

International Ocean Discovery Program  
*JOIDES Resolution* Science Operator  
FY15 Q3 Operations and Management Report

1 April–30 June 2015

Cooperative Agreement OCE-1326927

Submitted by the JRSO  
to  
The National Science Foundation  
and  
The *JOIDES Resolution* Facility Board

5 August 2015



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## Introduction

The organization of this quarterly operations and management report reflects activities and deliverables outlined in the International Ocean Discovery Program (IODP) *JOIDES Resolution* Science Operator (JRSO) FY15 Annual Program Plan to the National Science Foundation (NSF), as implemented by Texas A&M University (TAMU), acting as manager and science operator of the research vessel *JOIDES Resolution* as a research facility for IODP. Administrative services in support of JRSO activities are provided by the Texas A&M Research Foundation (TAMRF) through the TAMU System (TAMUS) Office of Sponsored Research Services (OSRS).

## Management and administration

Management and administration functions of the JRSO include planning, coordinating (with other IODP-related entities), overseeing, reviewing, and reporting on IODP activities.

### Subcontract activities

#### Overseas Drilling Limited

The JRSO continued to interact with Overseas Drilling Limited (ODL) to ensure efficient and compliant operations of the *JOIDES Resolution*.

#### Schlumberger Technology Corporation, Inc.

The JRSO continued to interact with Schlumberger Technology Corporation to ensure that wireline logging operations aboard the *JOIDES Resolution* continue in an efficient and compliant manner. The JRSO and Schlumberger have worked successfully to streamline travel and shipping activities.

#### Kochi Institute for Core Sample Research

The JRSO continued to interact with the Kochi Institute for Core Sample Research (KOCHI), Japan Agency for Marine–Earth Science (JAMSTEC), to provide for curatorial services for the NSF-owned core stored at the Kochi Core Center (KCC).

### Progress reporting

#### JRSO FY15 Q2 Quarterly Operations and Management Report

The JRSO operations and management report for the second quarter of FY15 (January–March 2015) was submitted to NSF on 5 May ([iodp.tamu.edu/publications/AR/FY15](http://iodp.tamu.edu/publications/AR/FY15)).

#### FY16 Annual Program Plan

The JRSO Annual Program Plan for FY16 was submitted to the *JOIDES Resolution* Facility Board (JRFB) for review on 30 June.

### Liaison activities

The JRSO reports to and liaises with funding agencies and IODP-related agencies (e.g., JRFB, JRFB advisory panels, Program Member Offices [PMOs], and other national organizations and facility boards)

and participates in facility board, advisory panel, and IODP Forum meetings. Minutes from the facility board meetings are available online ([iodp.org/facility-boards](http://iodp.org/facility-boards)).

### Planning meetings

JRSO representatives attended the Science Evaluation Panel (SEP) in June and the JRFB meeting on 12 and 13 May.

### Project portfolio management

The JRSO completed two projects, initiated two new projects, and continued working on three existing projects this quarter. Completed projects include phase III of the Laboratory Information Management System (LIMS) On-line Report Environment (LORE) project and the Stratigraphic Correlation Enhancements project. New projects include 360 Degrees to LIMS and Extending the Integrated Measurement System (IMS) to the Whole-Round Multisensor Logger (WRMSL) and Special Task Multisensor Logger (STMSL). Current projects under way include Superconducting Rock Magnetometer Installation and Software Update; Improve Web Services; and Scanning Electronic Microscope Uploader and Downloader.

### Web services

In addition to internal JRSO web page updates and additions, new content is regularly added to IODP expedition web pages at [iodp.tamu.edu/scienceops/expeditions.html](http://iodp.tamu.edu/scienceops/expeditions.html).

### Program website statistics

JRSO website	FY15 Q3 page views*	FY15 Q3 site visits*
<a href="http://www.iodp-usio.org">www.iodp-usio.org</a>	2,666	2,209
<a href="http://iodp.tamu.edu">iodp.tamu.edu</a>	396,974	35,714
<b>Total</b>	<b>399,640</b>	<b>37,923</b>

\*Where possible, visits by JRSO employees and search engine spiders were filtered out.

### Legacy web services

The Ocean Drilling Program (ODP) science operator, ODP legacy, and Deep Sea Drilling Project (DSDP) publications websites are hosted at TAMU. Key data, documents, and publications produced during the DSDP and ODP are preserved in the legacy websites, which highlight the scientific and technical accomplishments of these ground-breaking precursors to the Integrated Ocean Drilling Program and IODP. The legacy websites contain downloadable documents that cover a wide spectrum of Program information, from laboratory and instrument manuals to Program scientific publications, journals, and educational materials.

#### *Legacy website statistics*

Legacy website	FY15 Q3 page views*	FY15 Q3 site visits*
<a href="http://www-odp.tamu.edu">www-odp.tamu.edu</a>	614,080	35,004
<a href="http://www.odplegacy.org">www.odplegacy.org</a>	5,256	1,942
<a href="http://www.deepseadrilling.org">www.deepseadrilling.org</a>	358,308	12,766
<b>Total</b>	<b>977,644</b>	<b>49,712</b>

\*Where possible, visits by JRSO employees and search engine spiders were filtered out.

## Science operations

The JRSO is responsible for planning, managing, coordinating, and performing activities and providing services, materials, platforms, and ship- and shore-based laboratories for JRSO expeditions; long-range operational planning for out-year JRSO expeditions; and technical advice and assistance for European Consortium for Ocean Research Drilling (ECORD) Science Operator (ESO) and Center for Deep Earth Exploration (CDEX) expeditions.

