International Ocean Discovery Program

JOIDES Resolution Science Operator

FY17 Q3 Operations and Management Report

1 April–30 June 2017

Cooperative Agreement OCE-1326927

Submitted by the JRSO

to

The National Science Foundation

and

The *JOIDES Resolution* Facility Board

4 August 2017

Contents

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) FY17 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 TAMU Sponsored Research Services (SRS).

Management and administration

Management and administration functions of the JRSO include planning, coordinating (with other IODP-related entities), overseeing, reviewing, monitoring, assuring compliance, 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 worked successfully to streamline travel and shipping activities.

Progress reporting

JRSO FY17 Q2 Quarterly Operations and Management Report

The JRSO operations and management report for the second quarter of FY17 (January–March 2017) was submitted to NSF on 12 May 2017 (http://iodp.tamu.edu/publications/AR/FY17/FY17_Q2.pdf).

JRSO FY18 Annual Program Plan

Budget and text development for the IODP JRSO FY18 Annual Program Plan was initiated this quarter.

Liaison activities

The JRSO reports to and liaises with funding agencies and IODP-related agencies (e.g., *JOIDES Resolution* Facility board [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 (http://iodp.org/boards-and-panels/facility-boards).

Planning meetings

Brad Clement (JRSO Director of Science Services) and Mitch Malone (JRSO Assistant Director of Science Services and Manager of Science Operations) attended the JRFB meeting held 16 and 17 May at the NSF office in Arlington, VA. At the meeting, the draft FY18 Annual Program Plan was presented and expeditions were added to the FY19 and FY20 *JOIDES Resolution* schedule. Clement and Malone also attended an informal meeting of US members/chairs of JRFB panels on 18 May.

Project portfolio management

The JRSO closed one project (Laboratory Information Management System [LIMS] Data Display Tool—LIMSpeak II [LIVE]) and continued work on three existing projects: XRF Core Scanner Laboratory, XRF Core Scanner Uploader and Reports, and Coulometer. Additionally, the JRSO is carefully examining potential GEOdesc project benefits, costs, and alternatives (See "Software development" in "Development, IT, and databases").

Web services

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

Program website statistics

During the last quarter, the IODP TAMU website received 38,838 site visits and 352,782 page views. Where possible, visits by JRSO employees and search engine spiders were filtered out of the count.

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 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

Website	FY17 Q3 page views*	FY17 Q3 site visits*
www-odp.tamu.edu	230,159	27,022
www.odplegacy.org	3,784	1,734
www.deepseadrilling.org	37,757	7,860
Total	**271,700**	**36,616**

*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		Port (origin)	Dates [1, 2]	Total days (port/ sea)	Days at sea (transit[3]/ ops)	Co-Chief Scientists	Expedition Project Manager
South China Sea Rifted Margin[4]	367	Hong Kong	7 February– 9 April 2017	61 (5/56)	56 (2/54)	Z. Sun J. Stock	A. Klaus
South China Sea Rifted Margin[4]	368	Shanghai, China	9 April– 11 June 2017	63 (5/58)	58 (4/54)	Z. Jian H.-C. Larsen	C. Alvarez Zarikian
Non-IODP (11 June–27 July 2017) 46 days							M. Malone
Tasman Frontier Subduction and Climate	371	Townsville, Australia	27 July– 26 September 2017	61 (3/58)	58 (7/51)	R. Sutherland G. Dickens	P. Blum
Australia Cretaceous Climate and Tectonics	369	Hobart, Tasmania (Australia)	26 September – 26 November 2017	61 (5/56)	56 (7/49)	R. Hobbs B. Huber	K. Bogus
Creeping Gas Hydrate Slides and Hikurangi LWD[5]	372	Fremantle, Australia	26 November 2017– 4 January 2018	39 (5/34)	34 (15/19)	I. Pecher P. Barnes	L. LeVay
Ross Sea West Antarctic Ice Sheet History	374	Wellington, New Zealand	4 January– 8 March 2018	63 (5/58)	58 (16/42)	R. McKay L. De Santis	D. Kulhanek
Hikurangi Subduction Margin	375	Wellington, New Zealand	8 March– 5 May 2018	58 (5/53)	53 (2/51)	L. Wallace D. Saffer	K. Petronotis
Brothers Arc Flux	376	Auckland, New Zealand	5 May– 5 July 2018	61 (5/56)	56 (2/54)	C. de Ronde S. Humphris	T. Höfig
Non-IODP (5 July–14 October 2018) (101 days)							M. Malone
South Pacific Paleogene	378	Wellington, New Zealand	14 October– 14 December 2018	61 (4/57)	57 (11/46)	D. Thomas U. Röhl	A. Klaus
Non-IODP (14 December 2018–18 January 2019) (35 days)							M. Malone
Amundsen Sea West Antarctic Ice Sheet History	379	Punta Arenas, Chile	18 January– 20 March 2019	61 (3/58)	58 (12/46)	K. Gohl	A. Klaus
Iceberg Alley Paleoceanography & South Falkland Slope Drift[6]	382	TBD	20 March– May 2019	TBD	TBD	TBD	T. Williams
Dynamics of Pacific Antarctic Circumpolar Current	383	TBD	May–July 2019	TBD	TBD	TBD	C. Alvarez Zarikian

Expedition		Port (origin)	Dates [1, 2]	Total days (port/ sea)	Days at sea (transit[3]/ ops)	Co-Chief Scientists	Expedition Project Manager
Panama Basin Crustal Architecture (504B) & Engineering Testing[7]	384	TBD	July–September 2019	TBD	TBD	TBD	P. Blum
Guaymas Basin Tectonics and Biosphere	385	TBD	September–November 2019	TBD	TBD	TBD	T. Höfig
Non-IODP/transit (November 2019–January 2020)							M. Malone
Gulf of Mexico Methane Hydrate[4]	386	TBD	January–March 2020	TBD	TBD	TBD	L. LeVay
South Atlantic expedition TBD	387	TBD	March–May 2020	TBD	TBD	TBD	TBD

Notes: TBD = to be determined.
[1] Dates for expeditions may be adjusted pending non-IODP activities.
[2] The start date reflects the initial port call day. The vessel will sail when ready.
[3] Transit total is the estimated transit to and from port call and does not include transit between sites.
[4] Complementary Project Proposal (CPP) is contingent on substantial financial contribution outside of normal IODP funding.
[5] Combined expedition with 841 APL (Ancillary Project Letter) and logging while drilling (LWD) from Proposal 781A (Expedition 375).
[6] Combined expedition with 846 APL.
[7] Combined expedition with 769 APL and engineering testing.

