



IODDP

INTERNATIONAL OCEAN
DISCOVERY PROGRAM

UNITED STATES IMPLEMENTING ORGANIZATION

FY14 Quarterly Report 4

1 July–30 September 2014

NSF Contract OCE-0352500

Submitted by the USIO

to

The National Science Foundation

25 November 2014

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Introduction

The organization of this quarterly report reflects activities and deliverables that are outlined in the International Ocean Discovery Program (IODP) U.S. Implementing Organization (USIO) FY14 Annual Program Plan to the National Science Foundation (NSF) as implemented by the USIO, which comprises the Consortium for Ocean Leadership, Inc. (Ocean Leadership), and its partners, Texas A&M University (TAMU) and Lamont-Doherty Earth Observatory (LDEO) of Columbia University. In this document, references to TAMU include Texas A&M Research Foundation (TAMRF). When appropriate, this quarterly also reports on contract activities conducted for IODP's predecessor, the Integrated Ocean Drilling Program.

Management and Administration

The USIO provides integrated management that is led by Ocean Leadership in coordination with LDEO and TAMU. Management and Administration functions include planning, coordinating (with other IODP-related entities), overseeing, reviewing, and reporting on IODP activities.

USIO reports

FY14 Q3 IODP-USIO Quarterly Report

The USIO report for the third quarter of FY14 (April–June 2014) was submitted to NSF on 14 August 2014 (http://iodp.tamu.edu/publications/AR/FY14/FY14_Q3.pdf).

IODP-USIO Contract Closeout Plan

A revised IODP-USIO Closeout Plan for Contract OCE-0352500 was submitted to NSF on 3 July 2014.

IODP-USIO Final Technical Report to NSF

Planning and development was conducted for the IODP-USIO Final Technical Report to NSF, which will be delivered to NSF on 26 November.

Reporting and liaison activities

The USIO reports to and liaises with funding agencies and IODP-related agencies (e.g., facility boards), advisory panels, Program Member Offices (PMOs), and other national organizations, and participates in facility board, advisory panel, and IODP Forum meetings.

Meetings

Standard facility board, advisory panel, and other special meetings are listed in the Conference and Meeting Schedule below. USIO attendees to all meetings are listed in "Appendix B: Travel." Minutes from the facility board meetings will be made available online (<http://www.iodp.org/facility-boards>).

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Conference and meeting schedule

Conference/Meeting*	Date	Location
Chikyu Facility Board Meeting	11–14 July 2014	Yokohama, Japan

*Implementing organization meetings, advisory panel meetings, and Program-sponsored conferences.

Contract services

Ocean Leadership

Contract activity

Ocean Leadership received the following modifications during the reporting period.

NSF Contract OCE-0352500 with Ocean Leadership

- Modification 67: Extended the period of performance through 30 June 2015, approved the FY15 closeout budget of \$1,316,765, provided \$400,000 in incremental funding for the FY15 closeout budget, reduced the FY14 Annual Program Plan by \$504,911 to \$63,794,889, increased the contract's total value by \$811,854 to \$614,652,204, and updated the indirect rate chart.

Subcontract activity

Ocean Leadership issued the following subcontract modifications during the reporting period.

Ocean Leadership Subcontract JSC 4-03 with LDEO

- Modification 72: Extended the period of performance through 30 June 2015, approved the FY15 closeout budget of \$575,465, provided \$174,812 in incremental funding for the FY15 closeout budget, reduced the FY14 Annual Program Plan by \$51,286 to \$6,377,322, and increased the subcontract's total value by \$524,179 to \$61,405,204.

Ocean Leadership Subcontract JSC 4-02 with TAMRF

- Modification 87: Reduced the FY14 Annual Program Plan by \$443,616 to \$55,168,513 and reduced the subcontract's total value by \$443,616 to \$467,719,106.

LDEO

Subcontract activity

LDEO issued the following subcontract modifications during the reporting period.

LDEO subcontract with Schlumberger

- Amendment 14: Provided incremental FY14 funding in the amount of \$719,033.
- Amendment 15: Provided a no-cost extension through 31 December 2014.

LDEO subcontract with Howard & Associates Intl.

- Amendment 7: Provided incremental FY14 funding in the amount of \$46,335.

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LDEO subcontract with Leicester University

- Amendment 24: Provided incremental FY14 funding in the amount of \$35,000.
- Amendment 25: Provided a no-cost extension through 31 December 2014.

TAMRF

Subcontract activity

TAMRF issued the following subcontract modifications during the reporting period.

TAMRF subcontract with Overseas Drilling Limited

- Amendment 18: Provided incremental funding in the amount of \$6,300,000.

Contracts/procurement activity (\$100,000 or greater)

- 21 July 2014: Issued a purchase order to PSI Technology for the purchase of a server and associated support.
- 28 August 2014: Issued a purchase order to Tubojapan International in the amount of \$104,433.73 for the purchase of drill pipe inspection services.
- 19 September 2014: Issued a purchase order to Cortland Fibron BX Limited in the amount of \$336,224 for the purchase of an electro-optical-mechanical (EOM) cable.

Miscellaneous activity

- 29 August 2014: Submitted a Request for Approval letter to Ocean Leadership to purchase drill pipe inspection services.
- 16 September 2014: Submitted a Request for Approval letter to Ocean Leadership to purchase an EOM cable.

Insurance related to Ocean Leadership subcontracts

Total premiums for the USIO FY15 program of insurance will decrease approximately 3%, including all London-based and domestic policies for which premiums are determined, in part, on the projected FY15 expedition schedule and payroll.

Personnel status

Ocean Leadership

No positions were vacated, opened, advertised, or filled during the quarter.

LDEO

No positions were vacated, opened, advertised, or filled during the quarter.

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TAMU

The following positions were vacated during the quarter:

- Research Assistant I (Ty Cobb): 19 August 2014
- Research Assistant I (Gemma Maxwell): 29 September 2014

The following positions were opened and advertised during the quarter:

- Research Assistant I: 23 July 2014
- Staff Scientist: 24 July 2014

The following position was filled during the quarter:

- Graphics Specialist II (Douglas Cummings): 18 August 2014

USIO web services

The USIO websites are hosted at TAMU, LDEO, and Ocean Leadership. In addition to internal USIO web page updates and additions, new content is regularly added to IODP expedition web pages at iodp.tamu.edu/scienceops/expeditions.html.

USIO website statistics

USIO website	FY14 Q4 page views*	FY14 Q4 site visits*
www.iodp-usio.org	16,523	11,295
iodp.ldeo.columbia.edu	14,713	3,005
iodp.tamu.edu	836,806	42,758
Total	868,042	57,058

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

Legacy documentation

The USIO routinely archives electronic copies of documents and reports produced on behalf of IODP and the Integrated Ocean Drilling Program.

Legacy digital archive

Legacy preservation activities include storing electronic copies of relevant management and administration–related documents and reports produced by the USIO. Documents and publications archived this quarter in a dedicated Content Management System (CMS) included the IODP-USIO FY14 Q3 report, revised IODP-USIO Contract Closeout Plan, and contract modifications.

Legacy web services

Key data, documents, and publications produced during the Deep Sea Drilling Project (DSDP) and Ocean Drilling Program (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. The legacy websites contain downloadable documents that cover a wide spectrum of Program information, from laboratory and instrument manuals to all of the Program’s scientific publications, journals, and educational materials.

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The ODP Science Operator website and the DSDP Publications website are hosted at TAMU. The ODP legacy website is hosted at Ocean Leadership.

Legacy website statistics

Legacy website	FY14 Q4 page views*	FY14 Q4 site visits*
www-odp.tamu.edu	989,322	105,467
www.odplegacy.org	6,295	2,453
www.deepseadrilling.org	104,389	34,160
Total	1,100,006	142,080

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

Other projects and activities

TAMU Project Portfolio Management program

TAMU continued progress on the Laboratory Information Management System (LIMS) On-line Report Environment (LORE) and Stratigraphic Correlation Enhancements projects. Both projects are on track for completion by 30 November, and will be used in support of Expedition 353.

Technical, Engineering, and Science Support

The USIO is responsible for planning, managing, coordinating, and performing activities and providing services, materials, platforms, and ship- and shore-based laboratories for USIO expeditions; long-range operational planning for out-year USIO 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.