## JRSO expedition schedule

Expedition <sup>1</sup>		Port (Origin)	Dates <sup>2, 3</sup>	Total Days (Port/ Sea)	Days at Sea (Transit <sup>4</sup> / Ops)	Co-Chief Scientists	Expedition Project Manager
Arabian Sea Monsoon (CPP) <sup>5</sup>	355	Colombo, Sri Lanka	31 March–31 May 2015	61 (5/56)	56 (5/51)	D. Pandey P. Clift	D. Kulhanek
Tie Up/Non-IODP [31 May–31 July 2015]							M. Malone
Indonesian Throughflow	356	Fremantle, Australia	31 July–30 September 2015	61 (5/56)	56 (4/52)	S. Gallagher C. Fulthorpe	K. Bogus
Maldives Monsoon and Sea Level	359	Darwin, Australia	30 September–30 November 2015	61 (5/56)	56 (17/39)	C. Betzler G. Eberli	C. Alvarez Zarikian
Southwest Indian Ridge Lower Crust and Moho	360	Colombo, Sri Lanka	30 November 2015–30 January 2016	61 (5/56)	56 (14/42)	H. Dick C. MacLeod	P. Blum
South African Climates <sup>6</sup>	361	Port Louis, Mauritius	30 January–31 March 2016	61 (5/56)	56 (6/50)	I. Hall S. Hemming	L. LeVay
Non-IODP [31 March–31 July 2016]							M. Malone
Sumatra Seismogenic Zone	362	Colombo, Sri Lanka	31 July–30 September 2016	61 (5/56)	56 (7/49)	L. McNeill B. Dugan	K. Petronotis
Western Pacific Warm Pool	363	Singapore	30 September–30 November 2016	61 (5/56)	56 (8/48)	Y. Rosenthal A. Holbourn	D. Kulhanek

Notes: TBD = to be determined.

<sup>1</sup> Further expedition information can be obtained at [iodp.tamu.edu/scienceops/expeditions.html](http://iodp.tamu.edu/scienceops/expeditions.html).

<sup>2</sup> Dates for expeditions may be adjusted pending non-IODP activities.

<sup>3</sup> The start date reflects the initial port call day. The vessel will sail when ready.

<sup>4</sup> Transit total is the estimated transit to and from port call and does not include transit between sites.

<sup>5</sup> Complementary Project Proposal (CPP) is contingent on substantial financial contribution outside of normal IODP funding.

<sup>6</sup> Also includes Proposal 845-APL, Agulhas Current LGM Density.

## JRSO expeditions

### Expedition 353: Indian Monsoon

#### *Postexpedition activities*

The Expedition 353 postexpedition editing meeting was held 8–12 June in College Station, TX.

## Expedition 354: Bengal Fan

### *Postexpedition activities*

Two postexpedition meetings were scheduled for Expedition 354; the editing meeting will take place 7–10 July in College Station, TX, and the sampling party will take place 30 August–5 September at the KCC.

## Expedition 355: Arabian Sea Monsoon CPP

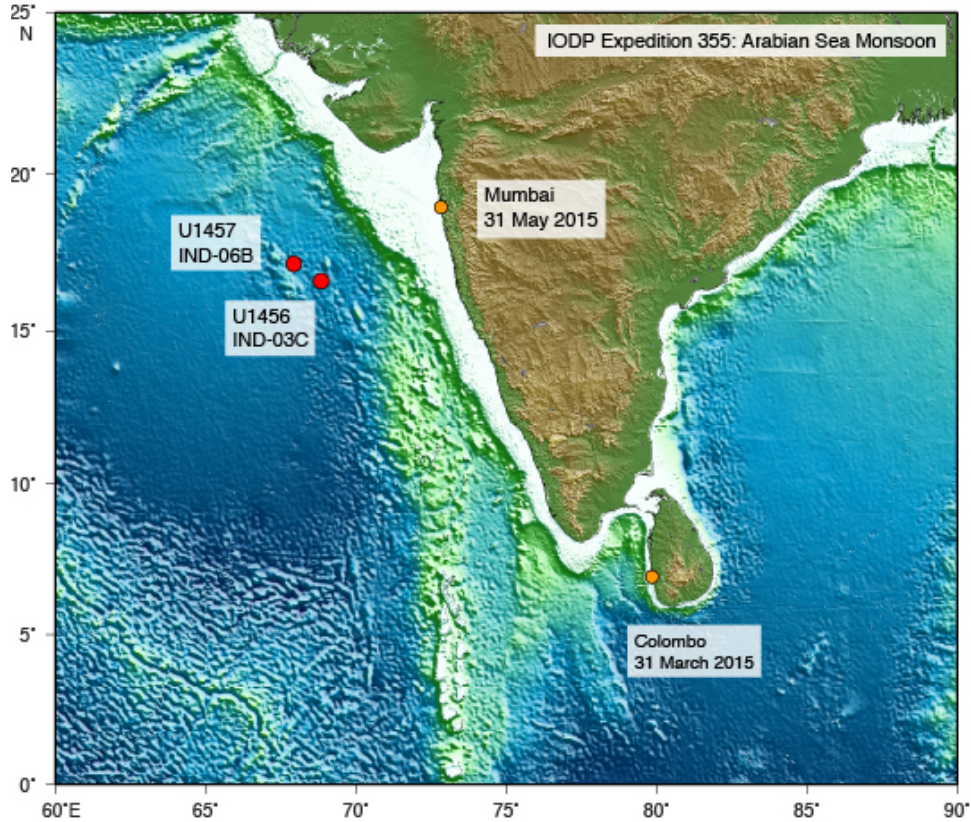
### *Planning*

JRSO staff focused on planning Expedition 355 outreach activities this quarter and attempted to obtain a berth for the previously limited 2 days in the Port of Mumbai. Despite support letters from the Indian Ministry of Shipping and the Indian Ministry of Earth Sciences, the port authority refused to allow the *JOIDES Resolution* to come to a berth. As a result, local outreach activities were cancelled.