JRSO expeditions

Expedition 363: Western Pacific Warm Pool

Postexpedition activities

The Expedition 363 postexpedition sample party was held 19–30 June in College Station, TX.

Expedition 366: Mariana Convergent Margin

Postexpedition activities

The postexpedition editorial meeting was held 22–26 May in College Station, TX.

Expedition 367 and 368: South China Sea Rifted Margin

Staffing

Expedition 367 Science Party staffing breakdown

Member country/consortium	Participants	Co-Chief Scientists
USA: United States Science Support Program (USSSP)	8	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)	0	
People's Republic of China: IODP-China	12	1
Australia and New Zealand: Australia/New Zealand IODP Consortium (ANZIC)	1	
India: Ministry of Earth Science (MoES)	1	
Brazil: Coordination for Improvement of Higher Education	0	

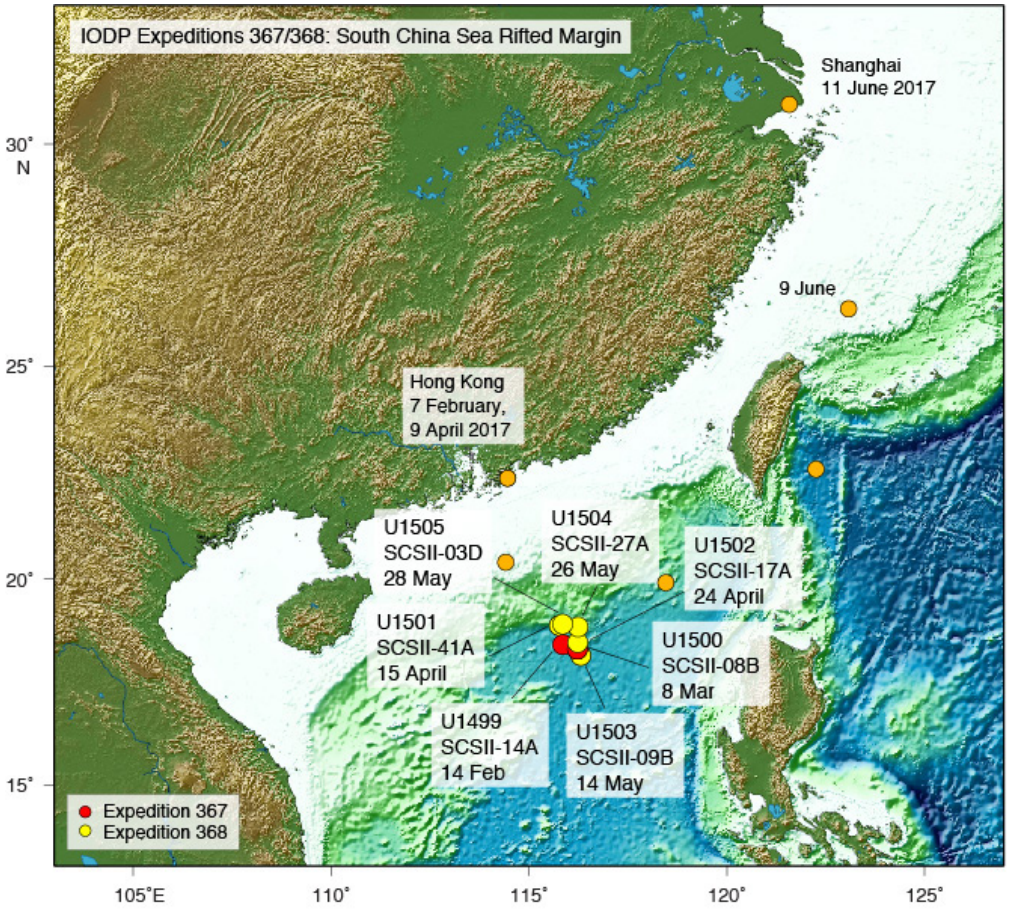
Expedition 368 Science Party staffing breakdown

Member country/consortium	Participants	Co-Chief Scientists
USA: United States Science Support Program (USSSP)	7	
Japan: Japan Drilling Earth Science Consortium (J-DESC)	1	
Europe and Canada: European Consortium for Ocean Research Drilling (ECORD) Science Support and Advisory Committee (ESSAC)	6	1
Republic of Korea: Korea Integrated Ocean Drilling Program (K-IODP)	1	
People's Republic of China: IODP-China	12	1
Australia and New Zealand: Australia/New Zealand IODP Consortium (ANZIC)	1	
India: Ministry of Earth Science (MoES)	1	
Brazil: Coordination for Improvement of Higher Education	1	

Clearance, permitting, and environmental assessment activities

Additional alternate sites and modification requests for Expedition 368 were submitted and reviewed at the Environmental Protection and Safety Panel (EPSP) meeting (2 and 3 May). Approved new sites were submitted for clearance.