JOIDES Resolution expedition schedule

Expedition	Port (Origin)	Dates ^{1, 2}	Total Days (Port/ Sea)	Days at Sea (Transit ³ / Ops)	Co-Chief Scientists	USIO Contacts ⁴	
Izu Bonin Mariana (IBM): Reararc	350	Keelung	30 March–30 May 2014	61 (5/56)	56 (4/52)	Y. Tamura C. Busby	TAMU: P. Blum* LDEO: G. Guerin^
IBM Arc Origins	351	Yokohama, Japan	30 May–30 July 2014	61 (5/56)	56 (5/51)	R. Arculus O. Ishizuka	TAMU: K. Bogus* LDEO: L. Drab^
IBM Forearc	352	Yokohama, Japan	30 July–29 September 2014	61 (5/56)	56 (7/49)	J. Pearce M. Reagan	TAMU: K. Petronotis* LDEO: S. Morgan^
Dry Dock/Non-IODP [29 September–29 November 2014]						M. Malone*	
Indian Monsoon	353	Singapore	29 Nov 2014–29 January 2015	61 (5/56)	56 (7/49)	S. Clemens W. Kuhnt	L. LeVay*
Bengal Fan	354	Singapore	29 January–31 March 2015	61 (5/56)	56 (6/50)	C. France-Lanord T. Schwenk	A. Klaus*
Arabian Sea Monsoon (CPP) ⁵	355	Colombo, Sri Lanka	31 March–31 May 2015	61 (5/56)	56 (5/51)	D. Pandey P. Clift	D. Kulhanek*
Dry Dock/Non-IODP [31 May–31 July 2015]						M. Malone*	

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Expedition		Port (Origin)	Dates ^{1, 2}	Total Days (Port/ Sea)	Days at Sea (Transit ³ / Ops)	Co-Chief Scientists	USIO Contacts ⁴
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 ⁶	359	Darwin, Australia	30 September–30 November 2015	61 (5/56)	56 (17/39)	TBD	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)	TBD	P. Blum*
South African Climates ⁷	361	Port Louis, Mauritius	30 January–31 March 2016	61 (5/56)	56 (6/50)	TBD	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)	TBD	K. Petronotis*
Western Pacific Warm Pool	363	Singapore	30 September–30 November 2016	61 (5/56)	56 (8/48)	TBD	D. Kulhanek*

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 The USIO contact list includes both the Expedition Project Manager (*), who is the primary contact for the expedition, and the Logging Staff Scientist (^). In addition, further expedition information can be obtained at <http://iodp.tamu.edu/scienceops/expeditions.html>.

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

⁶ Also includes Proposal 849-APL, Indian Peninsula Paleoclimate.

⁷ Also includes Proposal 845-APL, Agulhas Current LGM Density.

USIO expeditions

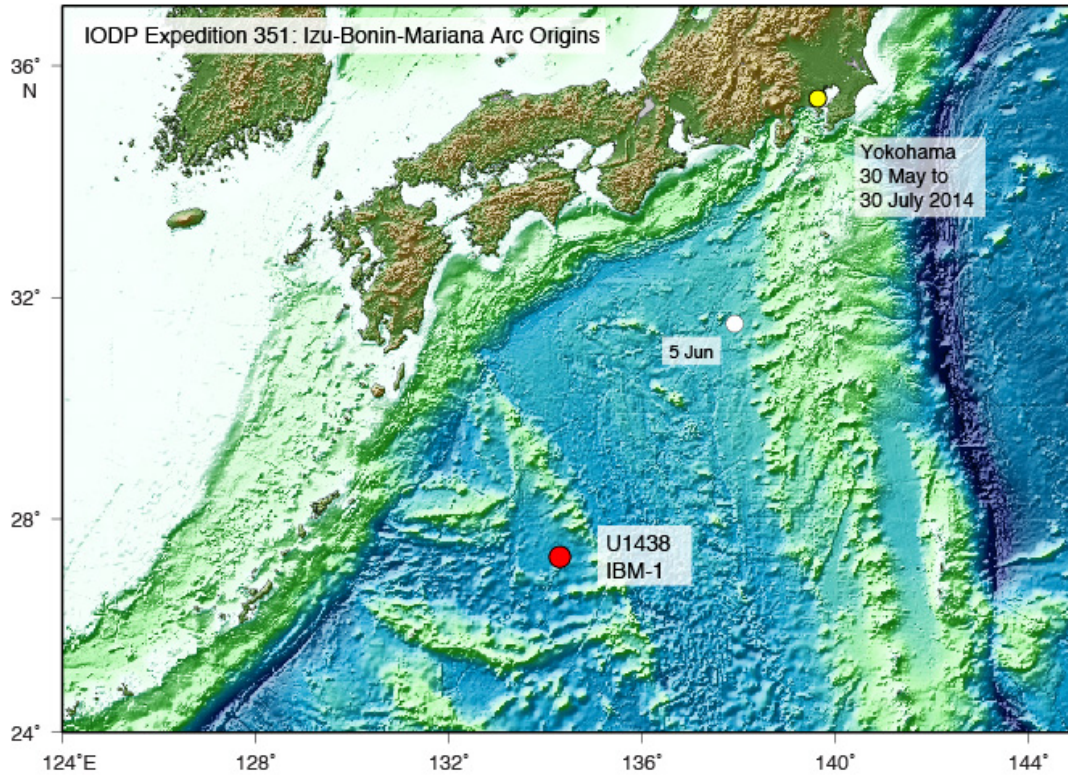
Expedition 351: Izu-Bonin-Mariana: Arc Origins

Staffing

Expedition 351 Science Party staffing breakdown		
Member country/consortium	Participants	Co-Chief Scientists
USA: United States Science Support Program (USSSP)	8	
Japan: Japan Drilling Earth Science Consortium (J-DESC)	3	1
Europe and Canada: European Consortium for Ocean Research Drilling (ECORD) Science Support and Advisory Committee (ESSAC)	8	
Republic of Korea: Korea Integrated Ocean Drilling Program (K-IODP)	0	
People's Republic of China: IODP-China	3	
Australia and New Zealand: Australia/New Zealand IODP Consortium (ANZIC)	2	1
India: Ministry of Earth Science (MoES)	0	
Brazil: IODP-Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)/Brasil	1	

Two scientists had to withdraw late in the process, but it was only possible to replace one of them, so J-DESC sailed with only 3 scientists.

Site map



Coring summary

Site	Hole	Latitude	Longitude	Water depth (m)	Cores (n)	Interval cored (m)	Core recovered (m)	Recovery (%)
U1438	U1438A	27°23.0108'N	134° 19.1020'E	4,700.2	3	26.5	24.90	94.0
	U1438B	27°23.0111'N	134° 19.1087'E	4,700.5	30	257.3	227.04	88.0
	U1438C	27°22.9963'N	134° 19.0883'E	4,700.2	0	0.0	0.00	0.0
	U1438D	27°23.0218'N	134° 19.1023'E	4,700.2	71	678.8	523.17	77.0
	U1438E	27°23.0153'N	134° 19.0898'E	4,700.0	85	743.7	450.73	61.0
	U1438F	27°23.0167'N	134° 19.0905'E	4,699.9	0	0.0	0.00	0.0
Expedition 351 totals:					189	1,706.3	1,225.84	71.8

Logging summary

Planned logging of Site U1438 called for deployment of four tool strings: the triple combination (triple combo; gamma ray, resistivity, porosity, and density) with the Magnetic Susceptibility Sonde (MSS), the Formation MicroScanner (FMS)-sonic (resistivity images and sonic velocity), the Göttingen borehole magnetometer (GBM), and the Versatile Seismic Imager (VSI; vertical seismic profile). This site was partially logged in Hole U1438D, and additional logging operations were carried out in Holes U1438E and U1438F during the reporting period. In Hole U1438E, the triple combo tool string was deployed first without a nuclear source due to poor borehole conditions. Because of an obstruction, the triple combo could not reach total depth (1,611 meters below seafloor [mbsf]) and logged the interval from 1,186 mbsf up to the base of the 10.75 inch casing (605 mbsf). As the caliper data showed a hole diameter too large to run other tool strings, only the GBM magnetometer tool was deployed and logged the 1,186–605 mbsf interval. To obtain logging measurements in the cased interval, a dedicated Hole U1438F was

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drilled to 700 mbsf and logged with the triple combo and FMS-sonic tool strings. A VSI run also measured traveltimes at nine stations in a check shot experiment. The check shot results and the sonic velocity data will allow determination of an accurate traveltime-depth relationship and correlation of Site U1438 observations to seismic reflection sections.

Science Summary

The intra-oceanic Izu-Bonin-Mariana (IBM) arc in the northwestern Pacific has been intensively examined over the past few decades, and much of its overall tectonic and magmatic history has been revealed. Arc inception occurred at ~52 Ma, concurrent with a major change in the motion of the Pacific plate. Sundering of the active volcanic axis of the arc took place at ~25 Ma, with formation of a volcanically inactive remnant arc (Kyushu-Palau Ridge [KPR]) accompanying seafloor spreading and eastward migration of the active volcanic front. The Amami Sankaku Basin (ASB) lies adjacent to and on the west flank of the northern KPR; the ASB floor has a simple structure comprising ~1.5 km of sediment overlying igneous oceanic crust. Expedition 351 targeted the ASB anticipating that recovery of the earliest stages of arc inception and evolution of the northern IBM arc would be preserved in the sedimentary record and that igneous basement samples would permit determination of the petrological, geochemical, and age characteristics of the pre-KPR crust in the region, from which the geochemical composition of the mantle prior to IBM arc inception and growth could be identified.