### Staffing

Expedition 355 Science Party staffing breakdown		
Member country/consortium	Participants	Co-Chief Scientists
USA: United States Science Support Program (USSSP)	5	1
Japan: Japan Drilling Earth Science Consortium (J-DESC)	2	
Europe and Canada: European Consortium for Ocean Research Drilling (ECORD) Science Support and Advisory Committee (ESSAC)	5	
Republic of Korea: Korea Integrated Ocean Drilling Program (K-IODP)	1	
People's Republic of China: IODP-China	2	
Australia and New Zealand: Australia/New Zealand IODP Consortium (ANZIC)	1	
India: Ministry of Earth Science (MoES)	10	1
Brazil: Coordination for Improvement of Higher Education	1	

Site Map



Coring summary

Site	Hole	Latitude	Longitude	Water depth (mbrf)	Cores (n)	Interval cored (m)	Core recovered (m)	Recovery (%)
U1456	U1456A	16°37.2855'N	68°50.3272'E	3,639.2	74	426.60	365.25	85.6
	U1456B	16°37.2851'N	68°50.3454'E	3,645.0	4	29.10	28.79	98.9
	U1456C	16°37.2940'N	68°50.3366'E	3,638.4	42	275.30	215.00	78.1
	U1456D	16°37.2766'N	68°50.3365'E	3,637.1	60	565.60	319.18	56.4
	U1456E	16°37.2857'N	68°50.3541'E	3,636.9	17	139.40	82.45	59.1
<b>Site U1456 totals</b>					<b>197</b>	<b>1,436.00</b>	<b>1,010.67</b>	<b>70.4</b>
U1457	U1457A	17°9.9487'N	67°55.8037'E	3,523.1	16	130.40	122.76	94.1
	U1457B	17°9.9485'N	67°55.7955'E	3,523.5	23	159.40	151.19	94.8
	U1457C	17°9.9486'N	67°55.8121'E	3,522.7	97	917.00	436.96	47.7
<b>Site U1457 totals</b>					<b>136</b>	<b>1,206.80</b>	<b>710.91</b>	<b>58.9</b>
<b>Expedition 355 totals</b>					<b>333</b>	<b>2,642.80</b>	<b>1,721.58</b>	<b>65.1</b>

Science summary

The southwest monsoon is one of the most intense climatic phenomena on Earth. Its long-term development has been linked to the growth of high topography in South and Central Asia. The Indian continental margin, adjoining the Arabian Sea, offers a unique opportunity to investigate tectonic-climatic interactions and the net impact of these processes on weathering and erosion of the Himalaya. During Expedition 355, two sites (U1456 and U1457) were drilled in Laxmi Basin in the eastern Arabian Sea to document co-evolution of mountain building, weathering, erosion, and climate over a range of

timescales. In addition, drilling through the sediments into the basement in the eastern Arabian Sea provides constraints on the early rifting history of the western continental margin of India with special emphasis on continental break-up between India and Seychelles and its relationship to the plume-related volcanism of the Deccan Plateau.

Drilling and coring operations recovered sediments from Sites U1456 and U1457 in the Laxmi Basin, penetrating 1,109.4 m below seafloor (mbsf) and 1,108.6 mbsf, respectively. Drilling at Site U1456 reached sediment dated at 13.5–17.7 Ma (late to early middle Miocene), although with a large hiatus between these underlying sediments and deposits dated as <10.9 Ma. There is a much longer hiatus at Site U1457 near the base of the cored section spanning from 10.9 to ~62 Ma. At both sites, there are hiatuses spanning ~8.2–9.2 Ma and ~3.6–5.6 Ma and a condensed section at ~2.0–2.6 Ma, although the total duration for each hiatus is slightly different between sites.

A major submarine fan draining the Western Himalaya and Karakoram must have been supplying sediment to the Arabian Sea since at least around 17 Ma. Sand mineral assemblages indicate that the Greater Himalaya were fully exposed to the surface by this time. Most of the recovered sediment appears to be derived from the Indus River and includes minerals, glaucophane and hypersthene in particular, that are unique to the Indus Suture Zone, most likely originating from the structural base of the Kohistan arc. Pliocene sandy intervals at Site U1456 were deposited in lower fan “sheet lobe” settings, with intervals of basin plain turbidites separated by hemipelagic muddy sections deposited during the Miocene. Site U1457 is more distal in facies, reflecting its more marginal setting. No major active lobe appears to have affected the Laxmi Basin since the Middle Pleistocene (~1.2 Ma).

We recovered sections spanning the 8 Ma climatic transition when monsoon intensity is believed to have changed strongly, although the nature of this change awaits postexpedition analysis. We also recovered sediment from a large mass transport deposit measuring ~330 m and ~190 m thick at Sites U1456 and U1457, respectively. This section includes an upper sequence of slump-folded muddy and silty rocks, as well as underlying calcarenites and limestone breccias, together with smaller amounts of volcanic clasts that are likely derived from the western Indian continental shelf. These deposits may form one of the world’s largest mass transport deposits.

Coring of igneous basement was successful at Site U1457 in the Laxmi Basin. Recovery of massive basalts and associated volcanoclastic sediment at this site should address the key questions related to rifting and volcanism associated with formation of Laxmi Basin. Geochemical analysis is required to understand the petrogenesis and thus the tectonic setting of volcanism that will reveal whether it is oceanic basalt or if it is contaminated by underlying continental crust. However, the fact that the lavas are massive and have few vesicles implies water depths of eruption likely >2000 m. This may preclude opening of the basin in presence of a major mantle thermal anomaly, such as that associated with the Deccan Large Igneous Province.