Operations summary



Coring summary

Site	Hole	Latitude	Longitude	Water depth (mbrf)	Cores (*N*)	Interval cored (m)	Core recovered (m)	Recovery (%)
U1499	U1499A	18°24.5698′N	115°51.5881′E	4493.7	71	659.20	417.05	63.3
	U1499B	18°24.5705′N	115°51.5990′E	4492.5	44	426.80	150.64	35.3
Site U1499 totals					**115**	**1,086.00**	**567.69**	**52.3**
U1500	U1500A	18°18.2762′N	116°13.1916′E	3801.7	34	329.80	93.55	28.4
	U1500B	18°18.2707′N	116°13.1951′E	3801.7	81	683.00	278.80	40.8
Site U1500 totals					**115**	**1,012.80**	**372.35**	**36.8**
U1501	U1501A	18°18.2762′N	116°13.1916′E	3801.7	1	9.50	9.73	102.4
	U1501B	18°53.0922′N	115°45.9483′E	2852.1	1	9.50	9.83	103.5
	U1501C	18°53.0919′N	115°45.9485′E	2845.8	62	461.90	444.77	96.3
	U1501D	18°53.0929′N	115°45.9370′E	2845.8	26	210.80	78.77	37.4
Site U1501 totals					**90**	**691.70**	**543.10**	**78.5**
U1502	U1502A	18°27.8720′N	116°13.8381′E	3763.7	40	383.20	176.81	46.1
	U1502B	18°27.8798′N	116°13.8409′E	3763.6	36	193.10	131.57	68.1
Site U1502 totals					**76**	**576.30**	**308.38**	**53.5**
U1500	U1503A	18°8.6300′N	116°18.8456′E	3867.7	0	0.00	0.00	0.0
Site U1503 totals					**115**	**1,012.80**	**372.35**	**36.8**

Site	Hole	Latitude	Longitude	Water depth (mbrf)	Cores (*N*)	Interval cored (m)	Core recovered (m)	Recovery (%)
U1504	U1504A	18°50.9199′N	116°14.5397′E	2816.6	21	165.50	52.93	32.0
	U1504B	18°50.8213′N	116°14.5978′E	2843.0	19	111.80	21.48	19.2
Site U1504 totals					**40**	**277.30**	**74.41**	**26.8**
U1505	U1505A	18°55.0560′N	115°51.5369′E	2916.6	1	0.30	0.38	126.7
	U1505B	18°55.0562′N	115°51.5370′E	2918.6	1	3.00	3.23	107.7
	U1505C	18°55.0570′N	115°51.5491′E	2917.4	64	480.20	480.15	100.0
	U1505D	18°55.0458′N	115°51.5501′E	2917.0	20	184.50	191.43	103.8
Site U1505 totals					**86**	**668.00**	**675.19**	**101.1**
Expedition 367/368 totals					**522**	**4,312.10**	**2,541.12**	**58.9**

Science summary

IODP Expeditions 367 and 368 are two joint expeditions formed from the same IODP proposal. These expeditions share the common key objectives of testing scientific hypotheses of breakup of the northern South China Sea (SCS) margin and comparing its rifting style and history to other nonvolcanic or magma-poor rifted margins. Four primary sites were selected for the overall program: one in the outer margin high (OMH) and three seaward of the OMH on distinct, margin-parallel basement ridges. These three ridges are informally labeled A, B, and C. They are located within the continent–ocean transition (COT) zone ranging from the OMH to the interpreted steady-state oceanic crust (Ridge C) of the SCS. The main scientific objectives were to

- Determine the nature of the basement within crustal units across the COT of the SCS that are critical to constrain style of rifting,
- Constrain the time interval from initial crustal extension and plate rupture to the initial generation of igneous ocean crust,
- Constrain vertical crustal movements during breakup, and
- Examine the nature of igneous activity from rifting to seafloor spreading.

During Expedition 367, we successfully completed operations at two of the four primary sites (Site U1499 on Ridge A and Site U1500 on Ridge B). At Site U1499, we cored 1081.8 m in 22.1 days with 52% recovery and then logged downhole data from 655 to 1020 mbsf. In 31 days at Site U1500, we drilled 1529 m, cored a total of 1012.8 m with 37% recovery, and collected log data from 842 to 1133 mbsf. At each site, drilling was designed to reach the depth of the main seismic reflector (acoustic basement), which prior to the expedition had been interpreted to be crystalline basement. The objective was to determine which lithospheric layer constitutes the basement of the COT and whether there was middle or lower continental crust or subcontinental lithospheric mantle exhumed in the COT before the final lithospheric breakup. At Site U1499, we cored ~200 m into the acoustic basement and sampled sedimentary rocks,

including early Miocene chalks underlain by pre-Miocene polymict breccias and poorly cemented gravels composed of sandstone pebbles and cobbles. Preliminary structural and lithologic analyses suggested that the gravels might be early synrift to prerift sediment. At Site U1500, the main seismic reflector corresponds to the top of a basalt sequence at ~1379.1 mbsf. We cored 149.90 m into this volcanic package, recovering 114.92 m (77%) of sparsely to moderately plagioclase-phyric basalt comprising numerous lava flows, including pillow lavas with glass, chilled margins, altered veins, hyaloclastites, and minor sediment. Preliminary geochemical analyses show that the basalt is tholeiitic. We speculate that the basalt might belong to the very early stage of magmatism prior to steady-state seafloor spreading (known as an "embryonic ocean" regime).

Expedition 368 was planned to drill at primary Sites U1501 and U1503 at the OMH and Ridge C, respectively. However, based on drilling results from Expedition 367, we chose to insert an alternate site (U1502) on Ridge A for Expedition 368. In total, the expedition completed operations at four sites (U1501–U1505). Site U1503, however, was not completed beyond casing to 990 m because of mechanical problems with the drilling equipment that limited us to operating with a drill string not longer than 3400 m from 25 May 2017 to the end of the expedition. The new alternate Site U1504 proposed during Expedition 367 met this condition. Site U1505 also met the operational constraints of the 3400 m drill string (total) and was an alternate site for the already drilled Site U1501.

