

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

Week 9 Report (12–18 May 2019)

During Week 9 of the International Ocean Discovery Program (IODP) Expedition 382, Iceberg Alley and Subantarctic Ice and Ocean Dynamics, we cored Hole U1538D (seafloor to 126.4 mbsf; 114.6 m recovered, 91%) at proposed Site SCO-11 in the Pirie Basin area. This was the last hole of the expedition and the rest of the week was spent on the sea voyage back to Punta Arenas, Chile. Bad weather delayed the start of coring at Hole U1538D and slowed the speed of the ship during the sea voyage. All times in this report are in ship local time (UTC – 3 h).

Operations

At the beginning of the week we were waiting on weather to improve. The ship's heave (the maximum peak-to-peak heave over a 10 min interval) remained above 5 m until 1930 h on 12 May. At that time we were able to resume rig floor operations.

Hole U1538D started at 2145 h on 12 May. Cores U1538D-1H to 14H penetrated from the seafloor to 126.4 mbsf and recovered 114.6 m (91%). A formation temperature measurement was made while taking Core 12H. We had to stop coring in order to leave time to raise the drill string and secure the bottom-hole assembly for transit before stormy weather and high seas arrived early on 14 May. The last core came on deck at 1240 h on 13 May, and the bit was clear of the seafloor at 1430 h, ending Hole U1538D.

Having completed operations at Site U1538, we started the sea voyage to Punta Arenas at 0000 h on 14 May. We had to leave Site U1538 earlier than originally planned because of deteriorating weather and sea conditions. This earlier departure briefly opened a short time window to core an additional ~100 m hole at Site U1534, which lies almost directly along the course from Site U1538 to Punta Arenas. However, headwinds slowed our progress to the extent that we no longer had time to carry out this plan (average speed was 3.7 kt on 14 May), so we proceeded directly to Punta Arenas.

Our course took us over the first two sites of the expedition, Sites U1534 and U1535. At 0930 h on 17 May we slowed to 5 kt and made a single east-to-west 3.5 kHz subbottom profiler survey over the sites. The survey recorded reflections down to about 70 mbsf, and the profile will help to correlate the stratigraphies between the two sites.

Science Results

Hole U1538D stratigraphy repeats the upper 126 m of Hole U1538A and extends a little deeper than Hole U1538C, which reached 106 mbsf. The cores consist of dark greenish gray, silty clay-rich and silty clay-bearing diatom ooze alternating with diatom-rich and diatom-bearing silty clay. The deepest core contains a thick layer of diatom ooze that is interpreted to have been deposited during Marine Isotope Stage 11 (~400 ka).

No new biostratigraphic results were obtained from Hole U1538D. Paleomagnetic investigations at Site U1538 involved measurement of the natural remanent magnetization on all Hole U1538D archive halves before and after demagnetization in a peak alternating field (AF) of 15 mT. The physical properties measurements from Hole U1538D were used to complete a continuous splice section for the site down to 130 mbsf.

We analyzed ~180 samples for major element composition on the inductively coupled plasma–atomic emission spectrometer (ICP-AES). This included 23 samples from Site U1534, 12 from Site U1535, 48 from Site U1536, 35 from Site U1537, and 48 from Site U1538. We waited until the end of the expedition to measure these samples because our priority was to measure pore water composition on the ICP-AES, and there is effort involved in changing the instrument to measure processed sediment samples. Analysis of the data has just started.

Outreach

joidesresolution.org: We posted three blogs this week: Rock Through the Looking Glass, Iceberg Alley Facebook Live Series, and The Iceberger.

Twitter (<https://twitter.com/TheJR>): We posted six tweets this week.

Facebook (<https://www.facebook.com/joidesresolution>): We posted six tweets this week, including a Facebook Live with Yasmina Martos.

Instagram (http://instagram.com/joides_resolution): There were four posts this week.

Live Events: There were videoconferences to schools and a university this week.

Technical Support and HSE Activities

Laboratory Activities

- The Bruker D4 X-ray Diffractometer continued to be problematic, making grinding sounds when a sample entered the measurement chamber. Rust particles were found inside the instrument. The sample spinner was removed, thoroughly cleaned, and

reinstalled. The grinding noise eventually subsided and measurements continued. After analyzing a few samples the instrument was found to have more rust particles deposited inside. Bruker has been contacted for replacement parts if necessary.

- After expedition measurements on the natural gamma radiation instrument were completed, the IODP JRSO technical staff began troubleshooting the drift of Detector 7 energy readings. Through a process of elimination, the photomultiplier tube base was replaced with a spare and the detector no longer seems to be drifting.

Application Support Activities

- We performed the end-of-expedition LIMS database export.

HSE Activities

- We conducted the weekly fire and abandon ship drill.
- Safety showers and eyewash stations were tested.