFit software not launching on Downhole Measurements Laboratory workstation.
- Resolved several minor issues with GEODESC description software.
- Resolved XSCAN (X-ray imager) issue where it wasn't creating thumbnails for LIVE.
- Assisted scientists and staff with password and other minor software issues.
- Investigated and experimented with IRIS, with assistance from Operations Superintendent.
- Resolved issue with SEM Uploader not working with files from the Hitachi SEM.

### *IT Support Activities*

- The ship's exchange email server experienced an issue sending emails to Gmail accounts, which was resolved with the help of TAMU IT.
- Investigating an issue with some of the video distribution units not playing the ship's video streams consistently.
- Preparation continues to implement the Starlink satellite internet for potential daily use on the ship. We are currently testing out a product called WifiGem to help facilitate access to the Starlink network.
- Continued routine beginning of expedition tasks. This includes updating servers, workstations, and daily-use software while in transit.

### *HSE Activities*

- Emergency shower and eyewash stations were tested.
- Daily COVID-19 tests were conducted.
- A lifeboat and fire drill held on 16 August at 1030 h.
- Safety training and laboratory tours completed for science party and new JRSO staff.
- Polar survival training conducted for science party and JRSO staff.