At Site U1501, we cored to 697.1 m in 9.4 days with 100.1% recovery. We also drilled ahead 433.5 m and then collected downhole log data from 78.3 to 399.3 mbsf. In 19.3 days at Site U1502, we penetrated 1679.0 m, set 723.7 m of casing, cored a total of 576.3 m with 53.5% recovery, and collected downhole log data from 785.3 to 875.3 mbsf and seismic data through the 10¾ inch casing. At Site U1503, we penetrated 995.1 m and set 991.5 m of 10¾ inch casing but took no cores. At Site U1504, we took 40 rotary core barrel (RCB) cores over two holes. The cored interval was 277.3 m with 26.8% recovery. We drilled an 88.2 m interval in Hole U1504B. At Site U1505, we cored 668.0 m with 101.1% recovery and collected logging data from 80.1 to 341.2 mbsf. Except for Site U1505, we drilled to acoustic basement, which prior to the expedition, except for Site U1501, had been interpreted to be crystalline basement. A total of 6.65 days were lost due to mechanical breakdown or waiting on spare supplies for repair of drilling equipment.

At Site U1501 on the OMH, we cored ~45 m into acoustic basement and sampled highly lithified sandstone to conglomerate of presumed Mesozoic age overlain by siliciclastic Eocene pre- to synrift sediments of Oligocene age and topped by primarily carbonaceous postrift sediments of early Miocene to Pleistocene age. At Site U1502, we recovered 180 m of hydrothermally altered brecciated basalts comprising pillow lavas below deep-marine sediments of Oligocene to late Miocene age. Coring was not performed within the upper 380 m (approximately Pliocene–Pleistocene) at Site U1502. At Site U1503 on Ridge C, 991.5 m of casing was installed in preparation for the planned deep drilling to ~1800 mbsf,

but no coring was performed due to mechanical failures, and the site was abandoned without further activity. Coring at Site U1504 on the OMH ~45 km east of Site U1501 recovered metamorphic schist to gneiss (greenschist facies) below late Eocene (?) carbonate rocks (partly reef debris) and early Miocene to Pleistocene sediments. At Site U1505, we cored to 480.15 m through Pleistocene to late Oligocene mainly carbonaceous ooze followed at depth by early Oligocene to late Eocene siliciclastic sediments.

As a result of the constraints on the length of drill string that could be deployed during the latter part of Expedition 368, the secondary expedition objectives addressing the environmental history of the SCS and Southeast Asia received more focus than planned because these sites are located in shallower water depths and required less penetration depth. This forced change in emphasis, however, was without fatal consequences for the primary tectonic objectives. The two expeditions together provided solid evidence for a process of breakup that included vigorous synrift magmatism as opposed to the often-favored interpretation of the SCS margin as a magma-starved margin.

Expedition 371: Tasman Frontier Subduction

Planning

Science and technical preparations with the science party continued. The Sample Allocation Committee (SAC) reviewed and discussed research plans, which were compiled and circulated to the Science Party. JRSO staffed worked with the Australia/New Zealand IODP Consortium (ANZIC) to firm up plans for a limited public relations day in Townsville, Australia. United States Science Support Program (USSSP) and JRSO staffed worked with the Co-Chief Scientists on onboard education and outreach activities.

Clearance, permitting, and environmental assessment activities

On 29 June, NSF approved the environmental evaluation for use of an acoustic source during Expedition 371 check shot surveys. The Australian government issued authorization on 29 May. The New Zealand government issued authorization on 26 May. A pre-activity notice was submitted to the New Zealand Environmental Protection Authority (EPA), as required by the authorization. The EPA acknowledged receipt and outlined additional forms and notifications required by the New Zealand Exclusive Economic Zone (EEZ) Act (2013). Depth extension requests for several sites were approved at the EPSP meeting (2–3 May).

Expedition 369: Australia Cretaceous Climate and Tectonics

Planning

SAC review of research plans was initiated. Laboratory and special requirements were also reviewed and assessed. Port call reconnaissance and travel/visa information were distributed to the Science Party.

Staffing

Two education and outreach (E&O) officers, one from the US and one from ECORD, accepted invitations to sail.

Clearance, permitting, and environmental assessment activities

The Australia Department of Environment and Energy determined that Expedition 369 is not a controlled action. Final authorization is pending.

Expedition 372: Creeping Gas Hydrate Slides and Hikurangi LWD

Planning

Research plans were received at the end of the reporting period. The temperature dual-pressure tool (T2P) was returned from the ship to University of Texas at Austin to be overhauled and made ready for the expedition. A conference call was held with key participants and JRSO staff to discuss preparations for use of the Motion Decoupled Hydraulic Delivery System (MDHDS) and T2P, including the potential for some additional testing of the MDHDS on the transit from Subic Bay, Philippines, to Townsville, Australia. Preparations for the use of the pressure core samplers are ongoing. An initial planning meeting on pressure core degassing was held in June with key JRSO staff and a shipboard scientist.

Staffing

Staffing of shipboard scientists was completed. An onboard US educator was selected. The search for an ANZIC E&O candidate is in progress.

Clearance, permitting, and environmental assessment activities

The clearance application was submitted to the US State Department on 5 April, and the US embassy in Wellington submitted the diplomatic note on 12 April.

Expedition 374: Ross Sea West Antarctic Ice Sheet History

Planning

The JRSO received an operational support memo from NSF Polar Programs in early May for the R/V *Nathaniel B. Palmer* to provide icebreaking services during Expedition 374. An addendum with new sites was submitted and reviewed by the Science Evaluation Panel (SEP). A potential ice observer was identified and is interested.

