**IODP Expedition 355: Arabian Sea Monsoon**

**Week 1 Report (31 March–5 April 2015)**

## Operations

Expedition 355, Arabian Sea Monsoon, officially began with the first line ashore at JCT Feeder Berth in Colombo, Sri Lanka, at 0842 h on 31 March 2015. This also officially ended Expedition 354, Bengal Fan. Ultimately the ship was asked to move to another pier (Bandaranaike West Quay [BQ-1]) and the vessel remained at this location for the remainder of the port call.

The first week of IODP Expedition 355 consisted entirely of port call activities in Colombo, Sri Lanka. Logistical challenges were experienced throughout the port call, especially the first day. Oncoming IODP staff were supposed to board the vessel for crossover with the offgoing Expedition 354 staff the morning of 31 March. The first batch of IODP staff were eventually allowed to board the ship at 1500 h and the last complement of staff finally boarded the ship at 2100 h. Clearance of the Expedition 354 scientists and IODP technical staff was so delayed that they were disembarked from the ship according to their flight departure time. The final group of offgoing personnel departed the vessel at 2300 h, finally arriving at the hotel at 0230 h on 1 April. Although the crossover of the Siem Offshore crew and arrival of the Expedition 355 science party was less eventful on the second day of port call (1 April), they weren't without challenges and confusion.

Logistical operations during the port call included bunkering 850 metric tons of Marine Gas Oil, 400 metric tons of drill/potable water, 80 metric tons of barite drilling mud from 1-ton bags, 100 metric tons of attapulgite sea gel drilling mud from 1-ton bags, 88 joints of 10¾″ casing, two drilling motors, one underreamer, one standard reentry cone, two boxes of core liner, other miscellaneous operational hardware, three 40 ft containers of science supplies, and three 20 ft containers of frozen, refrigerated, and food/dry goods. The inbound hazardous material air shipment experienced several delays resulting in a new estimated arrival of 5 April, the estimated day of departure. Local acquisition of critical items prevented waiting for the shipment.

Siem was able to repair the X-band radar, and also installed shims on the traveling block sheaves to remove excessive play, both of which could have been pacing items for departure.

Despite the logistical challenges experienced in all aspects of the port call, the ship departed only 13 h behind schedule because of the hard work and dedication of the Siem/ODL and IODP logistics personnel and crew. At 2136 h on 5 April the last line was cast off, and the transit to the first site began.

**Transit to Site U1456 (IND-03C)**

As of 2400 h on 5 April, the vessel had travelled 18 nmi (including 2 mi under pilot) at an average speed of 8.0 kt. The projected time of arrival to Site U1456 (proposed Site IND-03C) is 1200 h on 9 April 2015.

**Science Results**

IODP Expedition 355 (Arabian Sea Monsoon), based on IODP Proposal 793-CPP2, aims to understand the interaction between the Himalayas and the Tibetan Plateau uplift and the development and evolution of the Indian summer monsoon. The southwest monsoon is one of the most intense climatic phenomena on Earth and its long-term development has been linked to the growth of the high topography in South and Central Asia. Weathering of the Himalaya has also been linked to long-term drawdown of atmospheric $CO_2$ during the Cenozoic, culminating with the onset of Northern Hemisphere Glaciation. This expedition proposes to recover long records of erosion and weathering from the Indus Fan that will allow us to establish links between these processes and the paleoceanographic history of the region. The proposed drilling will be conducted within a regional seismic stratigraphic framework, allowing robust estimation of sediment budget, together with quantitative estimates for weathering fluxes. These goals will be achieved by coring at three primary sites on the Indus Fan, with total penetration depths ranging from ~0.7 to 1.6 km in water depths between 3.5 and 3.7 km. The primary objectives of the expedition are to:

1. Test whether Greater Himalayan exhumation correlates with the proposed monsoon intensification after 23 Ma;
2. Determine if the monsoon strengthened or weakened at 8 Ma;
3. Date the age of the base of the fan to constrain the timing of uplift of the Himalaya and Tibet Plateau; and
4. Decipher the nature of basement rocks in the Laxmi Basin (Eastern Arabian Sea) to constrain early seafloor spreading and its relation to the emplacement of the Deccan Flood Basalts. This objective would have significant implications for precise paleogeographic reconstructions in the northwest Indian Ocean.

The science party for Expedition 355 includes scientists of 10 nationalities from 11 IODP member countries.

The first six days of the expedition were spent familiarizing the scientists with the ship, laboratories, core flow, curation, sampling, and publication procedures used on the *JOIDES Resolution*. The core description team and paleontologists worked with the technical staff to learn how to enter descriptive data into DESClogik. They also worked with the Imaging

Specialist to setup microscopes for analysis of microfossils and smear slides. The core describers practiced operating the Section Half Imaging Logger (SHIL) and Section Half Multisensor Logger (SHMSL). They also began to converge on core description templates for sedimentary cores. The physical property scientists and paleomagnetists worked with the technical staff to review physical property measurements conducted on whole-round and section half cores, as well as discrete samples. The physical property specialists practiced operating the Whole-Round Multisensor Logger (WRMSL), Natural Gamma Radiation Logger (NGRL), and the Section Half Measurement Gantry (SHMG) systems. The geochemists worked with the chemistry laboratory technicians to learn how to operate the equipment and use the software. The microbiologist familiarized himself with the microbiology laboratory instruments and facilities and also developed a contamination testing plan using perfluorocarbon tracers (PFTs), microspheres, and drilling fluid communities.

The science party met to discuss proposed research plans and sample/data requests for post-expedition research. The Co-Chief Scientists, Staff Scientist, and Curator then began to meet with groups of scientists interested in similar measurements, including neodymium isotopes, organic geochemistry, clay mineralogy, and interstitial water measurement, to organize collaborations and work out conflicts. In addition, the science party began to converge on a shipboard sampling plan. The Staff Scientist presented a detailed overview of shipboard reports, and provided information about expedition report guidelines and available report writing resources. Each laboratory group began preparing a first draft of the Methods sections.

## Technical Support and HSE Activities

The following technical support activities took place during week 1.

### Port Call

- Crossover with departing technical staff was partially completed on 31 March due to immigration/customs difficulty in port.
- Daily staff meetings were held during port call.
- World Courier shipment (cold) from Expedition 354 went off on April 2.
- Expedition 354 cores were offloaded into two containers on 2 April.
- Received Expedition 355 air freight on 31 March.
- Received Expedition 354 and Expedition 355 surface shipment on 4 and 5 April 2015.
- Expedition 355 hazardous material air freight did not arrive for this port call.

### Laboratory

- All scientists started working in assigned laboratories. Technical staff gave introductions to each laboratory group and started training scientists on individual instruments.

- The Chemistry Laboratory received the Rotovap and Buchi vacuum pump requested for Expedition 355.
- Developers completed beginning-of-expedition activities, including cleanup of Expedition 354 database, creation of system accounts for all participants, application of Site 321-U1338 data for stratigraphic correlation practice, and implementation of outstanding specific bug fixes and feature additions to a variety of applications and systems.

**HSE Activities**

- Conducted life at sea and laboratory safety talk and tour for scientists.
- Tested safety shower and eye wash stations.