

IODP Expedition 395C: Reykjanes Mantle Convection and Climate: Crustal Objectives

Week 2 Report (13–19 June 2021)

Operations

During Week 2 of the International Ocean Discovery Program (IODP) Expedition 395C, Reykjanes Mantle Convection and Climate: Crustal Objectives, we began operations at Site U1555 (proposed Site REYK-13A).

Hole U1555H

The drill string was fully assembled to begin coring operations at Hole U1555H (60°13.69242'N, 28°30.02395'W). The hole was spudded at 0650 h on 13 June 2021 using the advanced piston corer (APC) system. Core U1555H-1H recovered 5 m of core, establishing a seafloor depth of 1523.6 m below sea level (mbsl). Cores 1H to 10H were cored to 90.5 m below seafloor (mbsf) with 101% recovery. Following Core 10H, 150 m of the core winch line was cut to remove damaged portions. Coring continued with Cores 11H to 15H to a depth of 138 mbsf. The core winch line was again damaged when it got stuck in the oil saver sub on the top drive. After removing, cutting, and reheading the line, coring continued with Cores 16H to 18H (138–166.5 mbsf). The extended core barrel (XCB) system was deployed for the remaining cores. Core 19X was only advanced 6 m to ensure that Core 20X would recover the sediment/basement interface, which was encountered at 176.5 mbsf. The final depth of Hole U1555H was 177.5 mbsf. The crew began tripping pipe and the bit cleared the seafloor at 1525 h on 14 June. At 2000 h, the bit cleared the rotary table, ending Hole U1555H. All APC cores were oriented using the Icefield MI-5 tool and formation temperature measurements were collected on Cores 4H, 7H, 10H, and 13H using the advanced piston corer temperature (APCT-3) tool. A total of 180.06 m of core was recovered from Hole U1555H, with 101% recovery.

Hole U1555I

The ship was offset 24 m east-southeast of Hole U1555H for operations at Hole U1555I. As the crew worked to assemble the drill string and bottom-hole assembly, the weather deteriorated and at 0315 h on 15 June operations ceased and the vessel began waiting on weather. Winds picked up to over 30 kt with waves up to 5.5 m over the course of the day. After 30 h, operations resumed at 0900 h on 16 June.

Hole U1555I (60°13.6897'N, 28°29.9984'W) was spudded at 1000 h and drilled without core recovery to 159.3 mbsf. The water depth for Hole U1555I was 1523.5 mbsl. The rotary core barrel (RCB) system was used to cut all cores from Hole U1555I. Cores 2R and 3R were collected from 159.3 to 178.7 mbsf with 77% sediment recovery and the sediment/basement interface was encountered at 176.5 mbsf.

Cores 4R to 6R (178.7–207.8 mbsf) were cut from the basement using 9.7 m coring advances. Beginning with Core 7R, the drill string was advanced ~5 m for each core, to prevent the core from jamming inside the barrel. Mud sweeps were performed following Core 8R as hole conditions had deteriorated. Coring continued from Core 9R to 26R (227.2–304.8 mbsf). After cutting Core 26R, the drill bit reached 49 rotating hours and the decision was made to change the bit. The crew began preparations for changing the drill bit, ending the operations for Week 2. The core recovery for the basement cores (4R to 26R) was 46%.

Science Results

Site U1555

The JRSO technical staff processed the cores and samples in the ship laboratories, following the measurement and sampling plan constructed by the shore-based Expedition 395 Co-Chief Scientists and science party members.

Hole U1555H

Samples were collected on the catwalk for shipboard and shore-based interstitial water (IW), gas, microbiology, and micropaleontology analyses. The sediment cores were run through the whole-round (WR) physical properties tracks, which includes magnetic susceptibility (MS), gamma ray attenuation (GRA) bulk density, *P*-wave velocity, and natural gamma radiation (NGR) measurements. WR core sections near the sediment/basement interface were imaged using the X-Ray Imager. The split section halves were imaged, measured for point magnetic susceptibility and color reflectance, and scanned using the superconducting rock magnetometer (SRM). Thermal conductivity measurements and moisture and density samples were collected for each core. X-ray diffraction (XRD) and carbonate samples were taken from the IW squeeze cake sediment residues.

The sediments are predominantly gray with brown layers and drop stones in Cores 1H and 2H. The sediments contain clay to silt-sized grains, and sponge spicules are visible in the cracks of the cores. Coring disturbance varies with some sections heavily disturbed from the heave of the ship. The average calcium carbonate content is 11 wt% and total organic carbon averages 0.3%. Pore water alkalinity has an average concentration of 3.6 mM with values slightly increasing downhole.

Hole U1555I

The first two cores (U1555I-2R and 3R) recovered sediment while the remaining cores consist of basaltic basement rocks. The WR core measurements include MS, GRA bulk density, and NGR. The split cores are being imaged and measured for *P*-wave velocity, thermal conductivity, color reflectance, point magnetic susceptibility, magnetic properties, and X-ray fluorescence (XRF)

using a handheld device. WR rock pieces were routinely collected for postcruise microbiology studies.

Core description, biostratigraphy, and analysis of shipboard data for Site U1555 will take place postcruise.

Education and Outreach

This week the Education and Outreach effort spanned multiple media types. Outreach Officer Jose Cuevas hosted a Facebook Live and YouTube Live event with the Expedition 395C Co-Chief Scientists. On Facebook, 65 individuals watched the video. The YouTube video had 81 views. Jose also hosted a shore-to-shore video event with the University of Southern California Wrigley Marine Institute's Research Experience for Undergraduates (REU) program. This video call's engagement reached 22 undergraduate students.

Expedition 395 scientist Sara Satolli contributed a blog post for the joidesresolution.org website.

Social Media Posts

Social media is spread across three platforms: [Facebook](#), [Twitter](#), and [Instagram](#). The table below summarizes the metrics and impacts of original posts (retweets not included). This includes impressions, which are the number of times a post has been displayed, and engagements, which includes likes, shares, and comments.

Social media is a collaborative effort, with many of the Expedition 395 science party and Expedition 395C technical staff engaged in posting original content and sharing posts from the *JOIDES Resolution* accounts.

| Platform | Number of Posts | Impressions | Engagements |
|-----------|-----------------|-------------|-------------|
| Facebook | 8 | 15353 | 1059 |
| Twitter | 19 | 90065 | 2667 |
| Instagram | 4 | | 317 |

Technical Support and HSE Activities

The JRSO technical staff were engaged in laboratory and project activities.

Laboratory Activities

- Cores from Holes U1555H and U1555I were received and processed.
- Personnel were trained on hard rock curation procedures.

- The technical staff are taking all samples and performing all measurements.
- The G. Gun Parallel Cluster was assembled in preparation for logging operations and all of the components were tested.
- The Imaging Specialist is working on a project to update and improve the Image Capture software for images taken with the microscope cameras and how to integrate the new microscope cameras into the shipboard workflow.

IT Support Activities

- The Petrel and Techlog software licenses have been updated.
- Navipac software was installed on the Underway Geophysics Laboratory computers.
- Exploration and testing of the replacement of the Mac minis are underway.

Developer Support Activities

- The developer worked on the QCViewer project.
- The Lims2Excel program was fixed and deployed in the Publications office.

Health and Safety Activities

- The safety shower and eye wash stations were tested.