Staffing

Science staffing was completed, and an introductory letter was issued. One scientist withdrew from the expedition, and efforts began for finding a replacement.

Clearance, permitting, and environmental assessment activities

The new alternate sites were reviewed at the EPSP meeting. JRSO and NSF initiated communications on meeting Antarctic Treaty requirements.

Expedition 375: Hikurangi Subduction Margin

Planning

Research plans were received at the end of the reporting period. Planning continues on observatory instrumentation details and deployment workflows. Long-lead hardware construction remains in progress. Manufacturing is almost complete on the flow meter seat, and a fit test will take place in August at the vendor. Principal Investigators associated with the pressure sensors and seafloor loggers will be in College Station, Texas, to connect batteries and check instruments on 6 and 7 September 2017.

Staffing

Education and outreach staffing process continued.

Expedition 376: Brothers Arc Flux

Planning

The Expedition 376 pre-expedition meeting was held in College Station, Texas, on 1 and 2 May. The *Scientific Prospectus* was published on 17 June. Internal planning related to high temperature issues continued. A decision on the electronics package to replace the obsolete electronics in the Ultra-High Temperature Multi-Sensor Memory Tool was made, and the package was ordered.

Staffing

Nominations were received from the Program Member Offices (PMOs) on 5 June and application review was initiated. Applications for the E&O officers were received, and interviews were planned for early next quarter.

Expedition 378: South Pacific Paleogene

Staffing

Two Co-Chief Scientist invitations letters were issued and accepted.

Expedition 379: Amundsen Sea West Antarctic Ice Sheet History

Staffing

One Co-Chief Scientist invitation letter was issued and accepted.

Engineering support

Engineering equipment acquisitions and updates

The hydraulic power units for the vibration-isolated television (VIT) winch were received and sent to Subic Bay, Philippines, in the surface freight. Planning for the installation continued with the vendor and Siem staff. Piping and related support supplies were ordered and included in the airfreight.

Technical and analytical services

Analytical systems

Analytical systems acquisitions and updates

The 2G Enterprises helium-free superconducting rock magnetometer (SRM) has been used on the ship since Expedition 366 (Mariana Convergent Margin). Four experienced paleomagnetists, Dr. Gary Acton (Sam Houston State University), Dr. Anthony Morris (Plymouth University), Dr. Robert Musgrave (The University of Sydney), and Dr. Xixi Zhao (University of California, Santa Cruz), joined the ship during the Shanghai port call to test the new SRM and its software. Although their final report is still pending, their preliminary statements indicate that the new SRM is functioning properly.

The Teledyne-Leeman Prodigy inductively coupled plasma–atomic emission spectroscopy (ICP-AES) failed during Expedition 368, and the decision was made to replace the ICP-AES with a more modern instrument. The JRSO decided to purchase an Agilent 5110 ICP-AES, which features an advanced sample inlet system with the potential to offer argon-use savings during an expedition. Plans were made for the new ICP to be installed prior to Expedition 371.

Development work continues on the new *P*-wave logger (PWL) system on the Special Task Multisensor Logger (STMSL). The system will be compared in performance and reliability to the PWL on the Whole-Round Multisensor Logger (WRMSL) during Expedition 371, with the plan to eventually retire the old design and to construct a clone for installation on the WRMSL.

The JRSO received the second X-ray fluorescence (XRF) Core Scanner to support scanning services at the Gulf Coast Repository (GCR) as an IODP programmatic measurement. The JRSO has transferred responsibility for the XRF Core Scanning Facility internally to the Curation section and has adopted responsibility for the old logger from the College of Geosciences.

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.

Curation and Core Handling

The Curation and Core Handling LWG did not meet this quarter because no curation-related issues arose from recent expeditions.

Geochemistry

The Geochemistry LWG met this quarter to discuss ongoing issues and any issues arising from recent expeditions. The LWG discussed the results of the recent microbial contamination workshop and its recommendations:

- JRSO staff will not encourage use of fluorescent microspheres because they are no longer state of the art; however, the *JOIDES Resolution* will continue to stock them for the time being so they will be available if a scientist requests them.
- Further testing of both perfluorocarbon tracer (PFT) compounds is recommended because insufficient data exist to determine if one is more effective.
- The LWG planned a revision of Technical Note 28 to be circulated to the wider community and then promulgated in early 2018.

The hydrofluoric acid (HF) use policy was discussed, along with the need to ensure the four required safety reagents are up to date; this was an action item for the Assistant Laboratory Officers given the Expedition 371 request for palynology.

Expedition-related discussions included the following:

- The LWG will review the laboratories page on the JRSO website and revise where necessary to make it clear which analyses/instruments are part of our standard measurements program and which should be requested ahead of time to give staff time to prepare.
- The LWG considered a request that the JRSO have a microbiology-specific technician but rejected it primarily because it would require reducing services elsewhere or reducing the science complement.
- Cruise evaluations across numerous expeditions recommended the purchase of an energy dispersive spectrometer (EDS) to supplement the scanning electron microscope (SEM); the JRSO is investigating EDS systems that are compatible with the Hitachi TM-3000 SEM but has not yet made a decision.
- Complaints that not all of the requested supplies and reagents were delivered to the ship were discussed and traced to communication errors among the requestors; the LWG also recognized

that shipping restrictions are increasing and getting hazardous materials delivered to the ship will continue to become more difficult, requiring longer lead times at least.

- Questions from the Expedition 367 Science Party about the safety of the pXRF were reviewed; better safety orientation and signage will be implemented to ensure all users and passersby understand that the instrument is safe when used properly.