## Expedition 356: Indonesian Throughflow

### *Planning*

Surface and air shipments were sent to Fremantle, Australia, during this quarter and plans were made for one final air shipment to be sent at the beginning of the next quarter. Planning continued for port call activities, including Australian outreach efforts.

### *Clearance, permitting, and environmental assessment activities*

Authorization to operate in Australian waters was issued on 19 May. On 20 April, NSF approved the request to conduct acoustic activities with check shot surveys as part of the logging program.

## Expedition 359: Maldives Monsoon and Sea Level

### *Planning*

All sample requests and research plans were submitted and development of related science, technical, and curatorial support requirements began during the quarter. Final logistical requirements were under way and the surface shipment deadline was set for July.

### *Staffing*

Science staffing was completed during this quarter.

### *Clearance, permitting, and environmental assessment activities*

Two new alternate sites and depth extension for a previously approved location were proposed for review at the next Environmental Protection and Safety Panel (EPSP) meeting (1–2 September).

## Expedition 360: Southwest Indian Ridge Lower Crust and Moho

### *Planning*

The Expedition 360 *Scientific Prospectus* was published in February. Efforts to ready operational equipment for primary and contingency plans continued, with research plans due at the beginning of the next quarter. The majority (20) of the Science Party attended the Indian Ocean Crust and Mantle Drilling workshop held 13–16 May at Woods Hole Oceanographic Institution.

## Expedition 361: South African Climates

### *Planning*

The Expedition 361 *Scientific Prospectus* is complete but publication is being held until EPSP review (see below). Initial communication with the Science Party began, and the Co-Chief Scientists developed contingency plans should we not receive clearance for the site in Indonesian waters.

### *Staffing*

Science staffing was completed this quarter.

### *Clearance, permitting, and environmental assessment activities*

The EPSP and the TAMU Safety Panel conducted an e-review of the Expedition 361 sites to finalize site locations for preparation of the clearance application to operate in South African and Mozambique waters, which will be submitted at the beginning of next quarter.

## Expedition 362: Sumatra Seismogenic Zone

### *Planning*

The Expedition 362 pre-expedition meeting was held 4 and 5 May in College Station, TX. Several new alternate sites were identified and will be reviewed at the next EPSP meeting. Plans were made to deploy the Motion Decoupled Hydraulic Delivery System (MDHDS) and upgraded electronic release system (ERS) during Expedition 359 to ensure that both are in working order to deploy the Sediment Temperature Pressure (SETP) tool and temperature-dual-pressure probe (T2P) during Expedition 362.

### *Staffing*

Invitations were issued to 22 scientists; 11 acceptances were received by the end of the quarter.

### *Clearance, permitting, and environmental assessment activities*

The Expedition 362 Co-Chief Scientists and JRSO Assistant Director attended a workshop in Jakarta on 27–28 May focused on issues associated with working in Indonesian waters. Several serious hurdles were identified that could prevent obtaining clearance.

## Expedition 363: Western Pacific Warm Pool

### *Planning*

The Expedition 363 pre-expedition meeting was scheduled for 3 and 4 September.

### *Staffing*

The call for applications was issued on 5 June. The application deadline to the PMOs was set for 15 August, and nominations will be provided to the JRSO on 15 October.

### *Clearance, permitting, and environmental assessment activities*

The US State Department determined that one Expedition 363 site is located in the Indonesian Exclusive Economic Zone (EEZ) but in waters where Australia has seabed rights by treaty and recommended that authorization be obtained from both countries. The Co-Chief Scientists were informed that the JRSO cannot pursue clearance for this site.

## Engineering support

### Engineering equipment acquisitions and updates

#### *Vibration-isolated television system*

The new replacement vibration-isolated television (VIT) cable was tested to specifications before and after being spooled onto the winch drum and readied for shipment. The cable was shipped to Australia and will be installed during the Fremantle tie-up period.

## Technical and analytical services

### Maintenance period activities

During the transit from Sri Lanka to Freemantle, laboratory activities included extensive core-splitting system maintenance (deep cleaning), inventory control, and computer systems upgrades. JRSO technical staff worked on preventative maintenance activities, cross training, and two projects, upgrading control software for core loggers and a custom uploader for Scanning Electron Microscope (SEM) images.

### Analytical systems

#### Analytical systems acquisitions and updates

The new DTECH alternating field (AF) demagnetizer was shipped to the *JOIDES Resolution* and will be installed in the paleomagnetism laboratory during the Expedition 356P maintenance period.

The correction factor provided for the frequency-adjusted MS2C 90 mm magnetic susceptibility (MS) loops by Bartington proved to be overcorrecting the MS reading by about 9%. The true correction factor was determined and will be applied going forward.

Planning began for two systems: a second shipboard imaging logger to perform the 360° imaging of the outside of hard-rock core sections and a He-free superconducting rock magnetometer (SRM), which was ordered from 2G Enterprises.

Perfluoromethyldecalin (PFMD, C<sub>11</sub>F<sub>20</sub>) was not pumped downhole during Expedition 355, as basalt cores were not obtained until the end of the expedition. However, shipboard experiments have shown good results for the PFMD in terms of instrumental analysis (gas chromatography with an electron capture detector [GC-ECD]). The microbiologist for the upcoming Expedition 360 (SW Indian Ridge) agreed to try PFMD, so hopefully the downhole experiment can be performed.

### Laboratory working groups

The laboratory working groups (LWGs) provide oversight, research direction, and quality assurance for the methods, procedures, and analytical systems both on the *JOIDES Resolution* and on shore. The groups meet regularly to review cruise evaluations, expedition technical reports, and issues management communications to provide advice on corrective actions and potential developments for laboratories.