Expedition 351 successfully accomplished its primary and most of its secondary objectives at Site U1438 in 4,700 m water depth, penetrating 1,461 m of sediment and 150 m of variably altered and veined sheeted lava flows of sparsely vesicular to nonvesicular, microcrystalline to fine-grained, aphyric to sparsely micropphyric (spinel-olivine-plagioclase-clinopyroxene), high-Mg, low-Ti, tholeiitic basalts, which form the uppermost oceanic igneous basement (Unit 1). Four additional units were established in the overlying sedimentary column; from oldest to youngest these are Unit IV (99.7 m) comprising mudstone, tuffaceous siltstone, breccia-conglomerate, sandstone, and radiolarian-bearing mud; Unit III (1,046 m) comprising Eocene–Oligocene tuffaceous mudstone, tuffaceous sandstone, gravel, and breccia-conglomerate with pebble/cobble-sized volcanic and sedimentary rock clasts; Unit II (139.4 m) comprising Oligocene tuffaceous mudstone, siltstone, and fine sandstone with localized slumping; and Unit I (160.3 m) comprising latest Oligocene to recent mud and ooze of terrigenous and biogenic origin, with interspersed and discrete tephra layers. The recovery at Site U1438 of an extensive sediment sequence will allow comprehensive analysis of the provenance, geochemical and petrological characteristics, and style of earliest arc magmatic activity in the KPR.

The voluminous volcanoclastic materials recovered from the Eocene through Oligocene sequence of Units II, III, and IV contain sufficiently fresh glass (at least in the shallower section) and igneous minerals (including the ubiquitous occurrence of amphibole) to allow comprehensive petrological and geochemical studies to determine the compositional evolution during the Paleogene of the IBM arc. This phase is rare in the tephra recovered from previously drilled sites in the IBM forearc and may indicate that significant across-arc strike compositional variability of magma composition was established in the Paleogene.

The FMS images show bedding and other features that may help characterize the large-scale tectonic development of the ASB; structural orientation may characterize the geographic provenance of the coarse-grained sediments. Sonic and density data from logs and cores will give a time-depth relationship

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for the site, providing characterization of seismic boundaries and accurate tie-points between core/log data and seismic data. The seismic velocity structure of the ASB specifically and adjacent KPR more generally will become better constrained.

The percentage of recovery and the quality of the cores obtained in the uppermost Unit I provide an excellent paleoceanographic sedimentary record, including the mid-Miocene climatic optimum, the Oligocene–Miocene transition, and the Eocene/Oligocene boundary, as well as a high-resolution record of the Pliocene–Pleistocene. Numerous layers of volcanic ash were recovered in the recent to Miocene sediments of Unit I, comprising fresh glass shards and igneous minerals. Pyroclastic components are dominantly vitric pumice and shards, whereas phenocrysts and isolated volcanogenic crystals include pyroxene, plagioclase, biotite, and quartz. Comparison of glass and mineral compositions with published data for the Ryukyu-Kyushu, Honshu, and Neogene IBM arcs will permit identification of the sources of volcanic ash; pending further age constraints, new data from Site U1438 will permit refined modeling of volumes, explosivity, and geochemical properties of the explosive output of the respective arcs surrounding the ASB.

The fundamentally important discovery of the age and composition of the oceanic basement at Site U1438 has provided critical constraints on the inception of the intra-oceanic IBM arc. It appears major motion changes of the Pacific plate following subduction of the Izanagi-Pacific Ridge along East Asia led to a reorganization of equatorially located networks of island arc systems in the region between the Australian and Asian plates. The Philippine Sea plate developed in this region and experienced trench rollback at one or more of its bounding plate margins. The oldest magmatic basement of the IBM arc is both latitudinally and longitudinally extensive, developed in a seafloor-spreading regime, and is dominated by tholeiitic magmas.

Expedition 352: Izu-Bonin-Mariana: Forearc

Planning

Final science, technical, and logistical planning was completed and air freight was dispatched to Yokohama during the quarter.

Staffing

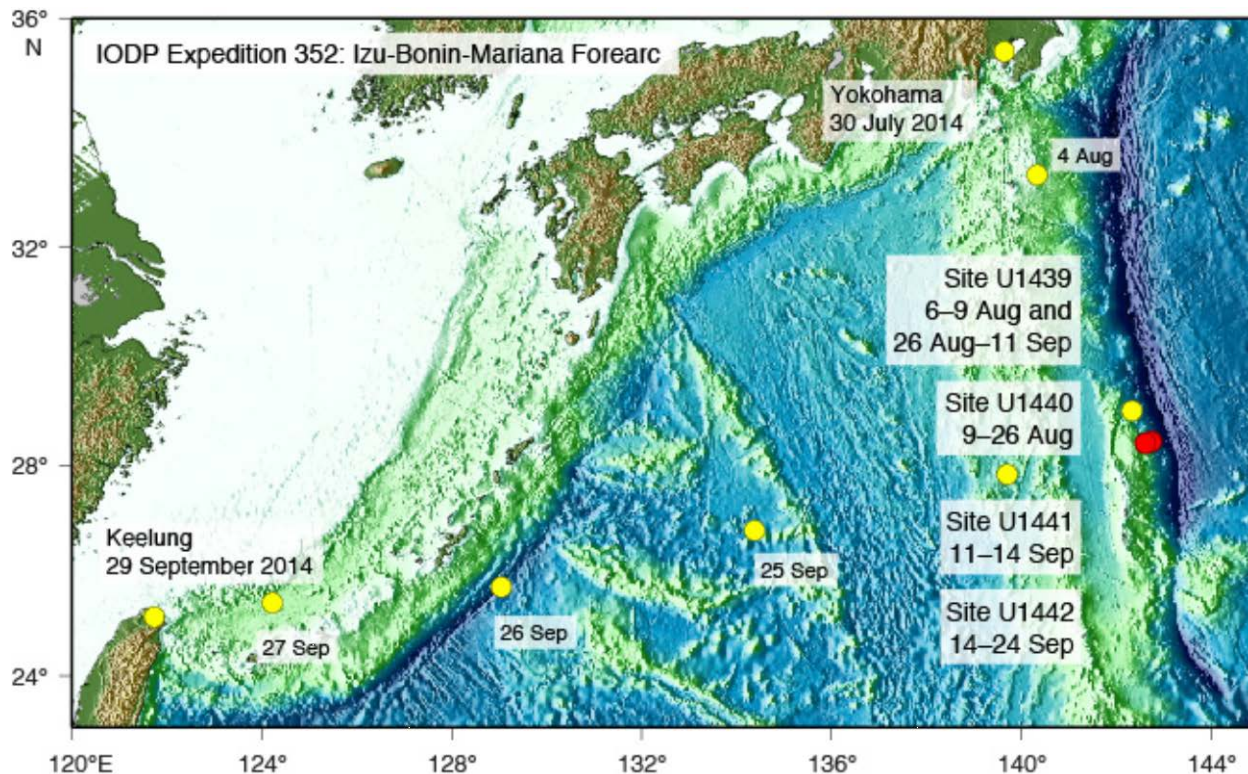
Expedition 352 Science Party staffing breakdown		
Member country/consortium	Participants	Co-Chief Scientists
USA: United States Science Support Program (USSSP)	8	1
Japan: Japan Drilling Earth Science Consortium (J-DESC)	4	
Europe and Canada: European Consortium for Ocean Research Drilling (ECORD) Science Support and Advisory Committee (ESSAC)	8	1
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)	0	
Brazil: IODP-Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)/Brasil	1	

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Clearance and permitting activities

An amended authorization to conduct marine research in Japanese waters that included the request for the contingency option to deepen and log Expedition 350 Site U1437 was issued 29 July 2014.

Site map



Coring summary

Site	Hole	Latitude	Longitude	Water depth (m)	Cores (n)	Interval cored (m)	Core recovered (m)	Recovery (%)
U1439	U1439A	28°24.4487'N	142°36.5120'E	3,128.1	23	199.4	170.66	85.6
	U1439B	28°24.4478'N	142°36.5244'E	3,128.2	0	0.0	0.00	0.0
	U1439C	28°24.4491'N	142°36.5368'E	3,129.2	42	362.3	107.84	29.8
Site U1439 totals:					65	561.7	278.50	49.6
U1440	U1440A	28°26.9890'N	142°45.2243'E	4,775.2	14	106.1	96.58	91.0
	U1440B	28°26.9976'N	142°45.2244'E	4,775.2	36	281.3	34.71	12.3
Site U1440 totals:					50	387.4	131.29	33.9
U1441	U1441A	28°25.6379'N	142°43.5390'E	4,446.9	22	205.7	50.74	24.7
Site U1441 totals:					22	205.7	50.74	24.7
U1442	U1442A	28°24.5784'N	142°37.3368'E	3,162.0	57	529.8	100.70	21.5
Site U1442 totals:					57	529.8	100.70	19.0
Expedition 352 totals:					194	1,684.6	561.23	33.3

Logging summary

Three sites were logged during Expedition 352 with two tool strings: the triple combo (gamma ray, resistivity, porosity, and density) and the FMS-sonic (resistivity images and sonic velocity). In addition, either the Ultrasonic Borehole Imager (UBI) or the Magnetic Susceptibility Sonde (MSS) were added at the bottom of the triple combo. In Hole U1440B, the triple combo-UBI tool string logged the interval above a borehole obstruction at 258 mbsf (~130 m above total depth), and the FMS-sonic tool string was able to log up from 246 mbsf. Hole U1439B was logged with the triple combo-MSS and the FMS-sonic tool strings above 402 mbsf (~140 m above total depth), where an obstruction in an inferred fault zone prevented further descent. Similar conditions were encountered in Hole U1442A, where the triple combo-MSS reached 370 mbsf (~160 m above total depth) and the FMS-sonic logged up from 286 mbsf. The log data collected from these three sites complement core recovery with continuous measurements of natural radioactivity, density, resistivity, and sonic velocity. Oriented microresistivity borehole images indicate a range of textures and structural features, including veins, fractures, and vesicles.