Geology

The Geology LWG met this quarter to discuss ongoing issues and any issues arising from recent expeditions. Discussion highlights include the following:

- GEOdesc, the proposed replacement for DESClogik, was discussed; the project proposal is being considered by the management team.
- Stratigraphic correlation support has made strides since the last meeting, with a user guide for the correlation process (and Correlator) as well as the uploader/downloader now in place; Peter Blum (JRSO Expedition Project Manager) will also work to bring technicians up to speed on the basic use of the software involved so that staff can be of more assistance to new correlators.
- Core description area ergonomics were discussed, with Technical Support being charged to make the third description table height adjustable (as the first two are) and the monitor mounts more flexible.
- Alternate lighting for the Section Half Imaging Logger (SHIL) and the axial illuminator that was purchased for side-by-side evaluation of images for quality were discussed; the new lighting would be cheaper to maintain in the long term, so experimentation was recommended.
- Expedition 367 scientists commented that the SEM was not working properly; investigation found a loose cable inside the stage mechanism, and Expedition 368 reported no problems.

Geophysics

The Geophysics LWG met this quarter to discuss issues arising from Expedition 367 and ongoing issues. Discussion highlights include the following:

- Complaints about the reliability of the TeKa TK-04 thermal conductivity system continue. The JRSO investigation determined that a data handling problem exists; it will be investigated and corrected. In addition, Rob Harris (Oregon State University) will bring his Hukseflux full-space needle thermal conductivity system to Expedition 375 to compare results with the TeKa TK-04.
- The LWG members continue to investigate ongoing issues with the core orientation tool; no good testing opportunity for the remachined snubber shock assembly was found during Expeditions 367

or 368, so Expedition 371 will be the first test of the new configuration to see if we have corrected the declination offset issue.

- The Agico JR-6A spinner magnetometer problems described during the expedition were associated with incorrect entry of the cube volume (7 cm^3 for the Japan-style cubes and 8 cm^3 for the IODP-style cubes); users must be aware of parameters entered in the JR-6A software.
- The JRSO continues to work with Agico to improve the spinner software in an attempt to address long-standing complaints about the complexity of the sample identifiers.

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 367 and 368 (South China Sea Rifted Margin) 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 from Expedition 359 (Maldives Monsoon and Sea Level) 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

	Janus database		LIMS database	
Rank	Country	Visitor sessions	Country	Visitor sessions
1	USA	1,364	USA	2,002
2	United Kingdom	710	Russia	358
3	Australia	440	Germany	228
4	Germany	342	Japan	196
5	Canada	268	China	189
6	Japan	232	Australia	154
7	China	228	United Kingdom	151

Rank	Janus database		LIMS database	
	Country	Visitor sessions	Country	Visitor sessions
8	Italy	119	Canada	113
9	Unknown	108	Unknown	94
10	France	93	France	90
	Others	317	Others	216
	Total	**4,221**	**Total**	**3,791**

Top 20 database web queries

Rank	Janus database		LIMS database	
	Query	Views	Query	Views
1	Imaging—core photos	2,133	Imaging—core photos	4,594
2	Physical properties—GRA	1,684	Samples	827
3	Site summaries	1,596	Physical properties—GRA	691
4	Core summaries	1,521	Summaries—sections	651
5	Physical properties—MSL	1,501	Imaging—LSIMG	543
6	Sample	978	Hole summaries	480
7	Summaries—special holes	973	Core summaries	266
8	Chemistry—carbonate	484	Chemistry—carbonates	219
9	Summaries—hole	447	Physical properties—NGR	193
10	Summaries—hole trivia	432	Physical properties—MAD	180
11	Imaging—prime data	405	Physical properties—MS	168
12	Paleontology—age models	315	Physical properties—PWL	112
13	Chemistry—IW	286	Chemistry—IW	107
14	Paleo—range tables	252	Physical properties—RSC	100
15	Chemistry—RockEval	248	Physical properties—PWC	91
16	Images—closeups	232	Imaging—TS images	91
17	Physical properties—MAD	216	Imaging—Microimg	87
18	Summaries—site details	207	Summaries—hole list	83
19	Summaries—site summary trivia	181	Chemistry—ICPAES	77
20	Paleontology—age profiles	173	Physical properties—MSpoint	77
	Others	2,554	Others	1,631
	Total	**16,818**	**Total**	**11,268**

Data requests to the TAMU Data Librarian

Requests	Total		Country	Total
Core photos	8		USA	7
How to	4		Australia	2
Chemistry	1		Unknown	2
Description	1		Brazil	1
Geode	1		Canada	1
Samples	1		Greece	1
174X data	1		India	1
			Norway	1
			United Kingdom	1
Total	17		Total	17

Software development

LIMS Data Display Tool—LIMSpeak II (LIVE)

Project scope and deliverables

The goal of this project is to replace the current LIMSpeak application with a set of applications that will replicate the majority of its features while (1) improving the user interface and experience and (2) adopting some user-requested improvements.

Project status

The JRSO successfully completed this project on 30 June 2017.

XRF Core Scanner Uploader and Reports

Project scope and deliverables

This project was formerly referred to as the Shore XRF Core Scanner Implementation project. The JRSO will purchase a second Avaatech XRF core scanner to be used on shore along with an existing Avaatech scanner to facilitate postexpedition XRF scanning. Goals include (1) developing data structure, uploader, and reports for XRF Core Scanner data; (2) developing quality assurance guidelines and quality control data tracking; (3) taking delivery of a second XRF Core Scanner; and (4) training JRSO staff in the use, care, and maintenance of both scanners.

Project status

This project remains on track for completion by August 2017.

XRF Core Scanner Laboratory

Project scope and deliverables

The purpose of this project is to review and revise current XRF operations and devise new procedures for the JRSO shore-based XRF laboratory. The implementation of these changes, both before and during installation of the new machine, should streamline the XRF core scanning process and provide a solid foundation for the new XRF laboratory. This project is closely related to the XRF Core Scanner Uploader and Reports project.

