

# **INTEGRATED OCEAN DRILLING PROGRAM**

**United States Implementing Organization**



**Integrated Ocean Drilling Program  
United States Implementing Organization**

**FY13 Quarterly Report 4**

**1 July–30 September 2013**

**NSF Contract OCE-0352500**

**IODP-MI Contract IODP-MI-05-03**

**Submitted by the USIO**

**to**

**The National Science Foundation**

**and**

**IODP Management International, Inc.**



**25 November 2013**



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## INTRODUCTION

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The organization of this quarterly report reflects activities and deliverables that are outlined in the Integrated Ocean Drilling Program (IODP) U.S. Implementing Organization (USIO) FY13 Annual Program Plans to the National Science Foundation (NSF) and IODP Management International, Inc. (IODP-MI) 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).

## MANAGEMENT AND ADMINISTRATION

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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

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### FY13 Q3 IODP-USIO Quarterly Report

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The USIO report for the third quarter of FY13 (April–June 2013) was submitted to NSF and IODP-MI on 14 August 2013 ([http://iodp.tamu.edu/publications/AR/FY13/FY13\\_Q3.pdf](http://iodp.tamu.edu/publications/AR/FY13/FY13_Q3.pdf)).

### FY14 IODP-USIO Annual Program Plan to NSF

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On 2 July 2013, the USIO submitted for review and evaluation the IODP-USIO FY14 Annual Program Plan to NSF, which outlines requests for costs including the Izu Bonin Mariana (IBM): Rear Arc, IBM: Arc Origins, and IBM: Fore Arc expeditions; the potential Complementary Project Proposal (CPP) South China Sea expedition; a non-IODP period totaling 124 days; long-lead time planning costs for expeditions proposed for FY15; and USIO efforts for education and outreach and associated management and administrative support. This IODP-USIO FY14 Annual Program Plan to NSF budget totaled \$64,499,800. The IODP-USIO FY14 Annual Program Plan to NSF also includes Appendix I: USIO IT Security Summary, Appendix II: Recommended IODP-USIO Program of Insurance, and Appendix III: IODP-USIO FY15–FY17 Closeout Plan Overview, which was submitted separately.

### IODP-USIO FY15–FY17 Closeout Plan Overview

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On 1 August 2013, the USIO submitted for review and evaluation Appendix III to the IODP-USIO FY14 Annual Program Plan, which provides a high-level overview including (1) potential and necessary contract closeout activities and estimated costs for Contract OCE-0352500 between the Ocean Leadership and NSF, which concludes at the end of FY14, and (2) activities related to

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demobilizing the *JOIDES Resolution* and shore-based activities. The FY15–FY17 closeout plan budget totaled \$19,883,576.

### IODP-USIO Final Technical Report to IODP-MI

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On 30 September 2013, the USIO submitted the IODP-USIO Final Technical Report to IODP-MI, which provides an overview of the operation and management of the riserless drilling vessel *JOIDES Resolution* by the USIO and highlights 10 years of technical and scientific accomplishments.

### IODP-USIO FY13 Annual Report

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The USIO began preliminary planning and data collection for the IODP-USIO FY13 Annual Report during the quarter.

## REPORTING AND LIAISON ACTIVITIES

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The USIO reports to and liaises with funding agencies and IODP-related agencies (e.g., the Science Advisory Structure [SAS]), Program Member Offices (PMOs), and other national organizations, and participates in SAS panels, IODP-MI task forces, working groups, and so on.

### Meetings

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Standard SAS committee and panel, IODP working group, task force, 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 for meetings of standing committees and task forces are available online (<http://www.iodp.org/meeting-reports>). Other special meetings for which minutes will not be available online are described in this section.

### Conference and meeting schedule

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Conference/Meeting*	Date	Location
<i>Chikyu</i> IODP Board Meeting	23–25 July 2013	Yokohama, Japan
<i>JOIDES Resolution</i> Facility Board Meeting	26 and 27 August 2013	Arlington, VA

\*Implementing organization meetings, IODP-MI task force meetings, Science Advisory Structure (SAS) panel meetings, and Program-sponsored conferences.

## CONTRACT SERVICES

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### Ocean Leadership

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#### *Contract activity*

Ocean Leadership received the following modifications during the reporting period.

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### **NSF Contract OCE-0352500 with Ocean Leadership**

- Modification 61: Reduced the FY13 Annual Program Plan by \$4,000,000 to \$63,445,307; reduced the estimated total value by \$4,000,000 to \$615,835,439; provided incremental funding in the amount of \$9,403,191, thereby fully funding the reduced FY13 Annual Program Plan; and updated the indirect rate chart.
- Modification 62: Approved the FY14 Annual Program Plan in the amount of \$64,499,800, reduced the estimated total value by \$500,200 to \$615,335,239, and incrementally funded the FY14 Annual Program Plan in the amount of \$8,000,000.

### **IODP-MI Subcontract IODP-MI-05-03 with Ocean Leadership**

- Modification 46: Provided incremental funding in the amount of \$550,388, thereby fully funding the FY13 Annual Program Plan of \$2,996,719.

#### ***Subcontract activity***

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

### **Ocean Leadership Subcontract JSC 4-03 with LDEO**

- Modification 65: Incrementally funded the FY13 Annual Program Plan in the amount of \$791,084.
- Modification 66: Reduced the FY12 Annual Program Plan by \$834,071 to \$6,764,865; provided incremental funding in the amount of \$834,071, thereby fully funding the FY13 Annual Program Plan in the amount of \$7,184,932; and reduced the total estimated costs of the subcontract by \$705,043 to \$54,837,482.

### **Ocean Leadership Subcontract JSC 4-02 with TAMRF**

- Modification 81: Reduced the FY13 Annual Program Plan by \$4,000,000 to \$57,060,683; reduced the total estimated costs of the subcontract by \$4,000,000 to \$468,426,143; and provided incremental funding in the amount of \$8,953,824, thereby fully funding the reduced FY13 Annual Program Plan.
- Modification 82: Approved the FY14 Annual Program Plan in the amount of \$55,812,129 and incrementally funded the FY14 Annual Program Plan in the amount of \$6,922,456.

## **LDEO**

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#### ***Subcontract activity***

LDEO issued the following subcontract modifications during the reporting period.

### **LDEO subcontract with Schlumberger**

- Amendment 8: Provided incremental funding in the amount of \$489,221.
- Amendment 9: Provided incremental funding in the amount of \$594,100.

### **LDEO subcontract with Leicester University**

- Amendment 17: Provided the final funding increment of \$135,000.

## TAMRF

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### *Subcontract activity*

TAMRF issued the following subcontract modifications during the reporting period.

### **TAMRF subcontract with Overseas Drilling Limited**

- Amendment 24: Provided FY14 incremental funding in the amount of \$5,000,000.

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

- 3 July 2013: Issued purchase order (PO) in the amount of \$136,155 to Hole Opener Corporation for the purchase of one 9 ½ inch outer diameter (OD) underreamer and mill tooth cone/arm assembly and one 11 ¾ inch OD underreamer and mill tooth cone/arm assembly.
- 2 September 2013: Issued a PO in the amount of \$136,883.04 to Solid IT Networks, Inc., for the purchase of information technology (IT) network equipment and associated support.
- 23 September 2013: Issued a PO in the amount of \$248,840 to Houston Downhole Drilling Tools, Inc., for the purchase of twenty-eight 8 ¼ inch OD × 4 1/8 inch inner diameter (ID) outer core barrels.
- 30 September 2013: Issued a PO in the amount of \$150,031.45 to Carl Zeiss Microscopy LLC for the purchase of one Axioscope microscope and accessories.

### *Miscellaneous activity*

- 3 July 2013: Issued a property loan agreement to the University of Cambridge for the loan of two Minolta spectrophotometers for use on the *James Cook* for the period of 28 July through 15 September 2013.
- 14 August 2013: Submitted out-year projections for vehicle acquisition, disposal, and cost/mileage data for FY13 in the Federal Automotive Statistical Data Tool (FAST) system.
- 19 September 2013: Submitted a request for approval letter to Ocean Leadership for the purchase of one Axioscope microscope and accessories.

## **INSURANCE RELATED TO OCEAN LEADERSHIP SUBCONTRACTS**

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As a result of negotiations finalized this quarter, the premium totals for all insurance policies within the FY14 program of insurance will decrease approximately 8% from the cost of FY13 premiums.

## **PERSONNEL STATUS**

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### **Ocean Leadership**

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No positions were vacated or filled during the quarter.



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The following positions were opened and advertised during the quarter:

- Administrative Assistant
- Director, Contracts and Compliance

### LDEO

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The following positions were vacated during the quarter:

- Logging Staff Scientist (Sally Morgan): 1 August 2013

There were no positions opened and advertised or filled during the quarter.

### TAMU

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The following positions were vacated during the quarter:

- Associate Marine Computer Specialist (Grant Banta): 6 September 2013
- Research Specialist (Yulia Vasilyeva): 21 August 2013

The following positions were opened and advertised during the quarter:

- Marine Computer Specialist

There were no positions filled during the quarter.

### USIO WEB SERVICES

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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](http://iodp.tamu.edu/scienceops/expeditions.html).

### USIO website statistics

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USIO website	FY13 Q4 page views*	FY13 Q4 site visits*
<a href="http://www.iodp-usio.org">www.iodp-usio.org</a>	16,793	10,733
<a href="http://iodp.ldeo.columbia.edu">iodp.ldeo.columbia.edu</a>	11,632	3,230
<a href="http://iodp.tamu.edu">iodp.tamu.edu</a> †	2,295,727	90,439
<b>Total</b>	<b>2,324,152</b>	<b>104,402</b>

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

†Data are unavailable for the period of 23–30 September 2013 for the IODP-TAMU website. Data provided cover the period 1 July–22 September 2013.

### LEGACY DOCUMENTATION

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

### Legacy digital archive

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Legacy preservation activities include storing electronic copies of relevant management and administration–related documents and reports produced by the USIO. Documents and

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publications archived this quarter in a dedicated Content Management System (CMS) included the IODP-USIO FY13 Q3 reports to NSF and IODP-MI, FY14 IODP-USIO Annual Program Plan to NSF, IODP-USIO FY15–FY17 Closeout Plan Overview, IODP-USIO Final Technical Report to IODP-MI, and contract modifications.

### Legacy web services

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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 IODP. 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.

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	FY13 Q4 page views*	FY13 Q4 site visits*
www-odp.tamu.edu†	1,122,366	266,231
www.odplegacy.org	5,516	2,245
www.deepseadrilling.org†	212,005	72,241
<b>Total</b>	<b>1,339,887</b>	<b>340,717</b>

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

†Data are unavailable for the period of 23–30 September 2013 for the ODP Science Operator and DSDP Publications websites. Data provided for those websites cover the period 1 July–22 September 2013.

