IODP Expedition 375: Hikurangi Subduction Margin

Week 8 Report (22–28 April 2018)

Operations

This week we conducted coring operations at Sites U1519, U1526, and U1520.

Hole U1519E

Coring was completed in Hole U1519E early in the week. Cores 6H to 13F advanced from 40.1 to 85.8 m and recovered 48.51 m (106%). Formation temperature measurements were taken with the advanced piston corer temperature tool (APCT-3) for Cores 6H–8H, 9F, 11F, and 13F. Once the drill string was recovered, the rig floor was secured for transit and the vessel left Site U1519 at 1312 h on 22 April.

Hole U1526A

We arrived at Site U1526 (proposed Site HSM-08A) at 1700 h on April 22. Our objective at this site was to sample a shallow section of the Tūranganui Knoll, which represents one component of the material entering the Hikurangi subduction zone. Upon arrival, a rotary core barrel (RCB) bottom-hole assembly (BHA) was assembled and lowered to the seafloor. Hole U1526A was started at 0150 h on 23 April. Cores 1R to 14R advanced from 0 to 83.6 m and recovered 29.26 m (35%). We retrieved the drill string while at the same time moving toward nearby Site U1520 in dynamic positioning mode.

Hole U1520D

After a ~6 h transit, we arrived at the specified coordinates of Hole U1520D at 2305 h on 24 April. Our objective at Hole U1520D was to core the uppermost sediments (above ~650 mbsf) that we drilled through at Hole U1520C earlier in the expedition. We assembled an advanced piston corer/extended core barrel (APC/XCB) BHA, and Hole U1520D was started at 0850 h on 25 April. Cores 1H to 49X advanced from 0 to 500.7 m and recovered 274.18 m (73%). Within this interval, we drilled without coring from 189.3 to 220.0 m and from 270.8 to 366.6 m. Formation temperature measurements were taken with the APCT-3 for Cores 4H, 7H, 10H, 13H, 16H, 19F, 23F, and 27F. As the week ended, we continued XCB coring from 500.7 m. Our target depth in this hole is ~650 m.

Science Results

During this week we measured cores from Sites U1519, U1526, and U1520, and attended four science meetings on the results from Sites U1519 and U1526.

Hole U1519E

Core U1519E-1H contains light-greenish gray mud and a 100 cm thick ash layer. Cores 2H to 13F are composed of alternating mud and silt with severe drilling disturbance. Most of the strata are inclined, although bed dips rarely exceed 50°. Steeper beds are recorded in folded strata, which likely represent mass transport deposits.

Planktonic foraminifers and calcareous nannofossils indicate that Sample U1519E-1H-CC (4.5 mbsf) is possibly Holocene (<0.009 Ma), and Samples 2H-1, 52 cm, through 13F-CC (14.00–85.78 mbsf) are late to middle Pleistocene (0.29–0.54 Ma).

Hole U1526A

Cores U1526A-1R to 2R contain light green nannofossil-rich calcareous mud. Core 3R is composed of light pink to whitish nannofossil-rich ooze. Cores 1R to 3R are severely disturbed by rotary drilling. Core 4R is composed of a volcaniclastic conglomerate. Cores 5R to 14R consist of a clast-supported volcaniclastic conglomerate containing basalt clasts with varying amounts of vesicles and alteration, and volcaniclastic sandstones. Formerly free pore space is filled with cement. Longer basalt fragments up to tens of centimeters long, with various amounts of vesicles and alteration, are intermixed in the conglomerate. A large number of veins are observed.

Planktonic foraminifer and calcareous nannofossils indicate that Sample U1526A-3R-1W, 56 cm (19.96 mbsf), is middle Pleistocene (<0.62 Ma), and Sample 3R-CC (21.09 mbsf) is late Miocene (<5.44 Ma).

Hole U1520D

Core U1520D-1H to the upper part of Core 3H consists of alternating dark gray silt and greenish gray mud in the upper part, transitioning to alternating dark gray sand beds and greenish gray mud in the lower part. Few ash layers are interbedded in the background lithology. From the lower part of Core 3H through Core 12H we see layers of alternating dark gray silt to fine sand and greenish gray mud. Starting with Core 13H, there is a change to alternating light gray silt and light greenish gray mud layers. Cores 17H to 30F contain alternating silt and greenish gray mud layers with interspersed ash layers up to 1 m thick. Starting with Core 31X, the lithology changes to alternating siltstone and greenish gray mudstone. Silts and siltstones generally exhibit parallel and cross lamination. Slight bioturbation occurs throughout the cored section.

Planktonic foraminifers and calcareous nannofossils indicate that Sample U1520D-1H-CC is Holocene (<0.009 Ma), Sample 6H-CC is late Pleistocene (<0.29 Ma), Samples 17H-CC to 30F-CC are middle to late Pleistocene (<0.54 Ma), and Samples 35X-CC through 40X-CC are middle Pleistocene (0.54–0.62 Ma).

Education and Outreach

Live Broadcasts

This week we conducted three live broadcasts with schools and universities in Malaysia, Germany, and the United States. These reached 160 people, from middle school to high school.

Social Media

We posted photos and videos (see below) on Facebook (https://www.facebook.com/joidesresolution), Twitter (https://twitter.com/TheJR), and Instagram (http://instagram.com/joides_resolution). Facebook had 8,268 followers, Twitter had 4,035 followers, and Instagram had 1,086 followers.

Videos

We posted three videos on YouTube, Facebook, and Twitter on (1) core-log-seismic integration, (2) nannofossils, and (3) and the evolution of the subsea camera.

Blogs

We published six blogs at http://joidesresolution.org on (1) the geology and scientific objectives of Site U1526; (2) piecing together the Hikurangi subduction zone puzzle using coring, logging, and seismic data; (3) how thin sections are made; and the three videos described above.

Technical Support and HSE Activities

The following technical support activities took place during Week 8.

Laboratory Activities

- Received and processed cores from Holes U1519E, U1526A, and U1520D.
- Prepared temperature controlled sample, regular sample, and equipment shipments.
- Performed troubleshooting for an issue with the *z*-axis velocity bayonet on the Gantry system.

Application Support Activities

- We started testing the new Cahn Balance program.
- We uploaded MAD container information.

IT Support Activities

- The disk size on the new development server was reduced at the request of the software development group.
- A new web client was enabled on the Cumulus digital asset management (DAM) system.

HSE Activities

- The IODP JRSO technical staff Marine Emergency Training Squad (METS) participated in a fire drill and assisted with testing a fire hose and nozzles.
- Held the weekly fire and boat drill as scheduled.
- Held an emergency drill for IODP and Siem Offshore night shift (1800–0600 h) personnel.
- Tested safety showers and eye wash stations.