IODP Expedition 345: Hess Deep Plutonic Crust

Week 2 Report (16–22 December 2012)

The second week of IODP Hess Deep Expedition (345) consisted of the final port call activities in Puntarenas (Costa Rica), the transit to Hess Deep, and the initial deployment of the drill string to initiate our drilling operations.

Operations

In week two, port call operations continued on 16 December with dock cleanup after the bulk loading operation. One 40 ft container of refrigerated food was loaded along with another 20 ft container of frozen food. The drill crew also began spooling on the new aft core line.

On 17 December, the drill crew completed spooling the new drill line. This process took much longer than anticipated (>24 h) due to a poor spooling of the line by the vendor. The installation would not have been possible without the recent modifications to the spooling tensioner that included replacement of the drum brakes with significantly better disc brakes. The last 20 ft container of dry goods was loaded aboard along with a replacement shipment of local fresh food, as half of the original fresh food delivery was rejected due to poor quality.

The pilot boarded the ship at 1715 h for the scheduled departure; however, after a captain and pilot conference, the pilot elected to delay departure until slack tide at 1800 h (all times in this section are given in ship local time; at the start of the expedition this was UTC – 6 h). In the interim a second tug was also brought over from the nearby container port of Caldera. All lines were singled up in preparation for an imminent departure. A few minutes before departure the Schlumberger hazmat/tools airfreight shipment arrived dockside. The tools were quickly lifted aboard with the crane and the last line was cast off at 1818 h. The pilot disembarked at 1832 h and we got underway at full speed for Site U1415 (HD-01B). This was 0.6 days ahead of the originally scheduled 0800 h departure on 18 December.

The transit to Site U1415 (HD-01B) was uneventful and operations, drilling, and Chief Scientists used the time to have multiple meetings discussing the specifics of the planned Hess Deep operations. The drill crew began testing the readiness of all drilling equipment. The 1117 nmi distance from Puntarenas to Site U1415 was covered in 4.2 days at an average speed of 11.0 nmi/hr. We arrived on location at 2350 h on 21 December and began the process of switching from the bridge "cruise" mode to dynamic positioning (DP) control. By 0040 h, all thrusters were deployed and DP was in full control of the ship. The drill crew spent the remainder of the day picking up drill collars and assembling the drill string. This required removing collars from the forward main deck rack and making them up into stands as well as drifting and strapping (measuring) all tubulars. After deploying 130 stands of 5 inch drill pipe the tripping operation was suspended at 1130 h to raise the upper guide horn (UGH) and deploy the subsea camera system. Deploying the camera system was our last operation of the week. A seafloor positioning beacon was attached to the camera system, so that it could be released from just above the seafloor. A 3.5 kHz sub-bottom pinger, for surveying the thickness of sediments, was also attached to the camera system, but not turned on. Our highest priority was to deploy the seafloor

positioning beacon and we wanted to minimize the chances another sound source (e.g., 3.5 kHz pinger) might cause problems with this.

Science Results

Our work this week focused on preparing the scientists for the full breadth of their shipboard activities. This included scientists meeting to discuss their primary research interests and holding kick-off meetings for each laboratory team (scientists and technical staff). The lab teams worked on preparing their methods, instruments, and workflow, facilitated by using ODP Leg 147 Hess Deep cores, samples, and data. At the end of the week, the lab teams circulated the first draft of their methods for review and underwent the Curator's introduction to core flow and sampling.

Presentations this week included science talks on the local geology of the Hess Deep drill sites, one on the Oman ophiolite, and one on deep magmatic processes beneath fast-spreading ridges. The Chief Scientists gave a presentation of the expedition science objectives and challenges for the ship's crew. The scientists were introduced to IODP drilling and coring technology, Hess Deep operations and challenges, wireline logging, and the education and outreach plans for the expedition. These included scientist tours of the dynamic positioning system, rig floor, wireline logging facilities, core tech shop, and mud pits.

A major focus of this week was planning the initial seafloor beacon deployment and assessment of sediment thickness using near bottom 3.5 kHz survey and the drill string. This included multiple meetings of the Chief Scientists with science, drilling, ship, and technical staff.

Education and Outreach

This week there were eight broadcasts to schools and scout groups in the UK, Japan and France. The broadcasts gave the students a comprehensive tour of the *JOIDES Resolution* and allowed for questions but not so long that they get bored. The educators have taken a variety of approaches to engage the students. For example, a polystyrene model of the Hess Deep rift was made to explain why we are drilling at the site. The educators are also developing activities to engage and challenge students and educators.

Technical Support

Science mission support:

- Technical staff continued Science Party training on instrument and system software;
- The following was completed in preparation of the pre-site video and sub-bottom survey:
    - Mounted the WHOI 3.5 kHz pinger on the VIT frame;
    - EPC thermal printers were repaired and tested;
    - Seismic amplifiers and filters were tested;
    - Additional video monitors were installed for watch standers;

    - The Bathy 2010 Acquisition Program's "passive" mode was tested;
    - New software was written to annotate the EPC thermal printer with WinFrog GPS data, capture beacon offset and to capture the 3.5 kHz pinger analog system for display and analysis.
- Bathymetric and magnetics data were collected on the transit from Costa Rica;
- Issues with the Whole Core Multi-sensor logger were corrected and await testing;
- A high-resolution bathymetric JPEG image was successfully used to display the ship's position against the Hess Deep topography using JRNav and Google Earth. Looks very nice on the upgraded video monitors.

Other technical activities:

- Completed installation of storage cabinets in the Underway Lab and the transfer of supplies from the Core Lab;
- Completed logistics activities;
- Initiated Christmas preparations.

HSE activities:

- The weekly fire and abandon ship drill was held as scheduled;
- Eye wash and safety showers systems were tested.