#### *Geology*

The Geology LWG met this quarter to discuss the following issues arising from Expedition 354 and 355 cruise evaluations and other ongoing issues:

- Upcoming work is planned to address major DESClogik bugs and simplify templates and value lists.
- Issues with the Correlator program were discovered during Expedition 353 (Correlator does not handle splice tie points properly). Until the program is updated, the JRSO has deployed a program to ensure the formatting of the data is valid and the workflow is restored.

- Some changes will be made to the arrangement of the microscope laboratory and the archive half section storage (e.g., a shield for the close-up flash so it won't bother people working at the nearby microscopes) to address some of the issues mentioned in cruise evaluation comments.
- Possible issues with the scale bar in the microscope image uploads will be investigated; however, it is possible that this issue resulted from user error as it has not been reported before.
- The BugWin program will be evaluated for paleontology data capture; a meeting was scheduled with the developer in July to determine the feasibility of deploying BugWin for use on IODP expeditions.

### *Geophysics*

The Geophysics LWG met this quarter to discuss the following issues arising from Expedition 354 and 355 cruise evaluations:

- Position errors on the SRM were addressed and the workflow changed to home the fiberglass boat prior to each demag or read pass. The issue was not repeated during Expedition 355, so that particular problem appears to be solved.
- One of the new Icefield MI-5 survey tools developed a fault during Expedition 355 (one faulty accelerometer was causing erroneous declination values) and was sent back to the manufacturer for warranty repair. It will be returned to the vessel for Expedition 356. The two remaining Minex FlexIt tools remain on board to ensure core orientation capabilities will be maintained.
- Dark core section performance on the color reflectance logger was improved by the use of the variable integration time method. However, the data quality of the Ocean Optics USB 3000 spectrophotometer for the first derivative of the reflectance as a function of wavelength ( $dR/d\lambda$ ), useful for estimating hematite and goethite concentration, remains poor regardless of the relative overall intensity. Alternate spectrophotometers and light sources will be evaluated next quarter to try to address this issue without having to go "back" to Minolta C-series spectrophotometers, which are slower due to flash charge time.
- Ongoing problems with the DTECH AF demagnetizer were reported during Expeditions 354 and 355; this will be solved when the new unit is installed.
- An issue with thermal conductivity was addressed when it was discovered that old code (which calculated a thermal conductivity value when the TeKa software failed to make a pick) had not in fact been deprecated. The software now uploads the raw data files no matter if a pick is made or not, and does not produce its own number if the TeKa software does not. Science users can download the raw data and make manual picks if they wish.

### *Geochemistry*

The Geochemistry LWG met this quarter to discuss the following issues arising from Expedition 354 and 355 cruise evaluations:

- Scientists complained that the Weatherford Laboratories Source Rock Analyzer (SRA) was not working. After working with the vendor, the SRA was returned to service during Expedition 355.

- An autosampler for the Agilent CARY 100 spectrophotometer will be purchased in order to cut down on the scientist time needed to perform the colorimetric measurements. This will be targeted for delivery during the Expedition 359 port call.
- A request for a stable isotope, benchtop X-ray fluorescence (XRF), and computed tomography (CT) scanner was received, but are not within scope of the shipboard measurements and the LWG did not recommend these be pursued.

#### *Curation and Core Handling*

The Curation and Core Handling LWG did not meet this quarter, as no curation-related issues were raised during the recent expeditions.

#### Other projects and activities

##### *Geosciences Laboratory*

The TAMU Geoscience XRF Core Scanner facility hosted five groups of scientists during this period for XRFCT scanning projects. Total utilization of the facility was ~50% of available days.

#### Core curation

The JRSO provides services in support of Integrated Ocean Drilling Program and IODP core sampling and curation of the core collection archived at the Gulf Coast Repository (GCR).

#### JRSO expedition core sampling

The JRSO planned sample and curation strategies this quarter for upcoming JRSO Expeditions 356, 360, and 361. A JRSO Curatorial Specialist supervised shipboard core sampling during Expedition 355 and reviewed all shipboard and moratorium-related requests in coordination with the other members of the expedition Sample Allocation Committee (SAC).

#### Gulf Coast Repository activity

##### *Sample requests*

The following “Sample requests” table provides a summary of the 6,599 samples that were taken at the GCR during the quarter. Sample requests that show zero samples taken may represent cores that were viewed by visitors during the quarter, used for educational purposes, or requested for XRF analysis. Public relations tours and educational visits to the repository are shown in the “GCR tours/visitors” table.

<b>Sample request number, name, country</b>	<b>Number of samples taken</b>	<b>Number of cores XRF scanned</b>	<b>Number of cores imaged</b>	<b>Number of visitors</b>
28848, Mitchison, United Kingdom	524			
29894, Harwood, USA	727			2
29965, Ohneiser, New Zealand	50			
27424, Marret-Davies, United Kingdom	50			
29871, McGee, USA	228			
31142, McKinley, USA	53			1

Sample request number, name, country	Number of samples taken	Number of cores XRF scanned	Number of cores Imaged	Number of visitors
29960, Winkelstern, USA	1			
29960, O'Connel, USA	814	155	155	6
30405, McManus, USA	210			
29672, St. John, USA	37			24
25954, Berggren, USA	6			
26286, Robinson, USA	10			
26622, Valletta, USA	22			
25578, Johnson, USA	6			
25516, Chenot, France	168			
22634, Jean, Germany	18			
25874, Trowbridge, USA	141			
26053, Koekpe, Germany	24			
26284, Kwiatkowski, USA	619			
26525, Hyeong, South Korea	49			
26307, Hiroyuki, South Korea	60			
21788, McKay, New Zealand	453			
26993, Kato, Japan	863			
27208, Damste, Netherlands	20			
27438, Salters, USA	24			1
22275, Singh, India	40			
28854, Phelps, USA	26			
27875, Herbert, USA	307			
28479, Duggan, USA	41			
28725, Stoll, Spain	21			
28725, Olivetti, Italy	5			
28437, Masterson, USA	20			
29651, Fildani, USA	26			
27419, Huck, United Kingdom	164			
28568, Syadali, Canada	8			
27991, Ohta, Japan	718			
28274, Firth, USA	0			1
31029, Roset, Spain	25			
22875, D'haenens, USA	21			
Tours/demonstrations	6			95
<b>Totals</b>	<b>6,599</b>	<b>155</b>	<b>155</b>	<b>130</b>