## OTHER PROJECTS AND ACTIVITIES

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### TAMU Project Portfolio Management program

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The LIMS Editing (LIME) tool category 4 project is on track for completion on 30 November, and the Shore Web Architecture Update and *JOIDES Resolution* Microscope Laboratory Infrastructure Renovation category 2 projects were under way during the quarter. Additionally, four new category 2 projects were approved for planning and execution (see “Software development” in Data Management).

## TECHNICAL, ENGINEERING, AND SCIENCE SUPPORT

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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.

## USIO EXPEDITION SCHEDULE

Expedition		Port (Origin)	Dates <sup>1, 2</sup>	Total Days (Port/ Sea)	Days at Sea (Transit <sup>3</sup> / Ops)	Co-Chief Scientists	USIO Contacts <sup>4</sup>
Southern Alaska Margin Tectonics, Climate & Sedimentation <sup>5</sup>	341	Victoria, British Columbia (Canada)	29 May–29 July 2013	61 (3/58)	58 (6/52)	J. Jaeger, S. Gulick	TAMU: L. Schneider* LDEO: A. Slagle^
Asian Monsoon <sup>5</sup>	346	Valdez, Alaska	29 July–28 September 2013	60 (5/55)	55 (18/37)	R. Tada R. Murray	TAMU: C. Alvarez Zarikian* LDEO: J. Lofj^
Dry Dock/Non-IODP [28 September 2013–26 January 2014]							

Notes: TBD = to be determined.

<sup>1</sup> Dates for expeditions may be adjusted pending non-IODP activities.

<sup>2</sup> The start date reflects the initial port call day. The vessel will sail when ready.

<sup>3</sup> Transit total is the transit to and from port call and does not include transit between sites.

<sup>4</sup> 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>.

<sup>5</sup> Expedition crosses dateline resulting in 60 operational days, 61 calendar days.

## USIO EXPEDITIONS

### Expedition 345: Hess Deep Plutonic Crust

#### *Postexpedition activities*

The Expedition 345 postexpedition editorial meeting was held 8–10 July 2013 in College Station, TX.

### Expedition 341: Southern Alaska Margin Tectonics, Climate, and Sedimentation

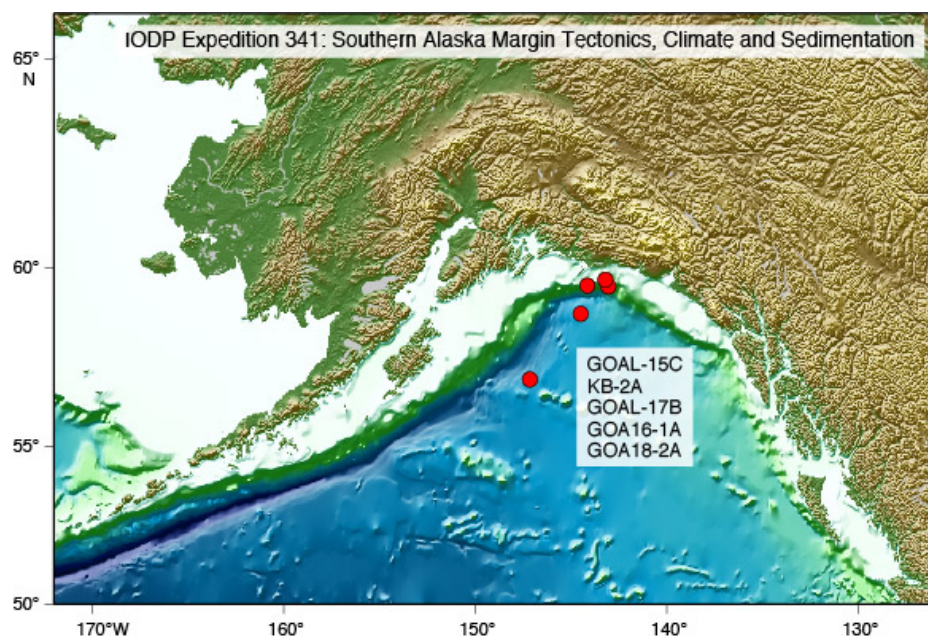
#### *Staffing*

Expedition 341 Science Party staffing breakdown	
Member country/consortium	Participants
USA: United States Science Support Program (USSSP)	9
Japan: Japan Drilling Earth Science Consortium (J-DESC)	7
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)	1
People's Republic of China: IODP-China	1
Australia and New Zealand: Australia/New Zealand IODP Consortium (ANZIC)	2
India: Ministry of Earth Science (MoES)	1
Brazil: IODP-Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)/Brasil	2

\*One ESSAC scientist did not make it to port because of visa problems and did not sail.

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### Site Map



### Coring Summary

Site	Hole	Latitude	Longitude	Water depth (m)	Cores (n)	Interval cored (m)	Core recovered (m)	Recovery (%)
U1417	U1417A	56°57.5996'N	147°6.5985'W	4198.6	22	168.0	167.74	99.8
	U1417B	56°57.5999'N	147°6.5781'W	4200.7	47	358.8	262.96	73.3
	U1417C	56°57.5888'N	147°6.5769'W	4199.0	28	225.0	216.83	96.4
	U1417D	56°57.5896'N	147°6.5973'W	4198.0	64	466.5	304.42	65.3
	U1417E	56°57.5896'N	147°6.5993'W	4199.5	37	348.7	146.92	42.1
<b>Site U1417 totals:</b>					<b>198</b>	<b>1,567.00</b>	<b>1,098.87</b>	<b>70.1</b>
U1418	U1418A	58°46.6095'N	144°29.5777'W	3679.2	33	209.9	216.85	103.3
	U1418B	58°46.6100'N	144°29.5559'W	3678.7	2	17.0	17.08	100.5
	U1418C	58°46.5991'N	144°29.5570'W	3677.0	32	228.2	229.48	100.6
	U1418D	58°46.5993'N	144°29.5579'W	3677.5	36	302.8	279.77	92.4
	U1418E	58°46.5890'N	144°29.5771'W	3678.7	11	100.6	98.70	98.1
	U1418F	58°46.5883'N	144°29.5986'W	3678.0	71	688.7	495.20	71.9
<b>Site U1418 totals:</b>					<b>185</b>	<b>1,547.20</b>	<b>1,337.08</b>	<b>86.4</b>
U1419	U1419A	59°31.9297'N	144°8.0282'W	698.6	29	193.0	111.24	57.6
	U1419B	59°31.9309'N	144°8.009'W	698.3	18	113.0	99.05	87.7
	U1419C	59°31.9204'N	144°8.0079'W	697.0	19	107.1	100.37	93.7
	U1419D	59°31.9200'N	144°8.0515'W	698.7	20	103.7	105.10	101.4
	U1419E	59°31.9310'N	144°8.0474'W	696.7	15	75.5	72.10	95.5
<b>Site U1419 totals:</b>					<b>101</b>	<b>592.30</b>	<b>487.86</b>	<b>82.4</b>
U1420	U1420A	59°41.3399'N	143°12.0599'W	259.4	106	1,020.8	139.91	13.7
<b>Site U1420 totals:</b>					<b>106</b>	<b>1,020.80</b>	<b>139.91</b>	<b>13.7</b>
U1421	U1421A	59°30.4399'N	144°2.7395'W	729.7	85	702.7	140.72	20.0
	U1421B	59°30.4284'N	144°2.7188'W	733.9	1	6.2	6.23	100.5
	U1421C	59°30.4298'N	144°2.7387'W	733.0	6	38.2	29.06	76.1
<b>Site U1421 totals:</b>					<b>92</b>	<b>747.10</b>	<b>176.01</b>	<b>23.6</b>
<b>Expedition 341 totals:</b>					<b>682</b>	<b>5,474.40</b>	<b>3,239.73</b>	<b>59.2</b>

### *Logging Summary*

Three Expedition 341 holes were logged during the reporting period (U1418F, U1420A, and 1421A). Two tool strings were deployed in Hole U1418F: a triple combination (triple combo)-Magnetic Susceptibility Sonde (MSS) down to 600 meters below seafloor (mbsf) and a Formation MicroScanner (FMS)-sonic that reached 582 mbsf. Similar variations in natural gamma ray measurements for potassium, thorium, and uranium suggest corresponding changes in clay mineralogy or content. Because of concerns about borehole stability, a single sonic-induction tool string was deployed in Hole U1420A; this tool string is designed to provide the highest priority measurements to meet science objectives (total gamma radiation, sonic velocity, and resistivity). Despite an enlarged borehole, the deep resistivity and sonic logs measured reliable formation properties down to 290 mbsf, where the tool string encountered a borehole obstruction. The sonic-induction and the Vertical Seismic Imager (VSI) tool strings were deployed in Hole U1421A. The borehole was not as enlarged in this shelf site as in the previous deep-water sites, and the tool strings were able to reach total depth (694 mbsf) while obtaining quality measurements. The check shot recorded with the VSI tool in Hole U1421A measured seismic traveltimes at six stations between 285 and 687 mbsf. These traveltimes are key measurements to link core and log data (recorded in depth) to seismic reflection surveys (recorded in two-way traveltime).

### *Science Summary*

A cross-margin transect was drilled during Expedition 341 to investigate the northeast Pacific continental margin sedimentary record formed during orogenesis within a time of significant global climatic deterioration in the Pliocene–Pleistocene that led to the development of the most aggressive erosion agent on the planet, a temperate glacial system.

Major objectives for drilling in the Gulf of Alaska were as follows:

- Document the tectonic response of an active orogenic system to late Miocene to recent climate change;
- Establish the timing of advance and retreat phases of the northwestern Cordilleran ice sheet to test its relation to dynamics of other global ice sheets;
- Implement an expanded source-to-sink study of the complex interactions between glacial, tectonic, and oceanographic processes responsible for creation of one of the thickest Neogene high-latitude continental margin sequences;
- Understand the dynamics of productivity, nutrients, freshwater input to the ocean, and surface and subsurface circulation in the northeast Pacific and their role in the global carbon cycle; and
- Document the spatial and temporal behavior during the Neogene of the geomagnetic field at extremely high temporal resolution in an undersampled region of the globe.