Science Summary

The objectives for Expedition 352 were to drill through the entire volcanic sequence of the Bonin forearc to (1) obtain a high-fidelity record of magmatic evolution during subduction initiation and early arc development, (2) test the hypothesis that fore-arc basalts (FAB) lie beneath boninite and to understand chemical gradients within these units and across the transition, (3) use drilling results to understand how mantle melting processes evolve during and after subduction initiation, and (4) test the hypothesis that the forearc lithosphere created during subduction initiation is the birthplace of suprasubduction zone ophiolites.

Expedition 352 successfully cored 1.22 km of igneous basement and 0.46 km of overlying sediment, providing diverse, stratigraphically controlled suites of FAB and boninite related to seafloor spreading and earliest arc development. FAB was recovered at the two deeper water sites (U1440 and U1441) and boninites at the two sites (U1439 and U1442) drilled upslope to the west. FAB lavas are depleted in high-field strength trace elements such as Ti and Zr relative to mid-ocean-ridge basalt (MORB), but have relatively diverse concentrations of trace elements because of variation in degrees of melting and the amount of subducted fluid involved in their genesis. All FAB underwent significant crystal fractionation in a persistent magma chamber system. Holes U1439C and U1442A yielded entirely boninitic lavas. We classified three boninite differentiation series based on variations in MgO, SiO₂, and TiO₂ concentrations for parental magmas. Lavas in both pairs of holes have compositions that generally become more primitive and have lower TiO₂ concentrations uphole. The presence of dikes at the base of the sections at Sites U1439 and U1440 provides evidence that boninitic and FAB lavas are both underlain by their own conduit systems and that FAB and boninite group lavas are likely offset more horizontally than vertically. We thus propose that seafloor spreading related to subduction initiation migrated from east to west after subduction initiation and during early arc development. Initial spreading was likely rapid, and an axial magma chamber was present. Melting was largely decompressional during this period, but subducted fluids affected some melting. As subduction continued and spreading migrated to the west, the embryonic mantle wedge became more depleted and the influence of subducted constituents dramatically increased, causing the oceanic crust to be built of boninitic rather than tholeiitic magma. The general decrease in fractionation uphole reflects the eventual disappearance of persistent magma

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chambers, either because spreading rate was decreasing with distance from the trench or because spreading was succeeded by off-axis magmatism trenchward of the ridge. The extreme depletion of the sources for all boninitic lavas was likely related to the incorporation of mantle residues from FAB generation. This mantle depletion continued during generation of lower silica boninitic magmas, exhausting clinopyroxene from the mantle such that the capping high-Si, low-Ti boninites were generated from harzburgite.

Additional results of Expedition 352 include the recovery of Eocene to recent deep-sea sediments that record variation in sedimentation rates with time because of variations in climate, the position of the carbonate compensation depth (CCD), and local structural control. Three phases of highly explosive volcanism (latest Pliocene to Pleistocene, late Miocene to earliest Pliocene, Oligocene) were identified, represented by a total of 132 graded air fall tephra layers. Structures found in the cores and reflected in seismic profiles show that this area had periods of normal, reverse, and strike-slip faulting. Finally, basement rock *P*-wave velocities were shown to be slower than those observed during logging of normal ocean crust sites.

Expedition 353: Indian Monsoon

Planning

Review of sample requests and research plans took place as well as review of the requests to refine science needs for the laboratories. Final logistical requirements were reviewed and shipping to the vessel was initiated. Discussions were also initiated with the Co-Chief Scientists to seek alternate sites in international waters in case India does not approve the marine research applications.

Staffing

One scientist from India withdrew from Expedition 353 on 23 August in favor of another expedition. On 11 September, IODP-India removed the remaining Indian scientist from the expedition and indicated they cannot provide a replacement.

Clearance and permitting activities

The American Embassy in India reached out to India's Ministry of Earth Science (MoES) to see if MoES could help push the marine scientific research application request through India's Ministry of External Affairs (MEA). MoES responded that they are not part of the project and would not be part of its implementation and hence could not be supportive of the marine scientific research application. The U.S. State Department continued efforts to obtain authorization, pursuing several different approaches.

Expedition 354: Bengal Fan

Planning

Planning during the quarter focused on ensuring that laboratory requirements for the expedition will be met and reviewing special requests from the Science Party. Initial review of sample requests and research plans was also initiated.

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Staffing

Final science staffing was completed this quarter, including replacement of one of the Co-Chief Scientists who had to withdraw from participation at the end of August.

Environmental assessment

A purchase order was issued for an environmental evaluation for conducting a check shot survey during the expedition.

Expedition 355: Arabian Sea Monsoon CPP

Planning

The USIO began initial communications with the Science Party to discuss laboratory requirements.

Staffing

Science staffing was nearly completed this quarter, with 27 scientists accepting invitations. A call was issued to fill specific specialties for the remaining two positions.

Expedition 356: Indonesian Throughflow

Planning

The *Scientific Prospectus* was published 7 August. In addition, the Australia/New Zealand International Ocean Discovery Program (ANZIC) expressed an interest in conducting education and outreach activities at both Australian port calls.

Staffing

The first round of invitations were issued this quarter to 13 scientists.

Expedition 359: Maldives Monsoon and Sea Level

Planning

Preparations began for the pre-expedition meeting, which is scheduled for the beginning of next quarter.

Staffing

Two of the proposal proponents accepted invitations to sail as Co-Chief Scientists.

Expedition 360: Southwest Indian Ridge Lower Crust and Moho

Planning

Preparations began for the pre-expedition meeting, which is scheduled during the next quarter, including detailed discussion of hole initiation and reentry options.

Staffing

Two of the proposal proponents accepted invitations to sail as Co-Chief Scientists.

Expedition 361: South African Climates

Planning

Initial discussions with the Co-Chief Scientists began this quarter.

Staffing

Two of the proposal proponents accepted invitations to sail as Co-Chief Scientists.

Expedition 362: Sumatra Seismogenic Zone

Clearance and permitting activities

The *JOIDES Resolution* Science Operator (JRSO) reviewed previous documentation required for obtaining authorization to operate in Indonesian waters, which were provided by U.S. State Department and proposal proponents. The JRSO initiated contact with the American Embassy in Indonesia and an agency in the Indonesian government named Badan Pengkajian dan Penerapan Teknologi (BPPT). BPPT indicated an interest in developing a Memorandum of Understanding (MOU) for the expedition and provided an initial contact for the effort.

Analytical systems

Analytical systems acquisitions and updates

The Thermo NITON XL3t GOLDD handheld X-ray fluorescence (XRF) instrument was repaired and returned to the *JOIDES Resolution* in time for Expedition 352. The Science Party used the instrument extensively and quite successfully to analyze both powders and bulk rock (practical because the basalt and boninite were both quite fine grained) and to better break out lithologic units with no phenocrysts or nonvarying phenocrysts.

New FLIR E8 cameras were purchased to replace the older, unreliable FLIR cameras used during Phase 1 of the Integrated Ocean Drilling Program. The Expedition 353 Science Party requested infrared imaging capability on the catwalk to identify cold spots in the unsectioned core, since the depth/temperature regime of the planned drill sites could potentially form methane hydrates.

Space constraints in the area of the special task multisensory logger (STMSL) prevented installation of the type of *P*-wave logger used on the whole-round multisensory logger (WRMSL), so the USIO purchased more compact roller-style *P*-wave transducers from GeoTEK, Ltd., to install in the STMSL. This configuration can also be directly compared to the piston style for further development.

After one of the Minex FlexIT core orientation tools failed, and upon learning that Minex no longer supports the tool, the USIO conducted a market survey of orientation tools and acquired MI5 Borehole Survey instruments from Icefield Tools, Ltd. These tools will be deployed for the first time during Expedition 353.

A new A.S.C. Scientific D-TECH Model D-2000 alternating field (AF) demagnetizer was purchased to replace the 20-year-old instrument, which had developed a number of faults in recent cruises. The new D-TECH will be delivered during the second quarter and will be deployed on either Expedition 355 or during the tie-up after it.

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Finally, IODP purchased a new helium-free cryogenic magnetometer from 2G Enterprises. This system will take some time to manufacture and deliver, so deployment of the new system is expected during FY16 or later.