### GCR tours/visitors

Type of tour or visitor	Number of Visitors
Scientist visitors	35
Educational tours/demonstrations (6)	95
<b>Totals</b>	<b>80</b>

### Use of core collection

The JRSO promotes outreach use of the GCR core collection by conducting tours of the repository (see “GCR tours/visitors” table above) and providing materials for display at meetings and museums. The repository and core collection are also used for classroom exercises.

### Other GCR activities

The GCR hosted the bi-annual meeting of the Curators of Marine and Lacustrine Geological Samples group on 21–23 April. There were 25 members of the international group in attendance. On 21–26 June, the JRSO hosted 24 participants in the Minority-Serving Institution-Reconstructing Earth’s Climate History (MSI-REaCH) School of Rock program, which made extensive use of the GCR core facility and collection. The GCR also began preparations for the Expedition 355 Sample Party to be held in August.

### Curating the legacy and IODP core collection at the Kochi Core Center

Under a long-term contract with the TAMRF, the KCC curates the Legacy (DSDP and ODP) cores and the IODP cores collected by the *JOIDES Resolution*. Sample requests related to these cores are received from the researchers all over the world, and the KCC provides services in support of core sampling, analysis, and education.

### Sample requests

The following “Sample requests” table provides a summary of the 2,502 samples that were taken at the KCC during the quarter. Sample requests that show zero samples taken may represent cores that were viewed by visitors during the quarter or used for educational purposes. Public relations tours and educational visits to the repository are shown in the “KCC tours/visitors” table.

KCC Sample request number, name, country	Number of samples taken	Number of visitors to KCC
23075A, Harris, United Kingdom	0	2
21685IODP, Hagino, Japan	693	4
25578IODP, Johnson, USA	19	
26592IODP, Alexander, United Kingdom	9	
26740IODP, Aoyama, Japan	21	
26993IODP, Kato, Japan	583	
21833IODP, Bourne, United Kingdom	21	
16336IODP, Blum, USA	39	1
28074IODP, Sawyer, USA	50	
28594IODP, Liu, USA	1	

KCC Sample request number, name, country	Number of samples taken	Number of visitors to KCC
28875IODP, Akhtar, USA	90	
27901IODP, Chanda, USA	22	
27981IODP, Obrochta, Japan	146	1
28003IODP, Uno, USA	47	
27975IODP, Herbert, USA	18	
28725IODP, Stoll, Spain	10	
27419IODP, Huck, United Kingdom	136	
28848IODP, Mitchison, United Kingdom	270	
29936IODP, Alloway, New Zealand	6	
29987IODP, Harris, United Kingdom	153	2
29645IODP, King, United Kingdom	32	
30796IODP, Moss, Australia	85	
30854IODP, Inoue, Japan	0	4
30942IODP, Mateo, USA	43	
30952IODP, Takayanagi, Japan	0	4
18275IODP, Najman, United Kingdom	8	
<b>Totals</b>	<b>2,502</b>	<b>18</b>

#### *KCC tours/visitors*

Type of tour or visitor	Number of Visitors to KCC
CMCR, Kochi University evaluation team	5
Tsukuba University staff and students	7
MEXT, Japan, staff	2
International trainee from JOGMEC, Japan	3
Kochi University staff and students	6
National Taiwan University staff	2
Denmark staff	2
Shikoku Economy & Industry Institute staff	3
<b>Totals</b>	<b>30</b>

#### Other KCC activities

The KCC received 3,704 archive and working half sections from Expedition 354 (Bengal Fan); these were racked in the new reefer.

The KCC shipped a large number of whole round (unsplit) core sections from Expeditions 351 and 353 to various institutions in the US and Germany for XRF scanning by expedition Science Party members. The cores will be returned to the KCC after they are scanned. As part of the KCC analytical service provided to the IODP researchers from abroad, one researcher from the US utilized the XRF analytical facility for studying some of the Expedition 350 cores. Eight Japanese participants of Expeditions 354 and 355 were provided precruise training at the KCC in order to familiarize them with curatorial procedures, core flow,



shipboard measurements, and so on. A video conference with the JRSO staff was held in June to prepare for the Expedition 354 sampling party scheduled for late August–early September. A KCC representative attended the Curators of Marine and Lacustrine Geological Samples bi-annual meeting hosted at the GCR, and Freelance Media staff from Tokyo visited the KCC to write an article for *Blue Earth* magazine.

## Development, IT, and databases

The JRSO manages data supporting IODP activities, including expedition and postexpedition data, provides long-term archival access to data, and supports JRSO Information Technology (IT) services. Daily activities include operating and maintaining shipboard and shore-based computer and network systems and monitoring and protecting JRSO network and server resources to ensure safe, reliable operations and security for IODP data and IT resources.

### Expedition data

#### LIMS database

Data from Expeditions 354 and 355 were added to the LIMS database on shore this quarter. These data are currently under moratorium and available only to the scientists who sailed on this expedition. Data for Expedition 350 were released from moratorium during this quarter.

#### Expedition data requests

The following tables provide information on JRSO web data requests from the scientific community. Where possible, visits by JRSO employees were filtered out.