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Drilling during Expedition 341 recovered a 3,240 m sedimentary record that extends from the late Pleistocene/Holocene through the late Miocene. Drilling at Sites U1417 and U1418 recovered distal and proximal deepwater sedimentary records, respectively. Site U1417 contains a complete and continuous interval from the mudline to 220.4 m core composite depth below seafloor (CCSF), the base of which was dated shipboard to 1.7–1.8 Ma, and additional material was recovered to 709 m core depth below seafloor (CSF). Site U1417 contains no apparent hiatuses through the late Miocene based on initial shipboard biostratigraphy and magnetostratigraphy. Site U1418 contains a complete and continuous interval from the mudline to 271 m, which was dated shipboard to 0.2–0.3 Ma, and additional material was recovered to 941 m. Site U1418 contains no apparent hiatuses through 1.2 Ma based on initial shipboard chronostratigraphy. Drilling at Sites U1419 and U1421 sampled the transitional environment along the continental slope. Site U1419 is located on a small ridge at 780 m water depth between two large shelf-crossing glacial troughs, whereas Site U1421 is located downslope of the Bering Trough. Site U1419 contains a complete and continuous interval from the mudline to 100 m that shipboard chronostratigraphy indicates is younger than 0.3 Ma. Site U1421 contains a continuous interval to ~30 m, and an interval to 694 m was recovered that accumulated in <0.3 m.y. based on shipboard chronostratigraphy. Lastly, Site U1420 is located proximal to the orogen on the continental shelf within, but near the flank of, the shelf-crossing Bering Trough. Site U1420 cores consist of drilled rock, lonestones, diamict, and mud that were deposited <0.78 m.y. ago based on shipboard biostratigraphy and magnetostratigraphy. All Expedition 341 sites reveal notable changes in seismic reflection facies and stratigraphy that can be integrated at the nested core–downhole log–seismic reflection profile scales.

A remarkable expedition discovery is the substantial sediment volume accumulating on the shelf, slope, and fan since the early Pleistocene intensification of Northern Hemisphere glaciation and, more significantly, since the mid-Pleistocene transition. The Expedition 341 cross-margin transect discovered transitions in sediment accumulation rates from >100 m/m.y. at the distal site to >1000 m/m.y. in the proximal fan and slope and on the continental shelf that provide a telescoping view of strata formation from the Miocene to the Holocene. All five sites include the middle Pleistocene to recent and demonstrate exceptional accumulation rates. The 709 m deep Site U1417 records Miocene to recent deposition in the distal Surveyor Fan, including the onset of glaciation at the Pliocene/Pleistocene boundary when sedimentation rates doubled to ~100 m/m.y. Site U1418 contains an expanded middle to late Pleistocene sedimentary record that also includes significant increases in sedimentation from ~400 m/m.y. in the middle Pleistocene to >1200 m/m.y. in the late Pleistocene. Slope Site U1421 and shelf Site U1420, both proximal to the Bering Glacier during glaciations, provided cores penetrating thick sequences of poorly sorted glacial sediments ranging from mud to boulders,

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accumulating at 1–2 km/m.y. Slope Site U1419 is slightly west of the Bering Trough mouth and also has exceptional late Pleistocene sedimentation rates (>800 m/m.y.).

Stratal lithofacies span from biogenic ooze to clast-rich diamict, both punctuated with ash, indicating a dynamic Neogene depositional environment. Lithofacies were interpreted shipboard as reflecting suspension fall out deposition, sediment gravity flows, large-scale mass wasting, ice rafting, organic productivity variations, and volcanic eruptions. Pleistocene strata are dominated by glacial sediments at all sites. The retrieval of Holocene interglacial sediments and microfossils at slope and fan sites provides a means to identify comparable interstadial periods in the deeper sedimentary record. An exceptional shipboard paleomagnetic chronology and biosiliceous and calcareous biostratigraphy provide a temporal framework to guide future analyses of particular glacial–interglacial periods. Shipboard analyses indicate that sedimentation at slope and fan sites corresponds to major global Pleistocene climate patterns. A notable discovery at Site U1418 is that proximal deep water sediment depocenters can contain an expanded record of fjord-like glacial marine facies during periods of maximum glacial sediment accumulation. Site U1420 demonstrated the potential for extremely thick Pleistocene depocenters in shelf settings where accommodation space can be maintained; consequently, individual glacial advance–retreat facies cycles can be seismically mapped. Postcruise analyses of sediment provenance will constrain this locus of erosion, linking it to onshore patterns of exhumation to ultimately test whether rapid erosion has the potential to lead to positive feedback in exhumation in an active orogen.

### **Expedition 346: Asian Monsoon**

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#### *Planning*

The internal Expedition 346 kick-off meeting was held 13 June 2013 in College Station, TX, to present an overview of the scientific objectives and current operations plan, to review and exchange information regarding new developments, and to identify issues relevant to implementing the expedition. Final science, technical, and logistical planning was completed and supplies, equipment, and hardware were shipped to port.



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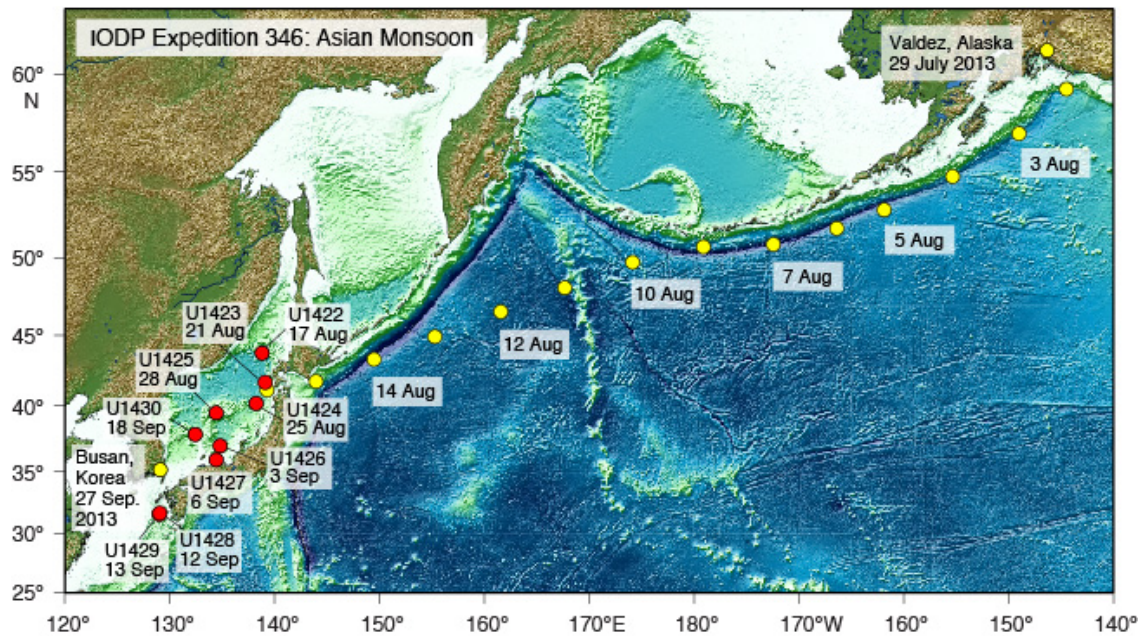
### Staffing

Expedition 346 Science Party staffing breakdown	
Member country/consortium	Participants
USA: United States Science Support Program (USSSP)	9
Japan: Japan Drilling Earth Science Consortium (J-DESC)	8
Europe and Canada: European Consortium for Ocean Research Drilling (ECORD) Science Support and Advisory Committee (ESSAC)	7
Republic of Korea: Korea Integrated Ocean Drilling Program (K-IODP)	2
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)	1
Brazil: IODP-Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)/Brasil	1

### Clearance and permitting activities

An addendum was submitted to Japan on 9 July to add alternate Site ECS-1C. The original Korean authorization was restricted to 13 September or later. When the expedition ran ahead of schedule, the USIO obtained a revised authorization for entry 9 September or later.

### Site Map





## FY13 QUARTERLY REPORT 4

### *Coring Summary*

Site	Hole	Latitude	Longitude	Water depth (m)	Cores (n)	Interval cored (m)	Core recovered (m)	Recovery (%)
U1422	U1422A	43°45.9903'N	138°49.9894'E		1	9.5	9.96	104.8
	U1422B	43°45.9981'N	138°49.9910'E		1	9.5	9.67	101.8
	U1422C	43°45.9816'N	138°49.9897'E	3429.0	31	205.2	215.78	105.2
	U1422D	43°45.9899'N	138°49.9785'E	3428.5	16	141.8	152.83	107.8
	U1422E	43°45.9896'N	138°50.0003'E	3428.7	14	111.6	114.34	102.5
<b>Site U1422 totals:</b>					<b>63</b>	<b>477.6</b>	<b>502.58</b>	<b>105.2</b>
U1423	U1423A	41°41.9494'N	139°04.9805'E	1785.2	22	206.6	212.89	103.0
	U1423B	41°41.9575'N	139°04.9800'E	1785.4	28	249.1	250.00	100.4
	U1423C	41°41.9511'N	139°04.9804'E	1785.2	6	57.0	59.07	103.6
<b>Site U1423 totals:</b>					<b>56</b>	<b>512.7</b>	<b>521.96</b>	<b>101.8</b>
U1424	U1424A	40°11.4001'N	138°13.9003'E	2807.3	17	158.8	160.99	101.4
	U1424B	40°11.4076'N	138°13.8997'E	2808.4	17	154.7	155.34	100.4
	U1424C	40°11.3914'N	138°13.8998'E	2807.2	7	63.9	64.35	100.7
<b>Site U1424 totals:</b>					<b>41</b>	<b>377.4</b>	<b>380.68</b>	<b>100.9</b>
U1425	U1425A	39°29.4396'N	134°26.5505'E	1913	1	9.5	9.81	103.3
	U1425B	39°29.4476'N	134°26.5502'E	1907.7	61	407.2	397.25	97.6
	U1425C	39°29.4311'N	134°26.5501'E	1907.5	3	25.0	23.21	92.8
	U1425D	39°29.4392'N	134°26.5395'E	1908.2	70	427.0	417.49	97.8
	U1425E	39°29.4392'N	134°26.5607'E	1908.6	13	113.1	107.75	95.3
<b>Site U1425 totals:</b>					<b>148</b>	<b>981.8</b>	<b>955.51</b>	<b>97.3</b>
U1426	U1426A	37°1.9996'N	134°47.9999'E	903	59	396.7	418.78	105.6
	U1426B	37°2.0088'N	134°48.0005'E	902.2	4	34.7	35.82	103.2
	U1426C	37°1.9912'N	134°47.9997'E	902.9	23	204.0	211.89	103.9
	U1426D	37°1.9996'N	134°47.9907'E	902.6	11	99.4	103.71	104.3
<b>Site U1426 totals:</b>					<b>97</b>	<b>734.8</b>	<b>770.20</b>	<b>104.8</b>
U1427	U1427A	35°57.9200'N	134°26.0604'E	339.4	87	548.6	542.59	98.9
	U1427B	35°57.9276'N	134°26.0600'E	325.6	61	400.6	422.41	105.4
	U1427C	35°57.9109'N	134°26.0600'E	325.9	52	351.1	367.77	104.7
<b>Site U1427 totals:</b>					<b>200</b>	<b>1,300.3</b>	<b>1,332.77</b>	<b>102.5</b>
U1428	U1428A	31°40.6391'N	129°02.0003'E	723.9	26	173.9	178.86	102.9
	U1428B	31°40.6483'N	129°02.0004'E	724.1	16	143.3	145.85	101.8
<b>Site U1428 totals:</b>					<b>42</b>	<b>317.2</b>	<b>324.71</b>	<b>102.4</b>
U1429	U1429A	31°37.0388'N	128°59.8509'E	732.1	21	184.2	190.29	103.3
	U1429B	31°37.0469'N	128°59.8512'E	731.6	22	186.2	200.92	107.9
	U1429C	31°37.0315'N	128°59.8503'E	732.4	22	174.3	180.70	103.7
<b>Site U1429 totals:</b>					<b>65</b>	<b>544.7</b>	<b>571.91</b>	<b>105.0</b>
U1430	U1430A	37°54.1595'N	131°32.2499'E	1072	32	274.4	258.24	94.1
	U1430B	37°54.1670'N	131°32.2501'E	1071.3	37	275.0	259.71	94.4
	U1430C	37°54.1511'N	131°32.2497'E	1072.8	34	250.0	257.02	102.8
<b>Site U1430 totals:</b>					<b>103</b>	<b>799.4</b>	<b>774.97</b>	<b>96.9</b>
<b>Expedition 346 totals:</b>					<b>815</b>	<b>6,045.9</b>	<b>6,135.29</b>	<b>101.5</b>