Laboratory working groups

The four 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. The Geology, Geochemistry, and Curation and Core Handling LWGs did not meet this quarter but scheduled meetings next quarter to discuss issues arising from recent expeditions.

Geophysics

Members of the Geophysics LWG met this quarter to discuss routine maintenance issues from recent expeditions and passed on to the physical properties technicians a request to implement a preventive maintenance schedule for the tie-up periods. A draft of this schedule was implemented during the current tie-up period in Subic Bay, the Philippines. A meeting of the full LWG to discuss the three IBM expeditions is scheduled for early next quarter.

Projects and other activities

Geoscience Laboratory

The TAMU Ocean Drilling and Sustainable Earth Science (ODASES) Geoscience Laboratory hosted three groups of scientists during this period for XRF scanning projects. The instrument has worked reliably since the replacement of the X-ray source and the upgrade of the instrument host computer. The XRF utilization was low this quarter, with only 40% of available days utilized.

Engineering support

Engineering equipment acquisitions and updates

Vibration isolated television system

The new replacement cable for the vibration isolated television (VIT) system was fabricated but failed initial tests. After the vendor admitted they could not meet the specs, the product was rejected. The USIO located an alternate vendor that is also being utilized by other oceanographic deepwater operators and ordered a new cable with a superior design at the end of the quarter.

Projects and other activities

Large-diameter pipe-handling infrastructure

Final acceptance testing of the large-diameter pipe-handling infrastructure took place in Germany on 26–29 October. This testing included a review of dolly and elevator revisions and spare parts; measurement of ears on elevators; function testing of blocks, safety clamps, and the elevator/dolly/stool system, including timing; and functional load testing of all four elevators.

Legacy documentation

The USIO routinely archives electronic copies of documents and reports produced on behalf of IODP and the Integrated Ocean Drilling Program. Legacy preservation activities for Technical, Engineering, and Science Support include storing electronic copies of expedition daily, weekly, and site summary reports; appropriate operations and engineering reports; and other technical documentation.

Engineering Development

The USIO is responsible for utilizing IODP resources to oversee and/or provide engineering development projects in accordance with the long-term engineering needs of IODP as prioritized by the *JOIDES Resolution* Facility Board.

USIO Technical Panel

The USIO Technical Panel (UTP) includes external members from industry and academia who will participate in bi-annual meetings to review engineering and operations issues within the USIO with the purpose of providing third-party advice to aid the USIO. The UTP is administered and operated by Ocean Leadership, the U.S. Systems Integration Contractor, with assistance from the USIO partners.

Project status

There were no UTP activities during the quarter.

Core Curation

The USIO 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).

Sample and Data Requests application

The Sample and Data Request (SaDR) application is now in use for all DSDP, ODP, and IODP Expeditions with the exception of Expedition 347, which is still using the Sample Material Curation System (SMCS) until the end of the moratorium period (February 2015).

Curation strategies and expedition core sampling

The USIO planned sample and curation strategies this quarter for upcoming USIO Expeditions 353 and 354. A USIO Curatorial Specialist supervised shipboard core sampling during Expedition 352 and reviewed all shipboard and moratorium-related requests in coordination with the other members of the expedition Sample Allocation Committee (SAC).

Curating the GCR core collection

All IODP core sample requests are handled by the GCR, Bremen Core Repository, and Kochi Core Center. The USIO conducts all responsibilities associated with curation of the GCR core collection and provides services in support of core sampling, analysis, and education.

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Repository activity

The following “Sample requests” table provides a summary of the 2,870 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.

Sample requests

Sample request number, name, country	Number of samples taken	Number of cores XRF scanned	Number of cores Imaged	Number of visitors
22889B, O'Connel, USA	337	132	132	1
23052A, Martinez-Boti, United Kingdom	25			
23167A, Wortmann, Canada	15			
16577IODP, Orcutt, USA	5			
22627D, Woodard, USA	151			
16716IODP, Holbourn, Germany	132			
16696IODP, Jean, Germany	1			
23180A, Ford, USA	76			
23173A, Zhao, China	78			
23177A, France, France	15			
23182A, Super, USA	160			
23135B, Costandache, Switzerland	2			
23188A, Bach, Germany	35			
21000B, Jaeger, USA	1			1
1841IODP, Reece, USA	112			
23193A, Robinson, United Kingdom	8			
23190A, Watkins, USA	24			
23196A, Prebble, New Zealand	15			
23202A, Norris, USA	36			
23201A, Hoenisch, USA	38			
22374H, Deister-Haas, Germany	200			
17538IODP, Zellers, USA	21			
23198A, Dameron, USA	43			
21341L, Rafter, USA	339			
21341M, Rafter, USA	48			
17747IODP, Ohneiser, New Zealand	60			
17794IODP, Cowan, USA	192			
2154IODP, Drury, Germany	273			1
17724IODP, Kubota, Japan	26			
17775IODP, Egli, Austria	57			
18021IODP, Rincon, USA	33			
17877IODP, Prebble, New Zealand	8			
18344IODP, Geldmacher, Germany	4			
23199A, Wavrek, USA	10			1
23178A, Qi, China	100			
23178B, Qi, China	21			
18683IODP, Crowe, Canada	40			
16745IODP, Rumford, USA	19			
18708IODP, Prebble, New Zealand			3	

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Sample request number, name, country	Number of samples taken	Number of cores XRF scanned	Number of cores Imaged	Number of visitors
22644D, Kulhanek, USA		133	133	3
18321, LeVay, USA	61			2
18316IODP, St. John, USA	9			
18683IODP, Bauer, Canada	40			
Tours/demonstrations	7			101
Totals	2,877	265	268	110

GCR tours/visitors

Type of tour or visitor	Number of Visitors
Scientist visitors	9
Educational tours/demonstrations (6)	91
Public relations tours (1)	10
Totals	110

Use of core collection

The USIO 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. In addition to regular tours, the GCR hosted a TAMU Honors Oceanography class and gave tours to the Summer Science Safari Camp and a group of TAMU women department heads.

Legacy documentation

The USIO routinely archives electronic copies of documents and reports produced on behalf of IODP, as well as Integrated Ocean Drilling Program, DSDP, and ODP legacy materials. Legacy preservation activities for Core Curation include the following project.

Core working half imaging

The USIO conducted digital imaging of working half sections that were pulled for sampling or other scientific requests during the quarter. High-resolution images of core working halves are posted on the web for public viewing to show how much the working halves have been sampled to date (<http://iodp.tamu.edu/curation/samples.html>).

This routine procedure focuses on imaging only those sections that get sampled; therefore, the section list for imaging correlates with all sections that are pulled for sample requests (see the “Sample requests” table above). Resampling of previously imaged working halves also results in an updated image.

Other projects and activities

Core splitter

A new core splitter was designed and built specifically for the GCR and was delivered to the repository in September. The splitter is capable of cutting various diameter cores in plastic or aluminum liners. This equipment will be used to help re-curate of some older DSDP cores.

Data Management

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

Expedition data

LIMS database

Expedition 351 data 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. No new data were released from moratorium in this quarter.

Log database

The following data from USIO Expeditions 351 and 352 were processed and included in the online database:

- Expedition 351, Hole U1438E: standard;
- Expedition 351, Hole U1438F: standard, FMS, and seismic;
- Expedition 352, Hole U1439C: standard and FMS;
- Expedition 352, Hole U1440B: standard, FMS, and UBI; and
- Expedition 352, Hole U1442A: standard and FMS.

Expedition data requests

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

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Top 10 countries accessing USIO web databases						
Rank	Janus database		LIMS database		Log database	
	Country	Visitor sessions	Country	Visitor sessions	Country	Visitor sessions
1	USA	1,104	USA	3,307	USA	799
2	Germany	321	China	1,729	China	103
3	United Kingdom	319	United Kingdom	158	United Kingdom	96
4	China	193	Hungary	91	Brazil	54
5	Japan	138	Japan	82	Japan	46
6	Unknown	109	Germany	69	Germany	45
7	France	105	Unknown	39	France	40
8	Norway	70	France	37	Algeria	34
9	Netherlands	53	Russia	31	Australia	32
10	Turkey	33	Australia	19	India	31
	Others	313	Others	155	Others	236
	Total	2,758	Total	5,717	Total	1,516

Janus database web queries		
Rank	Query	Uploads
1	Imaging—photos	1,294
2	Imaging—prime data images	867
3	Sample	862
4	Core summaries	606
5	Paleo—age model	589
6	Chemistry—interstitial water	578
7	Site summaries	545
8	Hole trivia	351
9	Chemistry—rock eval	343
10	Physical properties—MSL	333
11	Hole summaries	318
12	Special holes	288
13	Physical properties—PWS	268
14	Physical properties—GRA	267
15	Chemistry—carbonates	255
16	X-ray diffraction	201
17	Requests	191
18	Physical properties—MAD	159
19	Paleo—Palinv	151
20	Imaging—closeups	149
	Others	2,045
	Janus database total	10,660