Top 10 countries accessing JRSO web databases				
Rank	Janus database		LIMS database	
	Country	Visitor sessions	Country	Visitor sessions
1	China	4,782	USA	439
2	USA	786	United Kingdom	144
3	Germany	272	Germany	129
4	United Kingdom	252	Japan	122
5	Russia	234	Unknown	111
6	Australia	183	China	74
7	Norway	90	France	73
8	France	60	Netherlands	17
9	Japan	57	Portugal	12
10	Spain	48	India	10
	Others	352		60
	<b>Total</b>	<b>7,116</b>	<b>Total</b>	<b>1,191</b>

Top 20 database web queries				
Rank	Janus database		LIMS database	
	Query	Downloads	Query	Downloads
1	Core summaries	1,735	Samples	799
2	Site summaries	1,344	Section summaries	363
3	Images—photos	1,186	Images—LSIMG	344
4	Paleontology—species information	1,000	Images—core photos	318
5	Point calculation	672	Hole summaries	291
6	Samples	614	Chemistry—IW	262
7	Special holes	366	Description	192
8	Images—prime data images	349	Core summaries	191
9	Physical properties—GRA	340	Physical properties—GRA	188
10	Physical properties—MAD	284	Chemistry—carbonates	117
11	Physical properties—shear strength	268	Physical properties—MAD	111
12	Paleontology—age model	257	Images—close-ups	100
13	Paleontology—range charts	253	Chemistry—gas	93
14	Physical properties—NGR	249	Splice intervals	93
15	Hole trivia	239	Physical properties—RGB	80
16	Chemistry—carbonates	233	Chemistry—ICP-AES solids	70
17	Physical properties—MSL	227	Physical properties—RSC	65
18	Physical properties—PWL	220	Hole summaries list	60
19	Hole summaries	219	Splice tie points	57
20	Chemistry—IW	190	Physical properties—MS	56
	Others	3,796	Others	596
	<b>Total</b>	<b>14,041</b>	<b>Total</b>	<b>4,446</b>

Data requests submitted to the TAMU Data Librarian	
Requests	Total
Photos	7
How to access	5
Depth calculations	2
Drilling data	2
ICP-AES solids	2
Paleontology age models	2
Locations latitude/longitude	1
Logging	1
MAD	1
Permission for use of photos	1
SRM	1
Underway geophysics	1
VCD	1
<b>Total</b>	<b>27</b>

Countries submitting data requests to the TAMU Data Librarian	
Country	Total
United Kingdom	9
USA	7
Unknown	3
Belgium	2
Australia	1
Canada	1
Germany	1
India	1
New Zealand	1
Sweden	1
<b>Total</b>	<b>27</b>

## Software development

### LIMS On-line Report Environment

#### *Project scope and deliverables*

The goal of the LIMS LORE project is to implement a reporting framework that can incrementally handle very large data sets. The implementation will accommodate smooth transition from legacy systems to the new model. The implementation will ease the discovery and sharing of IODP content.

This effort focuses on the immediate need to be able to retrieve very large data sets (such as RGB) from current online systems without crashing end-users' browsers or intermediate systems participating in the transfer process. This effort does not address the needs and requirement for data publishing, which will be managed in a separate effort. Not only will this project solve the big data problems represented by RGB and other reports, but it will create a framework for the distribution of all kinds of data reports going forward. It is viewed as the replacement for both Web Tabular Reports and the current LIMS Reports.

#### *Project status*

The JRSO completed the final phase of this project in June 2015, and it is deployed at <http://web.iodp.tamu.edu/LORE/>.

### Stratigraphic Correlation Enhancements

#### *Project scope and deliverables*

This project delivers an updated set of programs to provide spliced data sets assembled using the affine table and splice interval table provided by the shipboard stratigraphic correlation specialist. The

deliverables will ensure accurate data, reliable process, and user-friendly interfaces and minimize the risk of spliced data sets that do not meet user intent and expectations. The scope includes the following components:

1. Correlation table files. Content and format of user-generated files for affine table, splice interval table (SIT), and splice tie points table (STPT; if still needed) are defined in detail as part of this project. The SIT represents the correlation specialist's splice definition more explicitly and completely than the STPT used to do and will therefore be used as the key table in the correlation workflow. This change in workflow should eliminate confusion among correlation specialists, support personnel, and computer programs.
2. Uploader for correlation files. The uploader program will be updated to comply with the newly defined correlation files' content and format in 1. This will also include the creation of new LIMS database tables for the correlation information.
3. Spliced data reports. The ultimate goal is to provide spliced data sets based on the affine table and SIT and the LIMS-internal program to assemble the spliced data sets. The existing program needs to be replaced to comply with 1 and 2.
4. Correlation files. The correlation files defined in 1 and loaded in 2 will be reported similarly to the way they are currently reported, but using all the new definitions and database tables.
5. Correlation data. LIMS2Correlator (the program used to extract correlation data from the LIMS database for use in the Correlator application) will be updated (or replaced). The main requirement is to include export of RGB data files.
6. Naming convention. A naming convention for alternate depth scales and splices will be implemented to facilitate user's selection of items from the choice lists on the LIMS Reports/LORE interface.
7. Legacy data conversion. Legacy data conversion will be included in this project if external users and expedition project representatives deem it worthwhile by assisting in the process.
8. Documentation. Processes and tools will be documented.

#### *Project status*

The JRSO completed this project in June 2015.

## Superconducting Rock Magnetometer Installation and Software Upgrade

#### *Project scope and deliverables*

In FY14, the JRSO and NSF approved replacement of the current shipboard liquid helium cryogenic magnetometer with a new liquid helium-free magnetometer. The magnetometer currently in use on board the *JOIDES Resolution* is almost 20 years old. Although it is still functioning well, the age of the system, the increasing costs of obtaining liquid helium, and the importance of magnetic measurements to IODP science were key factors in the decision to replace the current system. During this project, the JRSO will install the new helium-free magnetometer aboard the *JOIDES Resolution*, complete testing of the new system prior to Expedition 362, send the old liquid helium magnetometer to shore, and replace the software running the system.