### *Logging Summary*

Logging data were acquired at four of the nine sites drilled during Expedition 346 (Holes U1423B, U1425B, U1427A, and U1430B) with two tool strings: a “paleo-combo” (spectral gamma ray, caliper, density, resistivity, and magnetic susceptibility) and the FMS-sonic

(resistivity images of the borehole, sonic velocities, and gamma ray). In the Expedition 346 sites, the log data closely reflect variations in lithology, including clay-rich intervals, dolomite, and ash layers. Distinct changes in the log data correspond to key transitions in lithology, such as a change to more diatom-rich sediments (~124 mbsf in Hole U1423B), higher density and resistivity at the diagenetic boundary from biogenic opal-A to opal-CT (~340 mbsf in Hole U1425B), and a shift to more indurated sediments (~244 mbsf in Hole U1430B). High-resolution measurements, such as the FMS resistivity images, display cycles that correspond to variations in biogenic content relative to terrigenous clays. The log measurements and borehole images will be useful to refine the lithology interpretation in occasional intervals of poor recovery.

### *Science Summary*

IODP Expedition 346 drilled seven sites in the Sea of Japan/East Sea and two closely spaced sites in the East China Sea in August and September 2013. The total length of core recovered is 6,135.3 m, with an average recovery of 101%. To our knowledge, this 6,135 m is a record amount of core to be recovered by any single expedition during IODP. Drilling penetrated into the Miocene at two sites and the Pliocene at four sites in the Japan Sea/East Sea. The two sites in the East China Sea and one in the southeastern sector of the Japan Sea/East Sea yielded thick late Pleistocene sections exhibiting very high sedimentation rates. The expedition gathered an unparalleled archive of atmospheric-ocean linkages relating to the East Asian monsoonal system and, partly because of the implementation of new coring, sampling, and analytical strategies, we are confident that researchers studying this sediment will be able to propel the field of climate dynamics significantly forward.

The Sea of Japan/East Sea was last investigated by scientific ocean drilling during ODP Legs 127 and 128, nearly 25 years ago. Prior to those tectonically oriented research legs of ODP, the DSDP had conducted drilling operations during DSDP Leg 31 in 1973 in a challenging and ambitious attempt to reach basement objectives as the plate tectonic revolution was achieving widespread acceptance. Thus, Expedition 346 was the first scientific drilling expedition ever to focus exclusively on the climate system in this area that is at once so critical, yet potentially vulnerable, to the challenges society faces in the coming years of global climate change. With the East Asian Monsoon directly affecting the water supply of one-third of the global population, this research has direct bearing on society's understanding of this complex atmosphere-ocean climate system.

The original research goals of Expedition 346 were oriented toward exploring the relationships between atmospheric processes (e.g., the positioning of the atmospheric Westerly Jet circulation), rainfall (e.g., Yangtze River discharge), and oceanic processes (e.g., surface water circulation into and out of the Sea of Japan, sea ice formation, deep water convection and oxygenation, and biological productivity of the surface ocean). Multiple timescales were targeted, and assessing climate sensitivity variations through time and space was an important

component of the research plan. We aimed to reconstruct the onset and evolution of orbital- and millennial-scale variations of summer and winter monsoons, Westerly Jet position and intensity, desertification in East and Central Asia, and their interrelationships during at least the last 5 m.y. In detail, we targeted exploring the linkages between orbital- and millennial-scale variations of the East Asian Summer Monsoon and East Asian Winter Monsoon, discharge of the Yangtze and Yellow Rivers, and paleoceanography of the Sea of Japan/East Sea.

### **Expedition 349: South China Sea**

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#### ***Planning***

The USIO communicated with the CPP Expedition 349 Science Party throughout the quarter and began discussions concerning public relations at the Hong Kong port call. The deadline for sample and data requests was set for the first quarter of FY14.

#### ***Staffing***

Science staffing was completed during the quarter and efforts shifted to facilitating staffing of an education officer.

#### ***Clearance and permitting activities***

Based on recommendations from the Environmental Protection and Safety Panel (EPSP) and the TAMU Safety Panel, approval was granted for the request to drill down at Site SCS-6A if conditional requirements are met at Site SCS-3G.

### **Expedition 350: Izu-Bonin-Mariana: Rear Arc**

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#### ***Planning***

The Expedition 350 precruise meeting was held at IODP-TAMU in College Station, TX, on 9 and 10 July 2013, after which the *Scientific Prospectus* was finalized in August.

#### ***Staffing***

Science staffing neared completion, and a special call was issued to fill two remaining berths.

#### ***Clearance and permitting activities***

The application to conduct marine research was submitted to the U.S. State Department on 13 September. Because the clearance authorization received for Expedition 346 contained a very large, blanket water depth restriction for operations in the vicinity of submarine cables that would impact Expeditions 350 and 351 sites, direct negotiations were initiated with submarine cable companies. In addition, a new alternate site was developed and will need to be reviewed by EPSP and the TAMU Safety Panel.

## **Expedition 351: Izu-Bonin-Mariana: Arc Origins**

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### ***Planning***

The Expedition 351 precruise meeting was held at IODP-TAMU in College Station, TX, on 10 and 11 July 2013, after which the *Scientific Prospectus* was finalized and published in September.

### ***Staffing***

Science staffing neared completion, and a special call was issued to fill a specialty slot that opened as a result of a scientist's withdrawal from the expedition.

### ***Clearance and permitting activities***

Preparation of the application to conduct marine research began and, as with Expedition 350, direct negotiations were initiated with submarine cable companies. A new alternate site was developed and will need to be reviewed by EPSP and the TAMU Safety Panel.

## **Expedition 352: Izu-Bonin-Mariana: Fore Arc**

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### ***Planning***

The Expedition 352 precruise meeting was held at IODP-TAMU in College Station, TX, on 19 and 20 August 2013, and the draft *Scientific Prospectus* was finalized and submitted to the Publications Department.

### ***Staffing***

Science staffing neared completion, with 24 scientists accepting invitations to sail.

### ***Clearance and permitting activities***

The USIO began preparing the application to conduct marine research, which should be completed early in FY14, as there are no submarine cable issues in this area. All sites will need to be reviewed by EPSP and the TAMU Safety Panel.

## **ANALYTICAL SYSTEMS**

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### **Analytical Systems acquisitions and updates**

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New Agilent 7890 gas safety gas chromatographs (GCs) purchased earlier this year to replace the aging systems on the *JOIDES Resolution* were tested on shore this quarter and will be delivered to the vessel during the FY14 maintenance period.

### **Laboratory working groups**

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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

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potential developments for laboratories. All four LWGs met this quarter to discuss action items and recent cruise evaluations.

### *Geology*

The Geology LWG discussed the following ongoing quality assurance (QA) activities:

- Migration of value lists from previous Google site to the [www.scientific-ocean-drilling.org](http://www.scientific-ocean-drilling.org) domain (activity completed during the quarter);
- Upload of core description workbooks as assets to the database that will be downloadable as Excel workbooks containing all descriptive data entered during each expedition (activity ongoing through first quarter of FY14); and
- Implementation of IODP-MI Paleontology Coordination Group (PCG) taxonomic names list in DESClogik to help in controlling nomenclature and references (activity ongoing into FY14).

The LWG also discussed the following projects that have been approved by management for implementation:

- Automated thin section form creation project, which will improve the efficiency and ease of creating thin section reports from the descriptive data entered through DESClogik;
- Image tagging and length controls project, which will allow the selection of a “default display” image from a set of multiple section-half images so that the software that consumes these images can work as expected. It will also create QA controls for section length versus the image length;
- Stratigraphic correlation enhancements project, which will formally define the input and output format of “wiggle” data, affine table, and splice table information so that the designers of correlation tools (from Correlator to MATLAB scripts) can be informed as to the expectations of the USIO; and
- 360 degree image capture and reporting project, which will ensure that the composite images from the 360 degree whole round section imaging that are stored and available offline are also stored in the Laboratory Information Management System (LIMS) science database and available to download through the LIMS reports.

### *Geophysics*

The Geophysics LWG discussed the following recommendations, action items, and activities:

- Post-mortem analysis of failure of the section half multisensor logger (SHMSL) and troubleshooting actions taken during Expedition 341;

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- Edge correction issues on the natural gamma radiation multisensor logger (NGRL) and potential corrective actions;
- Successful installation of a photo switch for the whole-round loggers;
- The need for an alternate downhole orientation tool, as Minex was purchased by a third party and the new owner has discontinued the FlexIT survey tool; and
- Acquisition of additional electronics (e.g., pulser-receiver) to act as spares in response to failure of this component during Expedition 341, requiring the switching of the working P-R unit between the whole-round multisensor logger (WRMSL) and the discrete velocity system.