LIMS database web queries	
Query type	Views
LIMS Reports	16,268
Web Tabular Reports data	135
Web Tabular Reports samples	99
Web Tabular Reports summaries	58
LIMS database total	16,560

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Data requests submitted to the TAMU Data Librarian	
Requests	Total
How to access data	9
Photographs	4
Hole locations	3
Age	2
Depth	2
Samples	2
Seismic	2
Citation questions	1
Database functions (not data)	1
Descriptions	1
Drilling data	1
Logging	1
Magnetic susceptibility	1
Metadata	1
X-ray diffraction	1
Total	32

Countries submitting data requests to the TAMU Data Librarian	
Country	Total
USA	15
Germany	4
United Kingdom	4
Netherlands	2
Australia	1
Brazil	1
France	1
Iran	1
New Zealand	1
Spain	1
Suriname	1
Total	32

Other USIO web statistics*			
	Janus database	LIMS database	Log database
Database query hits:			
Entire site (successful)	19,591	35,935	9,881
Average per day	173	399	107.40
Visitor sessions:			
Total number of visitor sessions	2,725	6,998	1,516
Average per day	29.6	76	16.48
Average length of visit	No data available		6:45
International visitor sessions	1,512	2,391	47.30%
Visitor sessions of unknown origin	109	39	0.00%
Visitor sessions from United States	1,104	4,607	52.70%
Visitors:			
Unique visitors	949	1,144	729
Visitors who only visited once	607	559	661
Visitors who visited more than once	342	585	68
Average visits per visitor	2.87	6.12	2.08

Software development

LIMS On-line Report Environment (LORE)

Project scope and deliverables

The goal of this 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 red-green-blue color space [RGB]) from current on-line systems without crashing end-user's 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 reports going forward. It is viewed as the replacement for both Web Tabular Reports and the current LIMS Reports.

Project status

LORE remains on track for completion by 30 November and will be used in support of Expedition 353.

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 shall 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:

- 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 shall 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.
- Uploader for correlation files. The uploader program shall be updated to comply with the newly defined correlation files' content and format in bullet 1. This will also include the creation of new LIMS database tables for the correlation information.
- 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 bullets 1 and 2.
- The correlation files defined in bullet 1 and loaded in bullet 2 shall be reported similarly to the way they are currently reported, but using all the new definitions and database tables.

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- Update (or replace) the program used to extract correlation data from the LIMS database for use in the Correlator application (LIMS2Correlator). The main requirement is to include export of RGB data files.
- A naming convention for alternate depth scales and splices shall be implemented to facilitate user's selection of items from the choice lists on the LIMS Reports interface.
- Legacy data conversion shall be included in this project if external users and expedition project representatives deem it worthwhile by assisting in the process.
- Processes and tools shall be documented.

Project status

The Stratigraphic Correlation Enhancements project remains on track for completion by 30 November and will be used in support of Expedition 353.

Legacy documentation

Legacy preservation activities for Data Management this quarter included storing electronic copies of materials documenting all information technology architecture and corresponding services configurations.

IODP-LDEO inventory and online database update

The data inventory includes data from USIO Expeditions 301 to 352, including ESO Expeditions 302, 310, 313, and 325 and CDEX Expeditions 314, 319, 322, and 332.

Logging data archive

Logging data from the Integrated Ocean Drilling Program and IODP will be archived at the National Geophysical Data Center (NGDC) in Boulder, CO; with data bundled at the level of Exp-Site-Hole and stored as tar files, MD5 checksums generated for each of these bundles, and standard metadata records completed at this level of granularity. All USIO, CDEX, and ESO logging data as well as related documentation have been prepared for final submission to NGDC, and transfer of the data is expected to be completed by the end of December 2014.

Other projects and activities

LDEO IT inventory

LDEO IT equipment was inventoried on shore and on the ship, and preparations were made for disposal of obsolete and broken equipment. At the completion of Expedition 352, all LDEO IT systems were backed up to Network Attached Storage (NAS) and the two NAS systems were shipped back to LDEO. Hard drives of LDEO shipboard servers and workstations were wiped in compliance with Columbia University guidelines on equipment disposal, and custody was transferred to TAMU. Discussions on the disposition of shore-based IT systems continued.

Publications

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 reports, technical documentation, and scientific publications as defined in the USIO contract with NSF; and warehousing and distribution of Integrated Ocean Drilling Program, ODP, and DSDP publications.

IODP scientific publications

USIO publications

Scientific Prospectus

Gallagher, S.J., Fulthorpe, C.S., and Bogus, K.A., 2014. Reefs, oceans, and climate: a 5 million year history of the Indonesian Throughflow, Australian monsoon, and subsidence on the northwest shelf of Australia. *International Ocean Discovery Program Scientific Prospectus*, 356. <http://dx.doi.org/10.14379/iodp.sp.356.2014>

Data Reports

Kell, J.P., and Watkins, D.K., 2014. Data report: calcareous nannofossil biostratigraphy of Expedition 330, Louisville Seamount Trail, Sites U1372–U1377. *In* Koppers, A.A.P., Yamazaki, T., Geldmacher, J., and the Expedition 330 Scientists, *Proc. IODP*, 330: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.330.201.2014](https://doi.org/10.2204/iodp.proc.330.201.2014)

Shackford, J.K., Lyle, M., Wilkens, R., and Tian, J., 2014. Data report: raw and normalized elemental data along the Site U1335, U1336, and U1337 splices from X-ray fluorescence scanning. *In* Pälike, H., Lyle, M., Nishi, H., Raffi, I., Gamage, K., Klaus, A., and the Expedition 320/321 Scientists, *Proc. IODP*, 320/321: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.320321.216.2014](https://doi.org/10.2204/iodp.proc.320321.216.2014)

CDEX publications

Preliminary Report

Expedition 348 Scientists and Scientific Participants, 2014. NanTroSEIZE Stage 3: NanTroSEIZE plate boundary deep riser 3. *IODP Prel. Rept.*, 348. [doi:10.2204/iodp.pr.348.2015](https://doi.org/10.2204/iodp.pr.348.2015)

Data Report

Gao, Y., and Casey, J.F., 2014. Data report: major and trace element geochemistry of upper oceanic crust at IODP Site C0012. *In* Henry, P., Kanamatsu, T., Moe, K., and the Expedition 333 Scientists, *Proc. IODP*, 333: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.333.204.2014](https://doi.org/10.2204/iodp.proc.333.204.2014)

USIO reports

IODP Publication Services produces the USIO quarterly reports, annual reports, Annual Program Plans, and other reports as requested (see “USIO Reports” in “Management and Administration” for details on these documents).

Program-related citation statistics

2014 Ocean Drilling Citation Report

IODP Publication Services produces an annual Ocean Drilling Citation Report to provide information on how Program-related research is disseminated into the scientific community through publications. This report emphasizes the impact of Program science using figures that show citations in high-impact journals, master’s and doctoral dissertations based on Program science, research articles citing non-Program articles that contain primary research from IODP expeditions, and citations related to research undertaken in areas of continued interest throughout DSDP, ODP, the Integrated Ocean Drilling Program, and IODP.

This year’s study was conducted on citations published through December 2013 that were contained in the Ocean Drilling Citation Database as of June 2014 and “cited-by” statistics obtained through CrossRef and Google Scholar in September 2014. The study was completed this quarter and is available online at http://iodp.tamu.edu/publications/AGI_studies/AGI_study_2014.pdf.

Publications management

Integrated Ocean Drilling Program scientific publication deadline extension requests

The requirement of all Science Party members to conduct research and publish the results of their work is detailed in the Integrated Ocean Drilling Program Sample, Data, and Obligations Policy (www.iodp.org/program-policies/). To fulfill this obligation, scientists publish their papers in a peer-reviewed scientific journal or book that publishes in English, or as a peer-reviewed data report in the *Proceedings of the Integrated Ocean Drilling Program*. Manuscripts must be submitted within 20 months postmoratorium (26 months for synthesis papers). Science Party members may request a deadline extension of up to one year. The Platform Curator reviews and approves these extension requests, and IODP Publication Services monitors fulfillment of the publishing obligation. The tables below show extensions requested during the quarter and the status of all deadline extensions approved during the life of each volume.

Initial papers/data reports

Expedition	Submission deadline (20 months postmoratorium)	Deadline extensions approved in FY14 Q4	Overall extension status	
			Number approved	Number fulfilled
301	20 April 2007			
302	23 July 2007			
304/305	4 February 2008		14	12

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Expedition	Submission deadline (20 months postmoratorium)	Deadline extensions approved in FY14 Q4	Overall extension status	
			Number approved	Number fulfilled
308	7 March 2008		8	7
303/306	9 May 2008		13	10
307	13 June 2008		4	2
311	27 June 2008		12	8
309/312	28 August 2008		9	9
310	4 November 2008		16	13
313	4 August 2012		4	2
314/315/316	4 October 2010		27	22
317	4 September 2012		11	5
318	2 March 2013		4	
319	30 April 2012		6	3
320/321	30 June 2012		26	25
322	10 June 2012		11	7
323	10 August 2012		6	5
324	4 July 2012		10	9
325	16 March 2013*		31	8
327	5 May 2013		2	1
330	11 October 2013		10	2
333	18 January 2014			
334	13 December 2013†		31	
335	3 February 2014		4	1
336	16 July 2014	1		

*A 6 month extension was granted to the entire Science Party.