#### *Project status*

Work continued on this project, which is on track to complete all deliverables by the end of the 2016 tie-up period.

#### Improve Web Services

##### *Project scope and deliverables*

The goal of this project is to improve functionality and maintainability of web services for data input and output to LIMS by fixing and replacing existing web services with newer versions while implementing secure authentication for all services that use accounts and passwords (part of meeting a TAMU security requirement).

#### *Project status*

Work continued on this project, which is on track to complete all deliverables by July 2016.

#### Scanning Electron Microscope Uploader and Downloader

##### *Project scope and deliverables*

When completed, this project will provide online access to all images taken with the SEM, including metadata that were collected aboard the *JOIDES Resolution*. Data access will be established within the LIMS Reports interface, which already provides access to numerous reports of instrumental data. This tool will enable shipboard scientists and support staff to upload files, including pictures of thin sections, rock pieces, fossils, and so on. The metadata associated with the images will include equipment configuration (e.g., magnification, methods of sample preparation, and sample type and ID).

#### *Project status*

Work continued on this project, which is on track to complete all deliverables by July 2015.

#### Extending IMS to WRMSL and STMSL

##### *Project scope and deliverables*

This project replaces the current applications used on the WRMSL and STMSL with the current version of IMS framework application.

From the user's perspective, this application will have the look and feel of the other IMS-supported logging systems. From the developer's perspective, a large percentage of the code will be reused from the other IMS-supported logger libraries and new code will be developed in the IMS framework.

#### *Project status*

This project began this quarter and is on track to complete all deliverables by July 2015.

#### 360 Deg Images to LIMS

##### *Project scope and deliverables*

This project improves support for capture, retrieval, and management of Whole-Round Line Scan (WRLS) images and their composites. Successful integration entails revisions to data storage definitions, LIMS Reports, the data upload facility, and the Section Half Image Logger (SHIL).

### *Project status*

The JRSO initiated this project in June 2015 and began working on the project management plan.

## Publication services

IODP Publication Services provides publication support services for IODP and Integrated Ocean Drilling Program riserless, riser, and mission-specific drilling expeditions; editing, production, and graphics services for all required Program reports (see “Progress reporting” in “Management and administration”), technical documentation, and scientific publications as defined in the JRSO cooperative agreement with NSF; and warehousing and distribution of Integrated Ocean Drilling Program, ODP, and DSDP publications.

## Scientific publications

### JRSO publications

#### *Preliminary Reports*

<http://dx.doi.org/10.14379/iodp.pr.353.2015>

<http://dx.doi.org/10.14379/iodp.pr.354.2015>

#### *Proceedings*

<http://dx.doi.org/10.14379/iodp.proc.350.2015>

#### *Technical Notes*

<http://dx.doi.org/10.2204/iodp.tn.2.2015>

<http://dx.doi.org/10.2204/iodp.tn.3.2015>

### USIO publications

#### *Data reports*

<http://dx.doi.org/10.2204/iodp.proc.317.204.2015>

<http://dx.doi.org/10.2204/iodp.proc.327.202.2015>

<http://dx.doi.org/10.2204/iodp.proc.336.204.2015>

<http://dx.doi.org/10.2204/iodp.proc.344.201.2015>

### CDEX publications

#### *Data reports*

<http://dx.doi.org/10.2204/iodp.proc.319.203.2015>

<http://dx.doi.org/10.2204/iodp.proc.322.211.2015>

<http://dx.doi.org/10.2204/iodp.proc.343343T.203.2015>

ESO publications

*Scientific Prospectus*

<http://dx.doi.org/10.14379/iodp.sp.357.2015>

Citation management

Scientific publication digital object identifiers

Reports and publications	Digital object identifier (DOI) prefix	Number of online DOI resolutions			
		April 2015	May 2015	June 2015	FY15 Q3 total
IODP	10.14379	288	309	444	<b>1,041</b>
Integrated Ocean Drilling Program	10.2204	3,319	5,738	5,430	<b>14,487</b>
ODP/DSDP	10.2973	6,673	12,923	28,440	<b>48,036</b>

Publications management

Integrated Ocean Drilling Program closeout activities

*Publications closeout*

Integrated Ocean Drilling Program publications closeout activities continued during the reporting period. Expedition reports and postexpedition research publications published during the quarter in the *Proceedings of the Integrated Ocean Drilling Program* are listed above in “Scientific publications.” In addition, publication obligation papers and data reports related to Expeditions 310, 312, 316–318, 320/321, 324, 325, 329, 331, 334–338, 340, 343, and 344 were submitted to English language peer-reviewed journals or the Program.

Other activities

CrossMark

The CrossMark update system is a service of CrossRef, a not-for-profit trade association of scholarly publishers that facilitates reference linking and other sustainable cross-publisher services for the scholarly community. CrossMark allows scholars to easily identify instances of documents that are being actively maintained by their publishers. The appearance of a CrossMark logo on a PDF or HTML document indicates that the publisher is taking care of or stewarding it through any updates, corrections, retractions, or other changes.

During this quarter, Publication Services implemented the CrossMark update system by including the CrossMark logo/link and linked metadata on HTML and PDF versions of International Ocean Discovery Program Expeditions 349 and 350 chapters.

Publications website

The IODP Publications website is hosted at TAMU. During the last quarter, the IODP Publications website received 18,242 site visits and 265,506 page views.

## JRSO expedition science outreach support

JRSO staff provided support to the Education Officers during Expedition 355 and also assisted with planning for Expedition 356 port call public relations and outreach activities.



## Appendix: JRSO quarterly report distribution

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