

**IODP Expedition 385T:
Panama Basin Crustal Architecture and Deep Biosphere: Revisiting Holes 504B and 896A**

Week 1 Report (18–24 August 2019)

Operations

International Ocean Discovery Program (IODP) Expedition 385T began at 0642 h on 18 August 2019 with the first line ashore in Antofagasta, Chile. Customs and immigration arrived aboard shortly after arrival and cleared the offgoing personnel. At 0930 h, the Co-Chief Scientists, Expedition Project Manager, three scientists, three Outreach Officers, twelve JR Academy students and two instructors, three JRSO technical staff, and one Siem Offshore crew member boarded the vessel. At 1130 h the Expedition 379T (JR100) scientists, two JRSO technical staff, and one crew member moved off the vessel. By 1800 h, all freight was loaded. One of the port propulsion motors was removed to change the bearings and was reinstalled. The ship was ready for departure at 2000 h but immigration delayed the departure until the following day. At 1800 h on 19 August immigration arrived aboard and cleared the vessel for sailing. The last line was released at 1924 h and the 1724 nmi sea passage to Hole 896A began. The vessel made good speed and at the end of the week 1564 nmi had been completed at an average speed of 12.6 kt.

Science Results

Expedition 385T, Panama Basin Crustal Architecture and Deep Biosphere: Revisiting Holes 504B and 896A, seeks to advance volcanostratigraphic, hydrogeological, and deep biosphere studies of upper oceanic crust using legacy Holes 504B and 896A on the Costa Rica Rift flank. The first task will be to remove the wireline CORKs deployed from the R/V *Revelle* in 2001, which will enable the measurement of the borehole temperature profile and recovery of water samples. In addition to the newly acquired commercial Kuster water sampler, the new Multi-Temperature Fluid Sampler (MTFS) will be used for the first time in combination with the Extended Temperature Borehole Sonde (ETBS). Finally, we plan to obtain borehole wall images with the Formation MicroScanner (FMS) tool. During the transit to the operational area, the operations plan was refined through daily interaction between scientists and engineers. The water sampling tools were assembled and tested. We prepared a sampling and research plan for the expected borehole water recovery, including shipboard and shore-based scientists.

Outreach

The goals of the three Outreach Officers include conducting the general outreach tasks (social media, blogs, etc.), assisting the JR Academy in science communication projects, and reviewing the onboard Outreach Officer program. These goals were presented to scientists and the JR Academy participants in port. Activities towards these goals in the first week included three blogs (joidesresolution.org), five posts for Twitter (<https://twitter.com/TheJR>), four posts for Instagram (http://instagram.com/joides_resolution), and three posts for Facebook (<https://www.facebook.com/joidesresolution>). The team also divided the 12 students into three groups focusing on different methods of science communication: ship-to-shore broadcasts, video editing, and 2D illustration. The outreach team met with the groups various times through the week to develop ideas. The students will create a final project by the end of the expedition. In order to begin assessment of the Outreach Officer position, the outreach team began reviewing metrics and survey data feedback from previous years, evaluated social media data collection methods, and assessed the available equipment on board.

JR Academy

The JR Academy is a special oceanographic course for undergraduate students offered through Whatcom Community College. The 12 students and two instructors of the JR Academy attended meetings about shipboard life and safety, and went on tours to learn about the ship layout and operations on the first day. Classes began on 19 August and continued through the week, mornings and afternoons. In addition, a blend of required and optional evening activities was held. Class activities included meetings with each shipboard scientist to talk about career pathways; establishing classroom norms and expectations; exercises/discussion about ocean exploration and navigation; becoming familiar with the scientific mission of this particular expedition through talks and a documentary; and attending hosted tours of the ship laboratories, the bridge, and the drill rig. The students began gaining hands-on micropaleontology experience with core residues from Expedition 379T (JR100).

Technical Support and HSE Activities

Port Call Activities

- We assisted with the departure of the Expedition 379T science party and the arrival of the Expedition 385T science party, Outreach Officers, and JR Academy. Except for a few missing critical parts all logistics activities were completed without issue.

Laboratory Activities

- ICP-PREP:
 - Entire contents of the laboratory were removed, identified, and sorted.
 - Cabinets and shelving were removed and a new shelving system was installed.
- Thin Section:
 - The false floor was removed and the accumulated dirt excavated from the floor below.
 - Logitech water trap thoroughly cleaned, revealing that it was actually made of glass.
 - Began creating a suite of sample thin sections for microscope/imaging testing.
 - Rewrote Thin Section Laboratory Confluence page to conform to electronic laboratory notebook standards.
 - Testing/modifying lake sediment thin section impregnation SOP obtained from LacCore (original SOP cannot be done with our laboratory facilities).
- Chemistry:
 - Prepared for water sampling at the upcoming sites.
 - Calibrated the ion chromatograph (IC) for ammonium.
 - Updated Chemistry Laboratory worksheet to simplify manually uploading samples.
 - Programmed a worksheet to return sample information directly from the database to Excel via web services.
 - Installed a T-slot rack in the gas standards cabinet to secure them during rough weather.
 - Conducted preventive maintenance on the SRA and the TOC.
 - Created a worksheet for quickly creating sample tables and processing run data for the IC.
 - Switched out the old NGA with the updated sample introduction NGA.
 - Ran down items and set up workstations for doing Expedition 385T water sampling, and made the anaerobic chamber operational.
 - Installed the NGA2 in the NGA1 place and configured it to communicate with OpenLab; will finalize the Luer lock holder and calibrate the gas chromatograph.
 - Set up Cahn Balance in the Radiation Van for Expedition 385. Made two DB9-DB25 cables, one for the Radiation Van and one for the Department of Energy (DOE) van. Awaiting a second laptop for DOE setup; will test when laptop is finished.
 - LN2 generator back on and working (will use for flash freezing samples).
- Imaging:
 - Section Half Imaging Logger (SHIL) track was dismantled and the actuator was cleaned and lubricated. Camera and lights were reinstalled and calibrated.

