IODP Expedition 374: Ross Sea West Antarctic Ice Sheet History

Week 2 Report (7–13 January 2018)

Operations

Week 2 of Expedition 374 (Ross Sea West Antarctic Ice Sheet History) began while in Lyttelton, New Zealand, taking on fuel at the Oil Berth. After loading 640 metric tons of fuel oil, fuel operations were secured. At 0812 h (local ship time, UTC + 13 h) on 7 January 2018, the last line was released for the move back to Berth No. 7. The first line was secured at 0827 h, ending the brief transit. Loading operations resumed, and during the day fresh fruit and vegetables were loaded, the Formation MicroScanner tool was repaired and tested, and Polar Code training for the science party and technicians was completed. On 8 January, the final day of our 4.4 d port call, the vessel was inspected and issued a Polar Code certificate, all remaining trash was discharged, the last remaining items of freight were loaded or discharged, and immigration cleared the vessel for departure. After the vessel was secured for the sea passage to Antarctica, the harbor pilot came on board at 1552 h, and two port tugs arrived to assist with departure. The mooring lines were released and pulled back on board with the last line released at 1624 h. The vessel proceeded to the pilot station and the pilot departed the vessel at 1648 h after a 2 nmi transit. The vessel began its sea passage at 1648 h on 8 January 2018. At the end of the week the vessel had transited 1371 nmi on our way to rendezvous with the RVIB *Nathaniel B. Palmer* for escort into the Ross Sea polynya. Estimated rendezvous time is 2100 h on 14 January.

Science Results

The remainder of the port call and the transit was spent familiarizing the scientists with the ship, laboratories, core flow, curation, sampling, and publication procedures used aboard the *JOIDES Resolution*. The Co-Chief Scientists introduced the expedition scientific objectives, and other scientists presented results from previous IODP expeditions in Antarctica and other relevant depositional settings from high latitudes. All laboratory groups discussed and wrote the first draft of their Methods chapters. The sedimentologists and paleontologists worked with the technical staff to learn how to enter descriptive data into DESClogik, then began to prepare DESClogik templates for core description and micropaleontology. The sedimentologists also worked with the technical staff to learn core flow procedures in the Core Description Laboratory, including operation of the Section Half Imaging Logger (SHIL), Section Half Multisensor Logger (SHMSL), and handheld X-ray fluorescence (XRF) instrument. They also practiced visual core description and preparation and description of smear slides using legacy cores from previous Antarctic expeditions, including Deep Sea Drilling Project (DSDP) Site 270, Ocean Drilling Program (ODP) Site 1165, and Integrated Ocean Drilling Program Site U1361. The paleontologists worked with the Imaging Specialist to set up microscopes and cameras. The

palynologists practiced laboratory methods specific to the use of hydrofluoric acid (HF) for palynological processing with the geochemistry technicians, and the Laboratory Officer provided detailed HF training to the palynologists and geochemists. The paleontologists also compiled a figure and tables of biohorizons for diatoms, dinoflagellates, radiolarians, and foraminifers for the time interval 0–24 Ma.

The paleomagnetists learned how to operate the superconducting rock magnetometer (SRM) and conducted test measurements of the response function. The effective lengths of the integrated response function are 7.36 cm for the *x*-axis, 7.24 cm for the *y*-axis, and 9.13 cm for the *z*-axis, respectively. They also tested SRM noise levels during rough seas and conducted positioning tests of the tray relative to the superconducting quantum interference devices (SQUIDs). Data collected from test cores were used to adjust MATLAB and Python paleomagnetics tools for efficient processing of shipboard paleomagnetics data. The Physical Properties Specialists were introduced to the Whole-Round Multisensor Logger (WRMSL), Special Task Multisensor Logger (STMSL), and Natural Gamma Radiation Logger (NGRL), and practiced using these track systems with practice cores and calibration pieces to test the systems and develop proficiency in their operation. They were also trained to use the thermal conductivity probe, as well as how to make *x*-axis discrete measurements of *P*-wave velocity on the Section Half Measurement Gantry (SHMG) and moisture and density (MAD). The geochemists developed a sampling strategy and reviewed procedures for collecting sediment samples on the catwalk and for extracting interstitial water from whole-round samples. They were also trained to use the different analytical systems in the laboratory, including the gas chromatograph (for analysis of methane and other hydrocarbon gas), handheld refractometer (salinity), and Gran titration (pH, total alkalinity, and chlorinity). The also processed reference materials to practice measuring sediment samples using the inductively coupled plasma–atomic emission spectrometry (ICP-AES) instrument. The technical staff and Schlumberger logging engineer introduced the downhole logging scientists to general techniques, including a demonstration of tool string calibration on the helideck. They were also introduced to basic procedures in the processing software (Petrel), including how to download and import physical properties data, then integrate these data with seismic data.

Education and Outreach

The Education and Outreach (E&O) team continued to schedule live broadcasts with classrooms around the world. The first broadcast will be 16 January with the Charles de Gaulle school in the UK. The calendar for live events is quickly filling up. The Staff Scientist did a walkthrough of the live event tour route with the Educators to familiarize them with content typically included in the tour. The Educators also did a test connection with shore to verify that the connection was functioning properly.

Social media posts included eight blogs on the *JOIDES Resolution* Expedition 374 page (http://joidesresolution.org/expedition/374/), 12 posts on Facebook (https://www.facebook.com/joidesresolution), eight tweets and eight retweets on Twitter (https://twitter.com/TheJR), and six posts on Instagram (http://instagram.com/joides_resolution). The blogs included five blogs from the Educators covering port call, the start of the expedition, being at sea, the return of the program to the Ross Sea, and types of ice in Antarctica. Three scientists also posted blogs about the start of the expedition. The Videographer conducted numerous interviews with the Co-Chiefs and scientists, and created a trailer video as a teaser for the expedition.

Technical Support and HSE Activities

The following technical support activities took place during Week 2.

Laboratory Activities

- Laboratories are being prepared for coring.
- Physical counts were conducted in various storerooms and laboratories.
- Loose cable in NI connection box reconnected, which allowed Bathy2010 to start working.
- Attempted to install the new Agilent GCSampler80 autosampler for GC-PFT without success. Discussion with shore is ongoing to find a solution.
- Set up the handheld Vanta XRF (third-party tool), and conducted training for the scientists.
- A physical limitation was found on the STMSL between home and zero; moving the actuator 10 cm starboard allowed a 155 cm long section to fit.
- Levelwind jammed and was repaired after the chain was taken off to free it up.
- Made thin sections for Expedition 360T.
- Installed PVC curtains on the catwalk for cold weather.

HSE Activities

- Tested safety showers and eye wash stations.
- Conducted HF safety training.
- Established HF usage protocol with Siem Offshore personnel and shipboard scientists and communicated this to staff.