### *Geochemistry*

The Geochemistry LWG discussed the following recommendations, action items, and activities:

- Action item to save data in the coulometer, chlorinity, and alkalinity systems to the same precision as the data that is stored in the database; these systems currently save local data (as backup) with a different number of digits than what is stored in the database;
- Request for user interface changes for the coulometer to make workflow more easily understood and less error-prone;
- Recommendation against the suggestion to save methane/ethane or methane/ (ethane + ethene) ratios in the database as any change to one component might not update the ratio;
- Discussion of Metrohm ion chromatograph (IC) problems during Expedition 346, the worst of which was traced to a corrupted configuration file which was replaced by the vendor, and recommendation to adopt a standard operating procedure on the *JOIDES Resolution* to measure cations on both the IC and inductively coupled plasma-atomic emission spectroscopy (ICP-AES) unless there is a valid reason not to do so;
- Discussion of the new gas safety GCs and the plan for implementation;
- Discussion of the updated perfluorocarbon tracer (PFT) autosampler software, which is now compatible with the Agilent OpenLab software;
- Action item to activate, calibrate, and confirm functionality of all systems in the laboratory before each expedition, whether they are to be used during a cruise or not, so that corrective action items can be identified and implemented (e.g., PFT instrument is rarely used); and
- Discussion of documentation that needs updating.

### ***Curation and Core Handling***

The Curation and Core Handling LWG discussed adoption of core type “F” for cores obtained using the half-core APC tool. The decision was made not to adjust the existing “H”-type labeled cores from Expeditions 341 and 346, as relabeling of all of these cores would be very costly. Instead, drilling summary reports will be configured to sum F and H cores together, as both are piston cores.

The LWG also discussed the LIMS Editing (LIME) program and its successful use during Expedition 346 for more efficient and consistent cancelation of samples in the database (see “Software development” in Data Management).

### **Projects and other activities**

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#### ***Geosciences Laboratory (ODASES)***

The TAMU Ocean Drilling and Sustainable Earth Science (ODASES) Geoscience Laboratory hosted only two scientists during this period for X-ray fluorescence (XRF) scanning projects because of the X-ray source problem and the inability to perform scans above the minimum energy level. The new X-ray source was installed this quarter and operations resumed.

### **ENGINEERING SUPPORT**

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#### **Engineering equipment acquisitions and updates**

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##### ***Vibration-isolated television system***

Planning continued for the deeper water test of the vibration-isolated television system (VIT) and cable de-torque during the transit to Subic Bay. The final end product (i.e., color inspection camera) was acquired and will be installed at the end of the tie-up period next quarter.

### **Projects and other activities**

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#### ***Large diameter pipe-handling infrastructure***

Howard & Associates, USIO, and Siem personnel attended a successful factory acceptance test of the 500-ton elevators, handler, and stool at the Blohm & Voss facilities in Hamburg, Germany, this quarter. Based on the satisfactory results of this test, the USIO planned for at-sea testing during the transit from the Philippines to Hong Kong in January 2014.

#### ***Wireline heave compensating system***

The USIO and Schlumberger continued data collection under different conditions prior to beginning logging operations in open holes for optimizing the system’s capabilities. The USIO will continue to routinely assess results and work with Schlumberger to optimize the system if needed. Routine maintenance of the system was completed during the Victoria, Canada, maintenance period.

## **LEGACY DOCUMENTATION**

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

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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 SAS.

## **USIO TECHNICAL PANEL**

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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**

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Representatives from each USIO partner agreed to postpone the third in-person panel meeting. The USIO team members continued to focus on completing existing projects and will begin formulating a closeout plan together.

## **FY12 MULTISENSOR MAGNETOMETER MODULE PROJECT**

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The multisensor magnetometer module (MMM) is a new magnetometer tool under development at LDEO. The MMM will provide the capability to work in both strongly magnetized hard rock formations and in sediments with weaker magnetizations and will produce continuous records of the magnetic field in the borehole, from which magnetization and polarity of the rocks surrounding the borehole can be calculated. The tool will also provide borehole and tool orientation data and will measure the borehole field on three axes, allowing calculation of the full formation magnetization vector: inclination, declination, and total field intensity. This downhole magnetic information will complement core sample magnetic measurements and significantly enhance IODP's ability to magnetostratigraphically date sediment sequences.

FY12 deliverables for this multi-year project included tool delivery, modifications to extend LDEO and Schlumberger telemetry systems and surface panel software, completion of third-party tool certification requirements, bench and field tests at the test well at LDEO, and at-sea



deployment. All deliverables except complete systems integration testing and at-sea deployment were accomplished during FY12. Personnel changes within the USIO-LDEO engineering group in FY12 resulted in a reevaluation of the timeline for completing this tool.

### **Project status**

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Work on the project resumed this quarter with assembly and bench testing of the MMM. All sensors are operational, and potential borehole deployment is anticipated for late Fall 2013.

## **CORE CURATION**

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The USIO provides services in support of IODP core sampling and curation of the core collection archived at the Gulf Coast Repository (GCR).

### **SAMPLE AND DATA REQUESTS APPLICATION**

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The Sample and Data Requests (SaDR) software received requests for Expeditions 346, 348, and 349. A new version of the application will be ready for release in early October after minor revisions.

### **CURATION STRATEGIES AND EXPEDITION CORE SAMPLING**

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A USIO Curatorial Specialist supervised shipboard core sampling during Expeditions 341 and 346 and reviewed all shipboard and moratorium-related requests in coordination with the other members of the expedition Sample Allocation Committee.

### **CURATING THE GCR CORE COLLECTION**

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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.

### **Repository activity**

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The following “Sample requests” table provides a summary of the 6,051 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.

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### Sample requests

Sample request number, name, country	Number of samples taken	Number of cores XRF scanned	Number of cores Imaged	Number of visitors
2051IOP, Hornbach, USA	10			1
22854B, Veenstra, Netherlands	94			
22938A, Chang, Australia	32			
22937A, Kulhaneck, USA				8
22889A, O'Connel, USA	710	183		1
22933B, Kulhaneck, USA	2		1	
22939A, Horng, Taiwan	358			
1690IODP, Gillis, Canada	21			1
1932IODP, Tauxe, USA	151			1
22856A, Thomas, USA	73			
22940A, Zhang, China	6			
22947A, Rickaby, United Kingdom	9			
22747B, Kristall, USA	27			
22933A, Kulhaneck, USA			3	
22934A, Levy, New Zealand	685			5
22644B, Kulhaneck, USA	6			1
22450B, Weidle, United Kingdom	628			
22949A, Jaume, Italy	57			
22941A, Sawyer, USA	30			
22553C, DeCesare, USA	29			
22952A, Wortmann, Canada	25			
22662B, Kelly, USA	2			
22662C, Kelly, USA	160			
22632B, Winckler, USA	35			
22950A, Miller, USA	31			1
22948A, Purvis, United Kingdom	1			
2055IODP, Salabarnada, Spain	569			5
22488C, Edgar, United Kingdom	26			
2058IODP, Hoyanagi, Japan	286			
2068IODP, Welsh, Australia	5			
2067IODP, Hoyanagi, Japan	98			1
2077IODP, Pierce, USA	124			
21660B, Kender, United Kingdom	49			
2080IODP, Griffith, USA	10			
22951A, Paytan, USA	510			
1907IODP, Stroncik, Germany	30			1
22892B, Stroncik, Germany	891			
2084IODP, Stroncik, Germany	68			
2056IODP, Varol, USA	74			
22965A, Lyle, USA	129			1
Tours/demonstrations				77
<b>Totals</b>	<b>6,051</b>	<b>183</b>	<b>4</b>	<b>104</b>

***GCR tours/visitors***

Type of tour or visitor	Number of Visitors
Scientist visitors	27
Educational tours/demonstrations (4)	56
Public relations tours (4)	21
<b>Totals</b>	<b>104</b>

**USE OF CORE COLLECTION**

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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. A TAMU oceanography class was held at the GCR this quarter and two Summer Science Safari Camps and a TAMU GeoX Camp visited the repository.

**LEGACY DOCUMENTATION**

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

**Sample request file scanning**

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In October 2010, the USIO began scanning ODP and DSDP paper sample request files, which contain some information that is not included in the database. The PDF file formats will reduce the physical storage space of these documents and will make content more accessible when there is a need to research extra information on old use of the cores. The project was completed this quarter.

**Thin section archive sample scanning**

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The USIO continued high-resolution digital imaging of all GCR thin section archive samples from DSDP through ODP to make them publicly available online. This project began in October 2010 with the oldest thin sections (DSDP Leg 1) and has progressed to ODP Leg 165. The image collection to date was duplicated in the Cumulus database “Thin Sections” catalog where metadata can be tagged to the images, which will greatly improve the search and retrieve functions.

**Core working half imaging**

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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

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sampled to date (<http://iodp.tamu.edu/curation/samples.html>). The core working half images were duplicated in the Cumulus database “PR Images” catalog.

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.

### **Inventory of returned sample residues**

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Inventory of the collection of returned DSDP, ODP, and IODP sample residues from scientists was completed this quarter, and all of the returned sample residues are now sorted by expedition into labeled boxes.

## **DATA MANAGEMENT**

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The USIO manages data supporting IODP activities, including expedition and postexpedition data, provides long-term archival access to data, and supports USIO 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**

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#### **LIMS database**

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Expedition 341 data were added to the LIMS database on shore. These data are currently under moratorium and available only to the scientists who sailed on this expedition. Expedition 340 data were placed out of moratorium during this quarter.

#### **Log database**

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Standard data were processed for Expedition 341 Hole U1421A this quarter and standard and image data were processed for Expedition 341 Holes U1418F and U1421A and Expedition 346 Holes U1423B, U1425B, U1427A, and U1430B.