†A 1 year extension was granted to the entire Science Party.

Synthesis papers

Expedition	Submission deadline (26 months postmoratorium)	Deadline extensions approved in FY14 Q4	Overall extension status	
			Number approved	Number fulfilled
301	22 October 2007		1	1
302	21 January 2008		1	1
304/305	4 August 2008		1	1
308	8 September 2008		1	1
303/306	10 November 2008		1	1
307	15 December 2008		1*	1
311	29 December 2008		1	1
309/312	27 February 2009		1*	
310	4 May 2009		1*	
313	4 February 2013			
314/315/316	5 April 2011		1*	
317	4 March 2013			

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Expedition	Submission deadline (26 months postmoratorium)	Deadline extensions approved in FY14 Q4	Overall extension status	
			Number approved	Number fulfilled
318	2 September 2013			
319	30 October 2012			
320/321	30 December 2012			
322	10 December 2012			
323	10 February 2013			
324	4 January 2013		1	
325	16 September 2013			
327	5 November 2013			1
329	13 February 2014			
330	11 April 2014			
331	4 December 2013			
332	11 February 2014			

*Requests for submission deadline extensions beyond 38 months postmoratorium were received and referred to the respective Platform Curator.

Publications website

The IODP Publications website is hosted at TAMU. Traffic accessing USIO publications is monitored through publications.iodp.org.

Publications website	FY14 Q4 page views	FY14 Q4 site visits
www.iodp.org/scientific-publications	243,285	29,336

IODP digital object identifiers

IODP is a member of CrossRef, the official digital object identifiers (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. Statistics for the reporting quarter are shown in the table below.

Reports and publications	DOI prefix	Number of resolutions			
		July 2014	August 2014	September 2014	FY14 Q4 total
IODP	10.14379	35	17	39	91
Integrated Ocean Drilling Program	10.2204	4,243	3,299	3,960	11,502
ODP/DSDP	10.2973	6,245	4,045	3,975	14,265

Publications support

The USIO hosted the postexpedition editorial meetings for USIO Expedition 349 and CDEX Expedition 348 this quarter.

Technical documentation

Technical documents produced by the USIO are available to users via the Cumulus web client (iodp.tamu.edu/tasapps/) once they reach the technical draft stage.

Legacy documentation

The USIO routinely archives electronic copies of documents, reports, and scientific publications produced on behalf of IODP and the Integrated Ocean Drilling Program. Documents archived this quarter included all scientific publications produced during the quarter, the IODP-USIO FY14 Q3 report, and planning documentation for reporting deliverables.

Education

The USIO is responsible for developing and disseminating expedition-specific and thematic education activities and materials for elementary through post-secondary and free choice–learning audiences, promoting diversity programs and partnerships, and supporting legacy resources.

The USIO facilitates education activities through Deep Earth Academy (funded jointly by the USIO and the United States Science Support Program [USSSP]) in cooperation with other U.S. education and outreach groups, conducting teacher education activities; developing, testing, and disseminating educational curriculum that highlights IODP science research; and implementing live and near-real-time programs that highlight and use the *JOIDES Resolution* as a platform for education.

Professional development

2014 Schools of Rock

The second 2014 School of Rock of was held 10–16 August 2014 at the University of Delaware at Lewes. It focused on implementation of the Next Generation Science Standards, primarily for DC-based teachers. There were 18 participants, with instruction led by USIO staff and J. Biddle, a microbiologist at the University of Delaware. L. White (University of California, Berkeley Museum of Paleontology) and J. Johnson, a social psychologist, also led parts of the instruction.

Onboard educator program

A. Bogus (videographer) and M. Prosalik (Malvern Prep School) sailed as Education Officers on Expedition 351, and E. Christiansen (Dow High School) and A. West (independent multimedia producer) sailed as Education Officers on Expedition 352. West blogged on the National Geographic website (voices.nationalgeographic.com/author/awest/) in addition to the *JOIDES Resolution* website (joidesresolution.org), gaining an additional 2,782 hits.

Education Officers for Expedition 353 were also selected this quarter, with 1 American and 1 European educator sailing.

Educational outreach events

USIO staff gave presentations and manned an informational table at the Forum for Earth Sciences in Antarctica professional development workshop at the American Museum of Natural History (AMNH) in New York on 18 July. Approximately 100 New York–area teachers participated and received IODP materials.

The USIO presented several workshops and helped to sponsor and facilitate the National Marine Educators Association (NMEA) 2014 annual conference held 21–25 July in Annapolis, MD. More than 400 attendees participated.

Staff held an IODP-focused 3-hour workshop for 30 teachers at Ocean Leadership as part of the Smithsonian’s Earth’s History and Global Change Academy July 29.

The 2014 Smithsonian Science Education Academy for Teachers: Earth’s History & Global Change included an IODP-focused 3-hour workshop for 30 teachers held 29 July at Ocean Leadership.

A *JOIDES Resolution* Outreach Network (JRON) event was held 6 September at the Aquarium of the Pacific in Long Beach, CA. About a dozen JRON volunteers—mainly School of Rock alumni, Education Officers, and scientists—participated in facilitating hands-on table events, a reading of *Uncovering Earth’s Secrets*, and a live video broadcast with the *JOIDES Resolution* during Expedition 352. Volunteers interacted with more than 1,000 aquarium visitors during the event.

Expedition-based learning activities and materials

The USIO links school and public audiences to activities on board the *JOIDES Resolution* via advanced web technologies, the *JOIDES Resolution* website, video broadcasting, and/or podcasting. The USIO also produces new expedition-specific and thematic video and learning materials based on legacy material and science and life at sea during USIO expeditions.

JOIDES Resolution website and social networking

The joidesresolution.org website promotes each expedition with expedition pages, blogs, videos, images, and more, and serves as the hub for Program social networking on Facebook, Twitter, and YouTube sites. During this quarter, joidesresolution.org featured content from Expeditions 351 and 352. In addition, during this quarter the *JOIDES Resolution* Facebook page reached 5,000 “likes,” which is a major milestone. The *JOIDES Resolution* also has 1,800 followers on Twitter.

USIO educational website statistics

USIO educational website*	FY14 Q4 page views	FY14 Q4 site visits
www.joidesresolution.org	50,115	16,461

Videos and video broadcasts

Expedition 351 Education Officers conducted 38 video broadcasts, and Expedition 352 Education Officers conducted 43 live video broadcasts reaching more than 2,000 people. A. Bogus, videographer for Expedition 351, produced several videos while on board and completed more after the expedition, including *The Life of a Core* (youtu.be/5c8Bng0tmDw), *Story of a Scientist: Alex Bandini*

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(youtu.be/sg3hK8zhaFc); *Story of a Scientist: Clara Sena* (youtu.be/_J1b_lIs6FY); and *Expedition 351 Flash Mob* (youtu.be/JTeZPWACnRs). During Expedition 352, A. West produced *Flexing Steel* (youtu.be/2P6Dt6CFKUs) and *Life of a JOIDES Resolution Technician* (youtu.be/w-uhwcGbIVQ).

Educational materials development and distribution

Materials developed this quarter included the new videos mentioned above. Updated reprints of some of our most popular posters (including the Legacy of Scientific Ocean Drilling, *JOIDES Resolution* mini-poster, and the *JOIDES Resolution* papercraft model) were also produced.

Materials were distributed this quarter at conferences and outreach activities and in response to requests received through the joidesresolution.org website. The office no longer sends extensive materials through the mail but primarily distributes materials at events run by staff or volunteers.

Scientists as educators

The USIO provides regular opportunities for scientists to participate in educational programming. During this quarter, J. Biddle (University of Delaware) led the School of Rock; D. Norris (University of California, San Diego), B. Reese (University of Southern California [USC]), and D. Pak (University of California, Santa Barbara) participated in the Long Beach JRON event; and S. Pekar (Queens College) participated in the Forum at AMNH in New York (see “Educational outreach events”).

Strategic partnerships

Center for Dark Energy Biosphere Investigations

The USIO continued to partner with the Center for Dark Energy Biosphere Investigations (C-DEBI) to produce microbiology-related materials and projects. During this quarter, USIO staff kicked off a new education grant from C-DEBI (see “Activities related to existing grants”).

Outside funding and sponsorships

This section describes grant proposal submissions, awarded grants, and subsequent grant-supported activities that complement USIO science and education activities.

New grants

This quarter, the USIO kicked off a new NSF grant project titled the Minority-Serving Institution–Reconstructing Earth’s Climate History Program to Enhance Ocean and Climate Curricula and Provide Authentic Research Opportunities for Faculty and Students (MSI-REACH), which will work with minority-serving institutions and 2-year colleges to provide Earth science content and School of Rock programs over 4 years.

