

## **IODP Expedition 382: Iceberg Alley and Subantarctic Ice and Ocean Dynamics**

### **Week 2 Report (24–30 March 2019)**

During Week 2 of the International Ocean Discovery Program (IODP) Expedition 382, Iceberg Alley and Subantarctic Ice and Ocean Dynamics, we completed the transit from Punta Arenas to the first drill site of the expedition and started advanced piston corer (APC) operations at Site U1534 (proposed Site SFSD-03A). All times in this report are in ship local time (UTC – 3 h).

### **Operations**

Week 2 of the expedition began on 24 March at anchorage off Punta Arenas, Chile, waiting to refuel at the bunkering pier at the Cabo Negro Oil Terminal. On 25 March at 1630 h we started the 19.5 nmi transit to the Cabo Negro Oil Terminal and the first line ashore was at 2015 h. Overnight, 1300 metric tons of arctic-blend diesel were loaded, with bunkering completed at 0535 h on 26 March. However, the ship was not permitted to depart because the winds were above the 20 kt operating limit for the dock. While waiting for the winds to drop, the last of the critical items arrived via air freight and were loaded on the vessel. The winds remained above the operating limit until the evening of 27 March. The ship pushed off with the last line on board at 2230 h, beginning the transit to Site U1534 (proposed Site SFSD-03A). The pilot disembarked at 0535 h, beginning the sea voyage.

The 461 nmi transit was completed in 39 h at an average speed of 11.8 kt. We arrived at Site U1534 at 1300 h on 29 March, lowered the thrusters, and switched the ship into dynamic positioning mode at 1345 h. The precision depth recorder (PDR) reading showed an uncorrected depth of 608 m below sea level (mbsl) and a Matthews corrected depth of 603.6 mbsl, significantly shallower than the water depth of 780 mbsl given in the *Scientific Prospectus*. We checked both the 3.5 and 12 kHz PDR channels, as well as the water depth in the seismic profile over the site, and confirmed that the predicted depth was in error.

An advanced piston corer/extended core barrel (APC/XCB) bottom-hole assembly (BHA) was picked up with an 11-7/16 inch C-3 bit. The assembly was lowered with 5 inch drill pipe to 594.2 m below (rig floor) mbrf. The top drive was picked up, along with a 20 ft and a 30 ft knobby. Initially there was difficulty passing the sinker bar assembly through the blocks, but after three attempts, pulling and cleaning the oil saver each time, the sinker bar assembly passed through.

The drill string was spaced out and the first core of the expedition was taken at 2250 h on 29 March. Core 1H recovered 3.53 m of sediment, resulting in a sea floor depth of 605.1 mbsl for Hole U1534A.

On 30 March, APC piston coring continued from Core 2H to Core 10H at 79.5 m. After shooting Core 10H, the forward coring line parted, leaving the core barrel and sinker bars inside the BHA. The sinker bars were removed from the aft coring winch and attached to the forward line. A fishing assembly, consisting of an APC core barrel and a modified core catcher, was rigged up and lowered, and the sinker bars and core barrel were fished on the first attempt.

APC coring continued with Cores 11H–14H (89.0–115.7 m). Core 14H was a partial stroke, with only 1.2 m recovered and damage to the APC shoe, which was later repaired. We drilled 1 m to pass the obstruction (likely a drop stone) and then switched to half-length APC (HLAPC) coring. The coring line again had to be reheaded following Core 19F after a few stray cable strands were observed. At midnight on 30 March, Core 20F had been recovered, advancing Hole U1534A to a depth of 141.9 mbsf.

## **Science Results**

The science party spent most of Week 2 continuing to become familiar with their laboratory equipment and procedures, to be ready for the first sediment cores. The two Co-Chief Scientists and the lead proponent of the Subantarctic Front sites gave presentations on the science aims of the expedition. The scientists each introduced their scientific research plans, and the two Outreach Officers presented their plans for communicating the work of the expedition to the public, including ways for the science party to become involved. We held five group meetings to make plans for the research areas of chronostratigraphy, biomarker temperature proxies, ice-rafted debris, Southern Ocean current and wind systems, and foraminifer-based work. The Ship's Doctor conducted training sessions on survival in cold weather and cold water, and training in hydrogen fluoride (HF) safety was given to those working in, and close to, the Geochemistry Laboratory.