### **EXPEDITION DATA REQUESTS**

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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	1,097	USA	721	United States	570
2	Germany	284	United Kingdom	140	United Kingdom	106
3	United Kingdom	224	Spain	79	Germany	96
4	Japan	161	Germany	72	Japan	63
5	Unknown	112	Unknown	64	Brazil	61
6	Slovakia	76	Japan	60	China	53
7	China	71	Western Europe	34	France	39
8	Australia	67	China	31	Italy	33
9	France	56	South Korea	24	Australia	30
10	Norway	50	Netherlands	22	India	23
	Others	273	Others	125	Others	157
	<b>Total</b>	<b>2,471</b>	<b>Total</b>	<b>1,372</b>	<b>Total</b>	<b>1,231</b>

Janus database web queries		
Rank	Query	Uploads
1	Images—core photos	809
2	Samples	355
3	Hole trivia	285
4	Core summaries	278
5	Site summaries	168
6	Chemistry—rock eval	167
7	Requests	134
8	Hole summaries	129
9	Physical properties—GRA	110
10	Physical properties—MAD	107
11	Physical properties—MSL	94
12	Core log	94
13	Site trivia	93
14	Paleo—age profile	90
15	Chemistry—carbonates	87
16	Paleo—age models	82
17	Paleo—paleo investigations	70
18	Images—prime images	68
19	Curation—dtubes	67
20	Physical properties—PWL	65
	Others	975
	<b>Janus database total</b>	<b>4,327</b>

LIMS database web queries	
Query type	Views
LIMS Reports	18,656
Web Tabular Reports	582
<b>LIMS database total</b>	<b>19,238</b>

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Data requests submitted to the TAMU Data Librarian	
Requests	Total
Photos	4
Color data	2
Publishing photos (rights, credit)	2
Drilling summaries	2
Geochemistry	1
How to	1
Infrared images	1
MST	1
Paleomagnetism	1
Physical properties	1
Splice	1
Underway data	1
XRD	1
<b>Total</b>	<b>19</b>

Countries submitting data requests to the TAMU Data Librarian	
Country	Total
USA	11
United Kingdom	2
Canada	1
Japan	1
Norway	1
Portugal	1
Sweden	1
Unknown	1
<b>Total</b>	<b>19</b>

Other USIO web statistics*			
	Janus database	LIMS database	Log database
<b>Database query hits:</b>			
Entire site (successful)	52,412	23,232	7,965
Average per day	623	222	86.58
<b>Visitor sessions:</b>			
Total number of visitor sessions	2,471	1,372	1,231
Average per day	29	16	13.38
Average length of visit	00:11:31	00:29:18	00:07:14
International visitor sessions	51.07%	42.78%	53.70%
Visitor sessions of unknown origin	4.53%	4.67%	0.00%
Visitor sessions from United States	44.40%	52.55%	46.30%
<b>Visitors:</b>			
Unique visitors	1,324	747	637
Visitors who only visited once	977	601	569
Visitors who visited more than once	347	146	68
Average visits per visitor	1.87	1.83	1.93

## OPERATION, MAINTENANCE, AND SECURITY

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The USIO installed and configured two new Dell servers in the Borehole Research Group (BRG) server room in preparation for replacement of aging Sun Microsystems servers, replaced three dead 1500 VA UPS systems in the BRG server room, decommissioned the Xserve G5 which had been the primary backup server, and migrated both the primary and secondary backup servers to virtual machines on newer hardware.

## SOFTWARE DEVELOPMENT

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### LIMS Editing Tool

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#### *Project scope and deliverables*

The goal of this project is to design, develop, test, and deploy a software package to give data review and editing capabilities to the technical user while maintaining the associations and relationships within the LIMS data structure. The technical user will be able to cancel samples, tests, and results (and any daughter samples, tests, and results) and will be able to reinstate them as well. The user should be able to shift parentage of a sample and force the re-creation of label IDs for the sample and its daughters. The user should be able to create new tests and results (and fill them in, if necessary), but not new samples (Sample Master already provides this capability). The user will be able to call up a set of samples, tests, and results and edit one or many of them in a single session. The following are not included in the scope of the project:

- Reporting capabilities for edited samples beyond cut/paste from the screen (a report will be created for the audit trail as defined in the detailed scope),
- Creation of new samples (retained by Sample Master),
- Editing of certain sample types (HOLE, CORE, SECT, SHLF, PC; retained by Sample Master), and
- Creation of new tests and results (retained by MegaUploadaTron [MUT] and/or spreadsheet uploader).

#### *Project status*

An HVAC failure to the Regional Test and Integration Facility data center (hosted by TAMU) caused a catastrophic failure to the LIMS test database, which negatively impacted the project constraints. The management team decided to revise the project scope rather than delay the completion, and de-scoped the Change Sample Type and Edit Result modules. IODP tested the Edit Sample function in LIME during Expedition 346 with positive results. The LIME project is back on track for a 30 November completion.

### Shore Web Architecture Update

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#### *Project scope and deliverables*

The goal of this project is to replace TAMU's current web infrastructure with a modern, less complex system that supports more responsive patch management to protect against the constantly growing list of security holes identified by the information technology industry. The system will provide support for future web content and services, and include migration of current services such as the IODP, ODP, DSDP, and Publications web sites. The new system must be

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- Able to host the current web content and services, including IODP, ODP, DSDP, and Publications web sites;
- Accomplished with the least amount of downtime possible for current services;
- A secure system that conforms to the current best practice and security standards;
- Adaptable to the ship environment in order to keep the two locations as similar as possible;
- Able to provide for future web based projects and services, including content management systems;
- Able to provide software/hardware maintainability, and simplify patching and upgrades; and
- Reliable.

### *Project status*

The project team began developing the management plan for this project.

## ***JOIDES Resolution Microscope Laboratory Infrastructure Renovation***

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### *Project scope and deliverables*

The goal of this project is to create an ergonomic distribution of workspace in the microscope laboratory with desks designed to accommodate both right- and left-handed personnel. Additional goals include the following:

- Custom build desktops to fit the wall contours and recover used space.
- Recover additional floor space by consolidating microscope parts and supplies under the close-up table and by installing the petrographic image capture and archiving tool (PICAT) station over the close-up table (over the core run-out end).
- Provide space for the scanning electron microscope (SEM) workstation and supplies.
- Provide additional storage (drawers, utility shelves) and work space (pull-out table tops, custom-fitted table tops).
- Install custom shelving for library that will accommodate microscope stations (height issues).
- Move the close-up station out of the core description area, removing a congestion point near the elevators.
- Move the color printer from the microscope laboratory back into the core laboratory, thereby removing the traffic caused by core describers printing VCDs.
- Install a shallow bench for general use where the close-up table used to be.
- Provide additional sample/supply storage for curation under the above bench.
- Create space for a large display in the core description area.



*Project status*

This project execution is scheduled for the maintenance period beginning in October 2013.

**Thin Section Form Report**

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*Project scope and deliverables*

The goal of this project is to create a program that generates batches of form reports, one per thin section, for thin section data collected via DESClogik and exported to Excel workbooks.

*Project status*

The project team began developing a project management plan during this quarter.

**Image Tagging and Length**

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*Project scope and deliverables*

The goal of this project is to enhance the routine section half imaging workflow by (1) tagging one image as the display image in the case of replicate images of a section, and modifying the LIMS2Excel and VirtualCoreTable programs to use the display tag during image retrieval; (2) capturing the cropped image size into the database so it can be used for accurate image plotting in core summary graphics; and (3) providing some type of alert to the user if the cropped image length is significantly different from the section length registered in the database.

*Project status*

The project team began developing a project management plan during this quarter.

**Stratigraphic Correlation Enhancements**

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*Project scope and deliverables*

The goal of this project is to enhance several aspects of the stratigraphic correlation work flow and associated software programs, including specification of affine and splice tables generated by stratigraphic correlators and/or correlation programs, changing how we import the tables into LIMS, implementing a naming convention for correlation files and LIMS Reports choice lists, fixing the LIMS internal conversion program from splice tie table to splice interval tables, and updating to LIMS reports using stratigraphic correlation information.

*Project status*

The project team began developing a project management plan during this quarter.

## 360 Degree Images to LIMS

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### *Project scope and deliverables*

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

### *Project status*

The project team began developing a project management plan during this quarter.

## LEGACY DOCUMENTATION

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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

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The IODP-LDEO inventory and online database include data from IODP Expeditions 301–346 including ESO Expeditions 302, 310, 313, 325 and CDEX Expeditions 314, 319, 322, and 332.

## Expedition data archive

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All science data from Expeditions 320 through 340 have been archived at the National Geophysical Data Center (NGDC) in Boulder, CO.

## PUBLICATIONS

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IODP Publication Services provides publication support services for IODP 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 IODP-MI; and warehousing and distribution of IODP, ODP, and DSDP publications.

## IODP SCIENTIFIC PUBLICATIONS

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### USIO publications

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#### *Scientific Prospectus*

- Arculus, R., Ishizuka, O., and Bogus, K.A., 2013. Izu-Bonin-Mariana arc origins: continental crust formation at intraoceanic arc: foundations, inceptions, and early evolution. *IODP Sci. Prosp.*, 351. doi:10.2204/iodp.sp.351.2013
- Tada, R., Murray, R.W., and Alvarez Zarikian, C.A., 2013. Asian Monsoon: onset and evolution of millennial-scale variability of Asian Monsoon and its possible relation with

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Himalaya and Tibetan plateau uplift. *IODP Sci. Prosp.*, 346 addendum.

[doi:10.2204/iodp.sp.346add.2013](https://doi.org/10.2204/iodp.sp.346add.2013)

- Tamura, Y., Busby, C., and Blum, P., 2013. Izu-Bonin-Mariana Rear Arc: the missing half of the subduction factory. *IODP Sci. Prosp.*, 350. [doi:10.2204/iodp.sp.350.2013](https://doi.org/10.2204/iodp.sp.350.2013)

### *Preliminary Reports*

- Expedition 341S Scientists and Engineers, 2013. Simple Cabled Instrument for Measuring Parameters In Situ (SCIMPI) and Hole 858G CORK replacement. *IODP Prel. Rept.*, 341S. [doi:10.2204/iodp.pr.341S.2013](https://doi.org/10.2204/iodp.pr.341S.2013)

### *Proceedings*

- Le Friant, A., Ishizuka, O., Stroncik, N.A., and the Expedition 340 Scientists, *Proc. IODP*, 340: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.340.2013](https://doi.org/10.2204/iodp.proc.340.2013)

### *Data reports*

- Baldauf, J.G., 2013. Data report: diatoms from Sites U1334 and U1338, Expedition 320/321. 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.320321.215.2013](https://doi.org/10.2204/iodp.proc.320321.215.2013)
- Hepp, D.A., and Otto, D., 2013. Data report: consolidation characteristics of sediments along a shelf-slope transect from IODP Expedition 317, Canterbury Basin, New Zealand. In Fulthorpe, C.S., Hoyanagi, K., Blum, P., and the Expedition 317 Scientists, *Proc. IODP*, 317: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.317.203.2013](https://doi.org/10.2204/iodp.proc.317.203.2013)
- Leon-Rodriguez, L., and Dickens, G.R., 2013. Data report: stable isotope composition of Eocene bulk carbonate at Sites U1331, U1332, and U1333. 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.320321.208.2013](https://doi.org/10.2204/iodp.proc.320321.208.2013)
- Pueringer, M., Sager, W., and Housen, B., 2013. Data report: paleomagnetic measurements of igneous rocks from Shatsky Rise Expedition 324. In Sager, W.W., Sano, T., Geldmacher, J., and the Expedition 324 Scientists, *Proc. IODP*, 324: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.324.202.2013](https://doi.org/10.2204/iodp.proc.324.202.2013)
- Smith, M.E., Glick, E.V., Lodestro, S., and Rashid, H., 2013. Data report: oxygen isotopes and foraminifer abundance record for the last glacial–interglacial cycle and marine isotope Stage 6 at IODP Site U1313. In Channell, J.E.T., Kanamatsu, T., Sato, T., Stein, R., Alvarez Zarikian, C.A., Malone, M.J., and the Expedition 303/306 Scientists, *Proc. IODP*, 303/306: College Station, TX (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.303306.216.2013](https://doi.org/10.2204/iodp.proc.303306.216.2013)