Activities related to existing grants

C-DEBI grant

The USIO received a new \$50,000 grant from C-DEBI last quarter to produce an e-book about seafloor microbiology that will serve as a follow-up/sequel to *Uncovering Earth’s Secrets*. The USIO

began the project this quarter by sending its main subcontractors to USC to meet with the scientists and brainstorm an outline for the new e-book.

Legacy documentation

The USIO routinely archives electronic copies of documents, reports, and materials produced on behalf of IODP.

Legacy digital archive

Legacy preservation activities include storing electronic copies of relevant educational products and materials produced by the USIO each quarter in a dedicated CMS. Products and materials archived this quarter include the videos mentioned above (see “Videos and video broadcasts”).

Outreach

USIO Outreach activities are designed to build an easily accessible foundation of knowledge about IODP, to raise the visibility of the connection between the emerging scientific knowledge and its positive contribution to society worldwide, and to encourage interest in the Program. To accomplish these goals, the USIO targets informational outreach to the general public, science and general-interest media, legislators, scientists and engineers from within the IODP community and beyond, and decision makers at the national level.

Communications activities: media and public outreach

Port call outreach

This quarter, USIO hosted tours at the *JOIDES Resolution* port call in Keelung, Taiwan, on 30 September 2014. Nearly 300 people toured the ship, including VIPs, journalists, government officials, scientists, and students.

Public relations materials

Communications tools

The USIO’s outreach-focused Twitter account, @SeafloorSci, gained many followers by posting news from expeditions and links to related media. At the end of September, the account had more than 700 followers and more are being added regularly.

Program-related publications

Articles authored by USIO staff

Program-related science and other articles authored by USIO staff published during this quarter include the following. Bold type indicates USIO staff. Other Program-related science articles are available online through the ocean drilling citation database (iodp.tamu.edu/publications/citations/

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[database.html](#)) and the IODP Expedition-related bibliography (iodp.tamu.edu/publications/citations.html).

- Bahr, A., Jiménez-Espejo, F.J., Kolasinac, N., Grunert, P., Hernández-Molina, F.J., Röhl, U., Voelker, A.H.L., Escutia, C., Stow, D.A.V., Hodell, D., and **Alvarez-Zarikian, C.A.**, 2014. Deciphering bottom current velocity and paleoclimate signals from contourite deposits in the Gulf of Cádiz during the last 140 kyr: an inorganic geochemical approach. *Geochemistry, Geophysics, Geosystems*, 15(8):3145–3160. doi:10.1002/2014GC005356
- Hollis, C.J., Tayler, M.J.S., Andrew, B., Taylor, K.W., Lurcock, P., Bijl, P.K., **Kulhanek, D.K.**, Crouch, E.M., Nelson, C.S., Pancost, R.D., Huber, M., Wilson, G.S., Ventura, G.T., Crampton, J.S., Schiøler, P., and Phillips, A., 2014. Organic-rich sedimentation in the South Pacific Ocean associated with late Paleocene climatic cooling. *Earth-Science Reviews*, 134:81–97. doi:10.1016/j.earscirev.2014.03.006

News articles, news programs, media citations, or public commentary

The following citations comprise examples of news articles, news programs, media citations, or public commentary related to USIO expeditions and/or science. See the “IODP in the news” web page (iodp.usio.org/Newsroom/news.html) for other articles that raise the profile of the Program.

- Schwab, J., 2014. The future, buried in the deep. *Boston University Arts and Science Magazine*, 30 September 2014. <http://www.bu.edu/cas/magazine/fall14/murray/>
- West, A., 2014. “Ocean Views” blog from aboard the *JOIDES Resolution* (series). *National Geographic*, 18 July–26 September 2014. <http://voices.nationalgeographic.com/author/awest/>

Legacy documentation

The USIO routinely archives electronic copies of documents, reports, and materials produced on behalf of IODP.

Legacy digital archive

Legacy preservation activities include storing electronic copies of relevant outreach products and publications produced by the USIO each quarter in a dedicated CMS. Products and publications archived this quarter include media advisories, press releases, port call plans and outreach materials/documents.

Appendix A: FY14 Q4 finance report

Please contact info@oceanleadership.org for hard copies of financial pages.

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Appendix B: Travel

Purpose*	Category	Dates	Location	Institution: Personnel
Elevator testing/discussion of drill pipe inspections	Equipment testing	2–3 July 2014	Lafayette, LA	TAMU: K. Grigar, S. Midgley
International Conference on Intelligent Technologies for Interactive Entertainment (INTETAIN) 2014	Conference	9 July 2014	Chicago, IL	External: B. Becker, P. Ceisel
Chikyu Facility Board Meeting	Meeting	10 and 11 July 2014	Yokohama, Japan	Ocean Leadership: D. Divins
American Management Association (AMA) training: Getting Results without Authority	Training	11–14 July 2014	San Francisco, CA	TAMU: C. Broyles
Wireline testing of VIT DSL modem	Equipment testing	14–16 July 2014	Houma, LA	TAMU: D. Ferrell
AMA training: Time Management	Training	16–19 July 2014	New York, NY	TAMU: C. Alvarez Zarikian
AMA training: How to Communicate with Diplomacy, Tact, and Credibility	Training	16–18 July 2014	Dallas, TX	TAMU: D. Kulhanek
Software configuration management training	Training	20–25 July 2014	Washington, DC	TAMU: D. Ponzio
Oracle user security review	Meeting	20–22 July 2014	Dallas, TX	TAMU: R. Elumalai
Lloyds of London insurance broker meeting	Vendor meeting	26–30 July 2014	London, UK	TAMU: B. Clement, A. Davidson
Expedition 352 port call	Port call activities	26 July–5 August 2014	Yokohama, Japan	TAMU: D. Ferrell, P. Gates, J. Gillette, J. Gracia, R. Gray, B. Julson, S. Kale, R. Mitchell, J. Miller, M. Malone, L. Vasudevan Other: D. Schuler
JOIDES Resolution site visit	Contract closeout activities	27–30 July 2014	Yokohama, Japan	Ocean Leadership: D. Divins, M. Morell
Fundamentals of Purchasing seminar	Training	27 July–3 August 2014	Pittsburg, PA	TAMRF: T. Wilson
Expedition 352 Education Officer participation	Education	31 July–30 September 2014	Yokohama, Japan	Education Officers: E. Christiansen, A. West
NIWeek 2014	Conference	4–7 August 2014	Austin, TX	TAMU: L. Chen, D. Fackler, D. Ferrell
TAMU site visit	Contract closeout activities	4–8 August 2014	College Station, TX	Ocean Leadership: D. Divins, C. Reed
TAMU ITAC retreat	Conference	7 and 8 August 2014	Conroe, TX	TAMU: J. Rosser
School of Rock	Education	9–16 August 2014	Lewes, DE	External: J. Biddle, J. Johnson, T. Mace, L. White
AMA course: Time Management	Training	13–16 August 2014	Arlington, VA	TAMU: L. LeVay

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Purpose*	Category	Dates	Location	Institution: Personnel
LDEO site visit	Contract closeout activities	14 and 15 September 2014	Palisades, NY	Ocean Leadership: M. Morell
Data delivery to National Geophysical Data Center (NGDC)	Meeting	17–20 August 2014	Boulder, CO	TAMU: D. Sims
VMworld2014 Conference	Conference	23–29 August 2014	San Francisco, CA	TAMU: M. Cannon
Scientific Committee on Antarctic Research meeting	Meeting	24–29 August 2014	Auckland, New Zealand	TAMU: D. Kulhanek
National Science Foundation (NSF) Cybersecurity Summit	Conference	25–29 August 2014	Arlington, VA	TAMU: P. Gates, J. Rosser
Learning Tree Course: Communication Skills	Training	26–30 August 2014	Los Angeles, CA	TAMU: S. Herrmann
<i>JOIDES Resolution</i> Outreach Network event at the Aquarium of the Pacific	Education	6 September 2014	Long Beach, CA	External: A. Aust, R. Hatfield, K. Kurtz, Z. Rocio
NSF Large Facilities Workshop	Workshop	10–13 September 2014	Arlington, VA	TAMRF: B. Neyses TAMU: B. Clement
ODL site visit	Workshop	13–18 September 2014	Groningen, Netherlands	TAMRF: I. Kindt
Managing Emotions in the Workplace	Training	14–16 September 2014	San Francisco, CA	TAMU: B. Crawford
An Event Apart Web Design Conference	Conference	21–24 September 2014	Austin, TX	TAMU: P. Edwards
Hazardous Materials Training Multi-modal	Training	21–26 September 2014	Houston, TX	TAMU: T. Brashear
Elevator handling equipment/acceptance	Vendor meeting	24–30 September 2014	Hamburg, Germany	TAMU: K. Grigar

*Travel associated with meetings, conferences, port call work, and nonroutine sailing activities.

†Travel in support of USIO activities but paid from another source.

Appendix C: USIO quarterly report distribution

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T. Janacek, NSF, tjanacek@nsf.gov
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