Project status

This project remains on track for completion by July 2017.

GEOdesc

Project scope and deliverables

The purpose of this project is to replace DESClogik, with the principal goal of increasing performance and reliability. The GEODESC project will design, build, and deliver a new and improved geological description (GEODESC) tool set.

Project status

The JRSO is carefully examining potential GEODESC project benefits, costs, and alternatives and intends to decide on a path forward within the next three to nine months. This project will remain on hold pending a decision.

Coulometer

Project scope and deliverables

The purpose of this project is to design, build, and deliver an application with a simple, intuitive user interface that will make it easier for technicians and scientists to operate the Coulometer and correctly record the results of measurements. The new application will guide the user through a series of steps that make it simple and intuitive to operate the instrument and to save or discard results. The Coulometer application will be used as a pilot project for the development of a new and improved instrument control framework.

Project status

The JRSO management team approved this project for project execution in May 2017. This project is on track for completion by August 2017.

Other projects and activities

Tieup activities

The JRSO began work on the following shipboard tieup activities:

- Migrate JRSO GroupWise email to TAMU Exchange email system.
- Configure new Oracle Enterprise Manager (OEM) server.
- Upgrade Oracle Database system.
- Replace general-use Windows workstations.
- Replace general-use Macintosh workstations.
- Replace instrument hosts.
- Service Sharp copier.

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 371 and 369.

GCR activity

The following table provides a summary of the 7,002 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. For public relations or educational visits/tours, the purpose of the visit is shown in brackets in the "Sample request number, name, country" column and "No samples" is recorded in the "Number of samples taken" column if no new samples were taken.

GCR sample requests

Request number, name, country	Number of samples taken	Number of scientist visitors
50637IODP, Westerhold, Germany	1,501	1
50834IODP, Bauer, Canada	83	
50465IODP, Si, USA	81	

Request number, name, country	Number of samples taken	Number of scientist visitors
50444IODP, Harper, USA	34	
50041IODP, Auerbach, USA	314	2
50004IODP, Trubovitz, USA	29	
50210IODP, Hsu, USA	25	
50827IODP, Kast, USA	4	
50900IODP, White, USA	8	
50404IODP, Moretti, Germany	107	
51133IODP, Tzanova, USA	11	
50372IODP, Almeev, Germany	27	
51219IODP, Woermer, Germany	6	1
50904IODP, Loyd, USA	30	
50436IODP, Ford, United Kingdom	285	
51122IODP, Tzanova, USA	83	
5009IODP, Friedrich, Germany	754	
51065IODP, Villasenor, Chile	42	
51019IODP, Kuroda, Japan	42	
49925IODP, Taylor, United Kingdom	1,654	1
51525IODP, Bridgestock, United Kingdom	3	
51386IODP, Jensen, Canada	4	
51374IODP, Vignier, France	14	
51282IODP, Heuer F, Germany	109	
51636IODP, Robinson, USA	37	
51622IODP, Seki, Japan	76	
51008IODP, LeVay, USA	0	1
50232IODP, Yanchilina, Israel	26	
51833IODP, Petronotis, USA	34	
51812IODP, Ivarsson, Sweden	20	
49896IODP, Menini, France	75	
51885IODP, Chalk, United Kingdom	2	
51855IODP, Toomey, USA	1	
51845IODP, Birner, USA	7	
52256IODP, Cowan, USA	4	
48600IODP, Lam, USA	583	
51899IODP, Carme, Germany	101	
51857IODP, Zhou, USA	100	1
41734IODP, Li, USA	10	
52625IODP, Mitchison, Wales	62	
51849IODP, Patterson, USA	231	
52730IODP, Taylor, USA	42	
51974IODP, Bhattacharya, USA	179	
51348IODP, Phelps, USA	72	
51142IODP, Holbourn, Germany	55	2
53824IODP, O'Connel, USA	35	8
Totals	**7,002**	**17**

Use of core collection

The JRSO promotes outreach use of the GCR core collection by conducting tours of the repository and providing materials for display at meetings and museums. The repository and core collection are also used for classroom exercises. Drs. Leah LeVay and Denise Kulhanek (JRSO Expedition Project Managers) held two classes for 40 TAMU students at the GCR this quarter, and the annual GeoX tour designed to attract new students to the Geology program. A film crew funded by the Center for Dark Energy Biosphere Investigations (C-DEBI) visited the GCR with the aim to produce multimedia educational materials relating to microbiology. Their work included a repository tour and interviews with staff.

GCR tours/visitors

Type of tour or visitor	Number of visitors
Scientist visitors	17
Educational tours/demonstrations (3)	122
Public relations tours (1)	4
Totals	143

Other GCR activities

The Expedition 363 Sample Party was held at the GCR from 19 to 30 June, during which more than 48,000 samples were taken. A total of 33 scientists were in attendance at various times over the 12 day period.

XRF Core Scanning Facility

During the quarter, close to 1,000 core sections from six different expeditions were scanned at the GCR. For the majority of the quarter, XRF measurements were made on the single original Avaatech XRF Core Scanner. In June of 2017, the GCR received a second Avaatech XRF Core Scanner, and the instrument was successfully installed and tested just prior to the end of the quarter. Along with the installation of the new machine, the core scanning facility underwent a renovation that included the addition of new furniture (core prep tables, computer desks, etc.). Finally, the laboratory moved to a new spectrum processing software (from WinAxil to bAxil) and began migration to the new software.

Core sections scanned

Request type	Expedition, name, country	XRF	SHIL	WRMSL
Program	367, Höfig, USA	40		
Personal	363, Kulhanek, USA	576		
Personal	363, Bova, USA	205		
Personal	361, LeVay, USA	6		
Personal	356, Petrick, Germany	5		
Personal	181, Kulhanek, USA	7		
Personal	113, O'Connell, USA	116	45	116
Totals		955	45	116

Notes: SHIL = Section Half Imaging Logger; WRMSL = Whole-Round Multisensor Logger.