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- Suto, I., Kawamura, K., and Chiyonobu, S., 2013. Pliocene and Pleistocene diatom floras and taxonomic notes from the Canterbury Basin (IODP Expedition 317 Hole U1352B), off New Zealand. *In* Fulthorpe, C.S., Hoyanagi, K., Blum, P., and the Expedition 317 Scientists, *Proc. IODP*, 317: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.317.202.2013](https://doi.org/10.2204/iodp.proc.317.202.2013)

### CDEX publications

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#### Proceedings

- Chester, F.M., Mori, J., Eguchi, N., Toczko, S., and the Expedition 343/343T Scientists, 2013. *Proc. IODP*, 343/343T: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.343343T.2013](https://doi.org/10.2204/iodp.proc.343343T.2013)
- Inagaki, F., Hinrichs, K.-U., Kubo, Y., and the Expedition 337 Scientists, 2013. *Proc. IODP*, 337: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.337.2013](https://doi.org/10.2204/iodp.proc.337.2013)

#### Data reports

- Screaton, E., Rowe, K., Sutton, J., and Atalan, G., 2013. Data report: permeabilities of Expedition 322 and 333 sediments from offshore the Kii Peninsula, Japan. *In* Saito, S., Underwood, M.B., Kubo, Y., and the Expedition 322 Scientists, *Proc. IODP*, 322: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.322.210.2013](https://doi.org/10.2204/iodp.proc.322.210.2013)

### USIO REPORTS

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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

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#### Ocean Drilling Citation Database Annual Study

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IODP Publication Services produces an annual study of the Ocean Drilling Citation Database to present 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, and IODP.

This year’s study was conducted on citations published through December 2012 that were contained in the database as of June 2013. The study was completed this quarter and is available online at [http://iodp.tamu.edu/publications/AGI\\_studies/AGI\\_study\\_2013.pdf](http://iodp.tamu.edu/publications/AGI_studies/AGI_study_2013.pdf).

## IODP PUBLICATIONS MANAGEMENT

### IODP 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 IODP Sample, Data, and Obligations Policy ([www.iodp.org/program-policies/](http://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 FY13 Q4	Overall extension status	
			Number approved	Number fulfilled
301	20 April 2007			
302	23 July 2007			
304/305	4 February 2008		14	12
308	7 March 2008		8	7
303/306	9 May 2008		13	9
307	13 June 2008		4	2
311	27 June 2008		12	8
309/312	28 August 2008		9	9
310	4 November 2008		16	14
313	4 August 2012		4	2
314/315/316	4 October 2010		27	21
317	4 September 2012		11	5
318	2 March 2013		4	3
319	30 April 2012		6	3
320/321	30 June 2012		26	23
322	10 June 2012		11	6
323	10 August 2012		6	5
324	4 July 2012		10	6
325	16 March 2013*		31	6
327	5 May 2013		1	
329	13 August 2013	1	1	
330	11 October 2013	3	3	
331	4 June 2013		4	2
332	11 August 2013			
334	13 December 2013		1	

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

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

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### Synthesis papers

Expedition	Submission deadline (26 months postmoratorium)	Deadline extensions approved in FY13 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		1	
318	2 September 2013			
319	30 October 2012			
320/321	30 December 2012			
322	10 December 2012		1	
323	10 February 2013			
324	4 January 2013		1	
325	16 September 2013	1	1	

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

### IODP publications website

The IODP Publications website is hosted at TAMU. Traffic accessing USIO publications is monitored through [publications.iodp.org](http://publications.iodp.org).

Publications website	FY13 Q4 page views	FY13 Q4 site visits
<a href="http://www.iodp.org/scientific-publications">www.iodp.org/scientific-publications</a>	474,834	57,212

**Note:** Data are unavailable for the period of 23–30 September 2013. These statistics cover the period 1 July–22 September 2013.

### 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 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 following table.

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Reports and publications	DOI prefix	Number of resolutions			
		July 2013	August 2013	September 2013	FY13 Q4 total
IODP	10.2204	4,753	3,749	4,009	<b>12,511</b>
ODP/DSDP	10.2973	7,842	7,210	5,664	<b>20,716</b>

### PUBLICATIONS SUPPORT

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The USIO provided Publications Specialist services during USIO Expeditions 341 and 346 and hosted the postexpedition editorial meeting for USIO Expedition 345.

### TECHNICAL DOCUMENTATION

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Technical documents produced by the USIO are available to users via the Cumulus web client ([iodp.tamu.edu/tasapps/](http://iodp.tamu.edu/tasapps/)) once they reach the technical draft stage. Technical documents in production during the fourth quarter of FY13 are shown in the table below.

Technical documentation	FY13 Q4 status
<b>Quick start guides</b>	
Chemistry: inductively coupled plasma–atomic emission spectroscopy (ICP-AES)	V1.0 released
Chemistry: Metrohm ion chromatograph	V1.0 released
Logger: Natural Gamma Radiation Logger (NGRL)	V1.0 released
Logger: Section Half Imaging Logger (SHIL)	V1.0 released
Logger: Section Half Multisensor Logger (SHMSL)	V1.0 released
Logger: Whole-Round Multisensor Logger (WRMSL)	V1.0 released
Physical Properties: Automated Vane Shear (AVS)	V2.0 released
Physical Properties: Gantry	V1.0 released
Physical Properties: MADMax	V1.0 released
X-Ray: EVA Software	In revision
Paleomag: Agico JR-6 Spinner Magnetometer	Under technical review
Paleomag: D2000 AF Demagnetizer	Under technical review
Thin Section: Thin Section Prep	Under technical review
<b>User guides</b>	
Chemistry: Cary Spectrophotometer	V1.0 released
Chemistry: ICP-AES	V1.0 released
Chemistry: Source Rock Analyzer	V1.0 approved for continued use
Chemistry: Titrator (chloride)	V1.0 released
Chemistry: Titrator (pH, Alkalinity)	V2.0 released
Logger: NGRL	V1.0 released
Physical Properties: P-Wave Velocity	V2.0 released
Physical Properties: Strength	V1.0 released
Logger: SHIL	In revision
Physical Properties: Moisture and Density (MAD)	In revision
X-Ray: X-ray Diffraction (XRD)	In revision
<b>Advanced User Guides</b>	
Chemistry: Source Rock Analyzer	V1.0 approved for continued use
Physical Properties: MAD	In revision

## LEGACY DOCUMENTATION

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The USIO routinely archives electronic copies of documents, reports, and scientific publications produced on behalf of IODP. Documents archived this quarter included all scientific publications produced during the quarter, the FY14 IODP-USIO Annual Program to NSF, the IODP-USIO FY15–FY17 Closeout Plan Overview, the FY13 Q3 report, the IODP-USIO Final Technical Report to IODP-MI, the 2013 Ocean Drilling Citation Study, and planning documentation for reporting deliverables.

## EDUCATION

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USIO education activities are supported by NSF through other Program integration costs (OPIC). 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 programs; and implementing live and near-real-time programs that highlight and use the *JOIDES Resolution* as a platform for education. The USIO also conducts diversity outreach initiatives to allow minority students to pursue studies in earth systems sciences or to explore careers in scientific ocean drilling and large-scale science program management.

## PROFESSIONAL DEVELOPMENT

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### 2014 Schools of Rock

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Planning began for a School of Rock for undergraduate students to be held at the Indiana University of Pennsylvania in June 2014. Preliminary discussions were also initiated for a possible second School of Rock during FY14.

### Onboard educator program

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Onboard Education Officers for Expedition 341 included A. Mote (Ann Richards School for Young Women Leaders, Austin, TX) and C. Larson (National Aquarium of New Zealand; funded by the Australian and New Zealand IODP Consortium [ANZIC]). Larson and Mote worked in close collaboration during the expedition to produce blogs, classroom activities, short videos, social media posts, and a full schedule of video broadcasts to classrooms and workshops around the world.



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As an alternative to hosting an Onboard Education Officer, program staff worked with Expedition 346 technical staff to invite members of the Science Party to manage some of the outreach tasks, including blogging, Facebook and Twitter posts, and hosting live broadcasts. This strategy achieved success in expanding the *JOIDES Resolution's* audience, held followers' attention, and offered live interaction opportunities to groups worldwide.

### **Educational outreach events**

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USIO staff participated in the Smithsonian Science Education Academies program in July, during which teachers came to Ocean Leadership for an afternoon of hands-on activities and a live broadcast with the *JOIDES Resolution*. USIO staff also provided three hour-long sessions for Howard County, MD, science teachers during their back-to-school professional development work day, and led a discussion on August 13 among Challenger Center for Space Science Education leaders using IODP science to highlight the Next Generation Science Standards practices.

### **EXPEDITION-BASED LEARNING ACTIVITIES AND MATERIALS**

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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.

### **Deep Earth Academy website**

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Since its inception, the Deep Earth Academy website ([deeeearthacademy.org](http://deeeearthacademy.org)) has served as the hub for information on professional development, classroom activities, and materials ordering. During this quarter, the majority of the website's education resources and content was moved to the [joidesresolution.org](http://joidesresolution.org) website to streamline and simplify access to all materials, resources, and opportunities.

### **JOIDES Resolution website and social networking**

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The [joidesresolution.org](http://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, the site promoted Expeditions 341 and 346. Program staff implemented a new Activity Search tool and Educator Resources page this quarter, both of which are live now at <http://joidesresolution.org/node/3002>.

## USIO educational website statistics

USIO educational website*	FY13 Q4 page views	FY13 Q4 site visits
www.joidesresolution.org	47,261	14,579
www.oceanleadership.org/education/deep-earth-academy	12,715	9,548
<b>Total</b>	<b>59,976</b>	<b>24,127</b>

\*Ocean Leadership’s educational websites are funded jointly by the USIO and USSSP.

## Video broadcasts

Each Onboard Education Officer connects with numerous classrooms, museums, professional development programs, and special events to provide live ship-to-shore video broadcasts lasting 30–45 minutes each. This quarter featured Expeditions 341 and 346. With two dedicated Onboard Education Officers, Expedition 341 held a total of 54 live broadcasts reaching approximately 2,000 participants. Expedition 346 did not have an Onboard Education Officer, but program staff and expedition technical staff worked together to hold 14 video broadcast events, almost all of which were done using Zoom with multiple classrooms participating in each individual event. These events involved 24 groups (and approximately 800 participants) from the United States, Korea, Japan, and Europe.