The first core from Hole U1534A came on deck at 2305 h on 29 March. Cores 1H to 20F penetrated from 0 to 141.9 m and recovered 146.8 m (103%). All full-length APC cores (Cores 1H to 14H) were oriented, and formation temperature measurements were taken with Cores 4H, 7H, 10H, and 13H. Cores 1H to 7H were split and described. They consist of greenish-gray silty clay containing calcareous and siliceous microfossils. A few dropstones and calcareous macrofossils were present.

## **Outreach**

[joidesresolution.org](http://joidesresolution.org): Four blogs were posted this week.

*Twitter* (<https://twitter.com/TheJR>): Eleven original tweets, including a drill-string assembly time-lapse video; 17 retweets of Expedition 382 posts by @EGUCryo, @RemoteLongitude,

@NSF, @SarahKachovich, @MoRaymo, @Climateandlife, @icey\_mark, @planeterde.de, and more. An instructional poster, *Twitter for Scientists*, was posted in the conference room.

*Facebook* (<https://www.facebook.com/joidesresolution>): Eleven posts, including the name announcement of the expedition mascot (an Albatross), Bob Ross.

*Instagram* ([http://instagram.com/joides\\_resolution](http://instagram.com/joides_resolution)): Four posts and four Instagram stories, including a post about the decorated hard hats made by one of the IODP JRSO technical staff.

*Live Events*: Video link with Howell High School including Q&A with two scientists, 33 people in attendance.

## **Technical Support and HSE Activities**

### *Laboratory Activities*

- Contamination testing tracer pump prepared and tested for use.
- Prior to coring, while performing routine testing on the Section-Half Multisensor Logger (SHMSL), it was noticed that the integration time on the QE Pro spectrophotometer was extremely long. After extensive troubleshooting, the QE Pro was replaced with a new QEPro (91126) and it is performing well.
- Conducted training for new IODP JRSO technical staff in their assigned laboratories.
- IODP JRSO technical staff gave the science party training in their laboratories.
- Laboratories were prepared for coring.
- Began coring and processing cores and samples from Hole U1534A.

### *Application Support Activities*

- Worked with electronics and physical properties technicians to resolve the calibration problem with the QE Pro spectrometer on the SHMSL; after swapping the spectrometer with a spare we were able to properly calibrate again. Electronics technicians are testing the original QD Pro to determine whether it needs to be returned to vendor for servicing.
- Imported existing GRA density and magnetic susceptibility data into a dummy expedition (999) so stratigraphic correlators can practice using the software.
- Worked with stratigraphic correlators to help solve a problem in creating tie-points in the new version 3.0 of Correlator. The problem was solved with help from shore personnel.
- Deployed new components for CahnBalance software; added capability to sort history records by all columns in the table and record all measurements to history, even those not associated with a specific analysis.
- Worked with paleomagnetists to resolve an issue with the superconducting rock magnetometer (SRM). They were unable to use the offline treatment sequence function in

IMS 10.2 to run measurement sequences that contain offline treatments; this problem is still under investigation. Scientists will add the offline treatment characteristics to the comment field until this issue is resolved.

#### *IT Support Activities*

- Assisted with replacing the QE Pro unit on the SHMSL.
- Installed new monitor mounts in the user room.
- Devised a method for Expedition Project Manager (EPM) to remotely manage the Ship's Information TV channel from the EPM desk computer.
- Revisiting Advanced Authentication system for servers.
- Setup script to automatically copy raw and processed X-ray images to the data1 drive.

#### *HSE Activities*

- Personal safety in cold environments training provided to scientists and technical staff.
- Presentation of hydrofluoric acid (HF) safety and JRSO HF policy given to all Chemistry Laboratory personnel and technical staff.
- Safety showers and eyewash stations tested.
- A boat drill was held at 1300 h on 24 March.