- Printed and laminated all old expedition logos, and preparing to mount them in stairwell.
- Working with X-ray images in Matlab. Applying color maps to the data to see if color can increase the contrast.
- Physical Properties:
 - Section Half Multisensor Logger (SHMSL), Whole-Round Multisensor Logger (WRMSL), X-ray Multisensor Logger (XMSL), and NGR actuators were opened, cleaned, lubricated, and put back into service.
 - The second core imager intended for whole-round section imaging on igneous rock expeditions was considered redundant and was dismantled. Parts were returned to storage.
 - SHMSL, Velocity, and SHIL:
 - Fully dismantled tracks, shelving, and electronics.
 - A new shelf was installed, support equipment remounted and electrical cabling reinstalled, cleaning up and simplifying cable runs.
 - SHMSL: After reinstalling the QE-Pro spectrophotometer, we noticed a severe drop in intensity, very similar to what has been reported in the past. The spare QE-Pro was installed, resolving the immediate issue. Over the next week we plan on further testing because we suspect that the QE-Pro has internally reset its calibration factors.
 - SHMSL: Work has begun on deploying the MS3 into the IMS code base.
 - SHMSL: The computer that failed earlier in the expedition was returned to service after reapplying a previous backup image.
 - VELOCITY: The Phidget switching system was removed and a second NI O-scope installed.
 - VELOCITY: Shear wave experiment: temporary hardware and software set up; ongoing measurement and data analysis of acrylic, aluminum, and CAB standards using both standard/compressional and shear wave transducers.
- Core Receiving Platform (aka Catwalk):
 - Wind wall removed and will be disposed of in San Diego. Windows and window frames were packed for storage at TAMU.
- Core Splitting:
 - After lifting the splitter up for cleaning and maintenance the servo motor failed. Approximately one year ago the wiring in the back of the servo motor was damaged and repaired. The same wires were damaged again but now the encoder circuits were damaged when power was applied. We were initially unable to locate the spare reduction gear box; an attempt was made to separate the dead motor from the gear box, which failed. The spare was finally located and the system is up and running. A spare servo motor and gear box has been ordered.
- Core Description:
 - GEODESC meetings held and Balsamic mockups created and evaluated.

- Downhole Measurements:
 - Techlog project created with legacy logging data for Holes 504B and 896A. Scientists trained on FMS data loading and image concatenation.
 - Worked with scientist and engineers to prepare tools for upcoming water sampling activities.
 - Fabricated Kuster tool holder for extracting samples.
- Miscellaneous:
 - Reorganizing library books (75% done with inventorying science libraries).
 - New Gas monitoring system: Two new pressure transducer cables made and software developed. Installation to start next week.
 - Training Core Organization (new organized naming scheme), relabeling, LSIMG, WR Testing, NGR testing. Plus Cleaned up database of old training core data.
 - Completed testing on training cores as requested.

Application Support Activities

- GEODESC
 - Resumed meetings after project manager boarded the vessel.
 - Continued discussion of TemplateManager, revised specifications for Edit Template screen, Edit/Create General Observable screen, and Edit Create Taxa Observable screens.
 - Established meeting to begin developing test plan for Template Manager.
 - Discussed database design of projects.
 - Continued work in Excel and VBA to determine whether we can meet the requirements for the Data Capture application.
- IMS
 - Continued redesign of sample-id libraries.
 - Refactored Section-ID data structure to include text-id; needed to halt practice of parsing sample-number and sample-type from text-id; text-id is stored in new data structure; sample-number and sample-type are obtained from database lookup.
 - Built and tested several Vis to obtain data from web services.
 - Built and tested several utility Vis to parse data retrieved from web services.
- Worked with Assistant Laboratory Officer, Marine Computer Specialist, and physical properties technician to reupload GRA, MS, PWAVE-L, and NGR data to test hole 999-J1008D.
- Exported Ops database for shore developers in preparation for moving Drill Report to Java 11.
- Worked with curator and staff scientist to conduct experiment to make sure parenting water samples will work as anticipated; created a hole sample in expedition 999, then parented several water samples directly from the hole, verifying that the samples show up in LORE.

- LORE: created new Borehole Water report and modified IW report in preparation for reporting water samples.
- Worked with Assistant Laboratory Officer and Marine Computer Specialist to build laptops to run the CahnBalance application; to be placed in Radiation and DOE vans.

HSE Activities

- Conducted the Siem Offshore safety orientation for the science party and new staff.
- Conducted the IODP Life at Sea presentation and Safety Tour for the science party and new staff.
- Held the weekly fire and boat drill as scheduled.