Publication services

IODP Publication Services provides publication support services for Integrated Ocean Drilling Program and IODP riserless and riser drilling expeditions; editing, production, and graphics services for 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 distribution of Integrated Ocean Drilling Program, ODP, and DSDP publications.

Scientific publications

Newly published content on the IODP Publications website

Reports and publications	JRSO	USIO	CDEX	ESO*
Scientific Prospectus	10.14379/iodp.sp.376.2017			
Preliminary Report	10.14379/iodp.pr.362.2017			
Data Report		10.2204/iodp.proc.341.202.2017 10.2204/iodp.proc.342.205.2017 10.2204/iodp.proc.342.201.2017 10.2204/iodp.proc.341.204.2017	10.2204/iodp.proc.348.205.2017	10.2204/iodp.proc.347.201.2017
Expedition Report	10.14379/iodp.proc.359.2017			

*ESO publications are produced under contract with the British Geological Survey.

Citation management

Scientific publication digital object identifiers

IODP is a member of CrossRef, the official digital object identifier (DOI) registration agency for scholarly and professional publications. All IODP scientific reports and publications are registered with CrossRef and assigned a unique DOI that facilitates online access. DOIs have also been assigned to Integrated

Ocean Drilling Program, ODP, and DSDP scientific reports and publications. CrossRef tracks the number of times a publication is accessed, or resolved, through the CrossRef DOI resolver tool. Program statistics for the reporting quarter are shown in the table below.

Number of online DOI resolutions

Reports and publications	DOI prefix	April 2017	May 2017	June 2017	FY17 Q3 total
IODP	10.14379	1,268	1,317	1,363	3,948
Integrated Ocean Drilling Program	10.2204	2,727	3,676	3,340	9,743
ODP/DSDP	10.2973	7,322	7,150	3,956	18,428

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 Integrated Ocean Drilling Program Expeditions 317, 323, 333, 337, 341, 342, 344, 346, and 347 were submitted to English language peer-reviewed journals or the Program.

Publications website

The IODP Publications website is hosted at TAMU. During the last quarter, it received 20,680 site visits and 189,999 page views. Where possible, visits by JRSO employees and search engine spiders were filtered out of the count.

Other projects and activities

Postexpedition editorial meetings

The JRSO hosted postexpedition editorial meetings in College Station, Texas, for ESO Expedition 364 (Chicxulub K-T Impact Crater) 27–31 March; CDEX Expedition 370 (Nankai Trough Temperature Limit) on 25–28 April; and JRSO Expedition 366 on 22–26 May.

JRSO expedition science outreach support

JRSO staff assisted with planning for Expedition 371 port call public relations and outreach activities.

Abstracts authored by JRSO staff

The North American Micropaleontology Section (NAMS)—SEPM: Microfossils IV Conference

- Dávila Castro, L., **Kulhanek, D.K.,** Prebble, J.G., Bostock, H., and Cortese, G., 2017. Calcareous nannofossils as early Holocene paleoclimate indicators in the southwest Pacific Ocean: results from a piston core from the north of New Zealand [presented at the NAMS Microfossils IV Conference, Houston, TX, 5–9 April 2017).
- Lakin, N.T., **Kulhanek, D.K.,** Prebble, J.G., Bostock, H., and Cortese, G., 2017. Reconstructing early Holocene sea-surface temperature and nutrient conditions off South Island, New Zealand using calcareous nannofossil assemblages [presented at the NAMS Microfossils IV Conference, Houston, TX, 5–9 April 2017).
- Morelos, D., **Kulhanek, D.K.,** Prebble, J.G., Bostock, H., and Cortese, G., 2017. Early Holocene calcareous nannofossil assemblages from the New Zealand region as indicators of past surface-water temperature and nutrient conditions [presented at the NAMS Microfossils IV Conference, Houston, TX, 5–9 April 2017).

Articles authored by JRSO staff

Program-related science and other articles authored by JRSO staff published during this quarter include the following. Bold type indicates JRSO staff. Other Program-related science articles are available online through the Scientific Ocean Drilling Bibliographic Database (http://iodp.tamu.edu/publications/bibliographic_information/database.html) and the IODP expedition-related bibliographies (http://iodp.tamu.edu/publications/bibliographic_information.html).

- Hüpers, A., Torres, M.E., Owari, S., McNeill, L.C., Dugan, B., Henstock, T.J., Milliken, K.L., **Petronotis, K.E.,** Backman, J., Bourlange, S., Chemale, F., Jr., Chen, W., Colson, T.A., Frederik, M.C.G., Guèrin, G., Hamahashi, M., House, B.M., Jeppson, T.N., Kachovich, S., Kenigsberg, A.R., Kuranaga, M., Kutterolf, S., Mitchison, F.L., Mukoyoshi, H., Nair, N., Pickering, K.T., Pouderoux, H.F.A., Shan, Y., Song, I., Vannucchi, P., Vrolijk, P.J., Yang, T., and Zhao, X., 2017. Release of mineral-bound water prior to subduction tied to shallow seismogenic slip off Sumatra. *Science,* 356(6340):841–844. https://doi.org/10.1126/science.aal3429
- Tripathi, S., Tiwari, M., Lee, J., Khim, B.-K., and IODP Expedition 355 Scientists (including **D.K. Kulhanek**), 2017. First evidence of denitrification vis-à-vis monsoon in the Arabian Sea since Late Miocene. *Scientific Reports,* 7:43056. https://doi.org/ 10.1038/srep43056

Appendix: JRSO quarterly report distribution

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