## Educational materials development and distribution

Four new videos about sedimentology, structural geology, geochemistry, and downhole logging on the *JOIDES Resolution* were developed this quarter from footage taken during Expedition 344: Costa Rica Seismogenesis Project 2 (<http://www.youtube.com/playlist?list=PLogsCXymTkBlnI2FoB64yTr7MByWAZA2P>), and a series of six videos was produced on the R/V *Atlantis* in July as part of the Center for Dark Energy Biosphere Investigations (C-DEBI) grant to the USIO (<http://vimeo.com/user900189/videos>) (see “Outside funding and sponsorships”). Three new videos were also in the production phase during this quarter: an introduction/overview to the new International Ocean Discovery Program, an Education Officer video, and a How Science Works video focused on the science of Expedition 342: Paleogene Newfoundland Sediment Drifts.

The USIO launched two new activities focused on the process of science: *Investigating Seafloor Sediments—Proceed as a Scientist!* (<http://joidesresolution.org/node/3308>) and *Using the Cretaceous Impact Kit to Teach the Process of Science* (<http://joidesresolution.org/node/3289>). Development of a guidebook to holding *JOIDES Resolution* Outreach Network events also began this quarter.

Materials were distributed this quarter at conferences and outreach activities and in response to requests received through the Deep Earth Academy 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

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The USIO provides regular opportunities for scientists to participate in educational programming. During this quarter, scientists participating in program events included: A. Fisher (UC-Santa Cruz), G. Wheat (University of Alaska/Fairbanks), D. Thomas (TAMU), K. Inderbitzen (University of Alaska/Fairbanks), B. Orcutt (Bigelow Laboratory for Ocean Sciences), C. Alvarez Zarikian (USIO), and R. Murray (Boston University).

## STRATEGIC PARTNERSHIPS

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### Center for Dark Energy Biosphere Investigations

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The USIO continued to partner with C-DEBI to produce microbiology-related materials and projects. During this quarter, USIO staff continued working with B. Orcutt to adapt the Adopt-a-Microbe website/activities into a stand-alone curriculum module; this work is scheduled for completion in early FY14. USIO staff also sailed on the *Atlantis* as a part of the C-DEBI grant to the USIO (described below).

## OUTSIDE FUNDING AND SPONSORSHIPS

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

### Activities related to existing grants

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#### *C-DEBI grant*

The USIO partnered with C-DEBI during FY11 on the education and outreach components of the *Atlantis* Expedition AT18-07, which collected samples and data from seafloor observatories (CORKS) installed during IODP Expedition 327: Juan de Fuca Ridge-Flank Hydrogeology. A continuation was awarded that supports USIO-managed education and outreach programs during the second phase of this project, including an expedition to the same sites on the R/V *Thompson* scheduled for 11–26 July 2013. During the expedition, USIO staff partnered with the University of Rhode Island’s Inner Space Center to do 80 live interactions to museums, aquaria, and other groups. Utilizing the high-speed internet connection provided to *Atlantis* for telepresence during this expedition, the USIO staff was able to connect to all of these groups—including several program-initiated groups—with high-quality audio and video programming. During the expedition, the education team also uploaded blogs, expedition updates, and photos regularly to [www.explorationnow.org/atlantis](http://www.explorationnow.org/atlantis). This partnership has strong potential to increase the quality of our live ship-to-shore programming going forward. In addition, videographer L. Strong produced a series of videos (see “Educational materials development and distribution”). The educators who sailed with the expedition are currently working on their individual postcruise projects.

### ***Ship-to-Shore Science grant (NSF Informal Science Education Pathways)***

During this quarter, each project team completed their projects and prepared final reports. Planning began for an in-person meeting with all the project lead personnel in early FY14, during which the entire project will be wrapped up and a new full-scale NSF Informal Science Education proposal developed for submission in January 2014.

## **DIVERSITY SUPPORT INITIATIVES**

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### **IODP-USIO Diversity Internship**

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In partnership with LDEO, the USIO cosponsored the participation of two undergraduate students in the 10-week LDEO Summer Internship program: N. Porter (Wesleyan University) and E. Martinez (University of California, Berkeley). Both students worked until mid-August with mentors from LDEO on research projects that used scientific ocean drilling data and/or core samples. Research results for their projects will be made available at <http://www.ldeo.columbia.edu/education/programs/summer-internship/ldeo-interns>.

## **LEGACY DOCUMENTATION**

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

### **Legacy digital archive**

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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 all videos produced during the quarter (see “Educational materials development and distribution”).

## **OTHER PROJECTS AND ACTIVITIES**

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### **J-aRt contest**

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A special artist-designed t-shirt was developed this quarter as a prize for all J-aRt winners.

## **OUTREACH**

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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

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### Port call outreach

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More than 360 people toured the *JOIDES Resolution* on 29 and 30 September while it was in port in Busan, South Korea, at the conclusion of Expedition 346. Organized in collaboration with the Korean IODP Office (K-IODP) and the Korean Institute of Geoscience and Mineral Resources (KIGAM), the tours drew university and high school students, government officials, and scientific colleagues from all corners of South Korea.

### Public relations materials

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#### *USIO media advisories and news releases*

During this quarter, the USIO either developed and published or played a role in developing the following press releases and media advisories (all items below are press releases unless noted otherwise):

- *JOIDES Resolution* concludes operations in the Gulf of Alaska [30 August 2013]. <http://oceanleadership.org/joides-resolution-concludes-operations-gulf-alaska/>
- IODP data helps scientists confirm existence of the largest single volcano on Earth [6 September 2013] <http://oceanleadership.org/iodp-data-helps-scientists-confirm-existence-largest-single-volcano-earth/> [News release was picked up by *Nature* (London, U. K. ), *National Geographic*, *WIRED*, *Huffington Post*, *CNN World*, *PBS.org*, *NPR.org*, *The Washington Post*, *International Science Times*, *International Business Times*, *Mirror News*, *Science Today*, *Eco News Network*, and more.]

#### *Communications tools*

The Summer 2013 issue of the *Core Discoveries* newsletter was published during this quarter. ([http://usssp-iodp.org/wp-content/uploads/CoreDiscoveries\\_Summer2013\\_FINAL.pdf](http://usssp-iodp.org/wp-content/uploads/CoreDiscoveries_Summer2013_FINAL.pdf)). This issue features FY13 expedition updates, an article highlighting IODP's role in confirming the existence of the largest single volcano on Earth, and tips on how to develop a drilling proposal for IODP.

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 approximately 500 followers and more are being added regularly.

### Program-related publications

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#### *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/](http://iodp.tamu.edu/publications/)

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

- Barth, N.C., **Kulhanek, D.K.**, Beu, A.G., Murray-Wallace, C.V., Hayward, B.W., Mildenhall, D.C., and Lee, D.E., 2013. New c. 270 kyr strike-slip and uplift rates for the southern Alpine Fault and implications for the New Zealand plate boundary. *J. Struct. Geol.* doi:10.1016/j.jsg.2013.08.009
- Cook, C.P., van de Flierdt, T., **Williams, T.**, Hemming, S.R., Iwai, M., Kobayashi, M., Jimenez-Espejo, F.J., Escutia, C., González, J.J., Khim, B.-K., McKay, R.M., Passchier, S., Bohaty, S.M., Riesselman, C.R., Tauxe, L., Sugisaki, S., Lopez Galindo, A., Patterson, M.O., Sangiorgi, F., Pierce, E.L., Brinkhuis, H., **Klaus, A.**, Fehr, A., Bendle, J.A.P., Bijl, P.K., Carr, S.A., Dunbar, R.B., Flores, J.A., Hayden, T.G., Katsuki, K., Kong, G.S., Nakai, M., Olney, M.P., Pekar, S.F., Pross, J., Röhl, U., Sakai, T., Shrivastava, P.K., Stickley, C.E., Tuo, S., Welsh, K., and Yamane, M., 2013. Dynamic behaviour of the East Antarctic ice sheet during Pliocene warmth. *Nat. Geosci.*, 6:765–769. doi:10.1038/ngeo1889
- Dorador, J., Rodríguez-Tovar, F.J., and IODP Expedition 339 Scientists (including **Alvarez Zarikian, C.**, **Lofi, J.**, and **Williams, T.**), 2013. Digital image treatment applied to ichnological analysis of marine sediments. *Facies*. doi:10.1007/s10347-013-0383-z
- Hines, B.R., **Kulhanek, D.K.**, Hollis, C.J., Atkins, C.B., and Morgans, H.E.G., 2013. Paleocene-Eocene stratigraphy and paleoenvironment at Tora, Southeast Wairarapa, New Zealand. *N. Z. J. Geol. Geophys.* doi:10.1080/00288306.2013.836112
- **Schneider, L.J.**, Bralower, T.J., Kump, L.R., and Patzkowsky, M.E., 2013. Calcareous nannoplankton ecology and community change across the Paleocene-Eocene Thermal Maximum. *Paleobiology*, 39(4):628–647. doi:10.1666/12050

### ***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 ([www.iodp-usio.org/Newsroom/news.html](#)) for other articles that raise the profile of the Program.

- Joyce, C., 2013. Immense underwater volcano is the biggest on Earth. *National Public Radio*, 6 September 2013. <http://www.npr.org/templates/story/story.php?storyId=219762755>
- Gramling, C., 2013. East Antarctica’s ice sheet not as stable as thought. *Science*, 21 July 2013. <http://news.sciencemag.org/2013/07/east-antarcticas-ice-sheet-not-stable-thought>
- Harris, R., 2013. Our once and future oceans: taking lessons from Earth’s past. *NPR Morning Edition*, 2 August 2013. <http://www.npr.org/2013/08/02/208032918/our-once-and-future-oceans-taking-lessons-from-earths-past>

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- Howard, B.C., 2013. New giant volcano below sea is largest in the world. *National Geographic*, 5 September 2013. <http://news.nationalgeographic.com/news/2013/09/130905-tamu-massif-shatsky-rise-largest-volcano-oceanography-science>
- Kim, M., 2013. New Mexico-size volcano discovered in the depths of the Pacific Ocean. *Washington Post*, 6 September 2013. [http://articles.washingtonpost.com/2013-09-06/national/41824612\\_1\\_volcano-mauna-loa-ice-cube](http://articles.washingtonpost.com/2013-09-06/national/41824612_1_volcano-mauna-loa-ice-cube)
- Mohan, G., 2013. Ocean volcano may be largest on Earth, biggest in solar system. *Los Angeles Times*, 5 September 2013. <http://www.latimes.com/science/sciencenow/la-sci-sn-ocean-volcano-largest-20130905,0,1515388.story>
- Orcutt, B.N., Wheat, C.G., Rouxel, O., Hulme, S., Edwards, K.J., and Bach, W., 2013. Oxygen consumption rates in subseafloor basaltic crust derived from a reaction transport model. *Nat. Commun.*, 4:2539. doi:10.1038/ncomms3539
- Redfern, S., 2013. Deep microbes live long and slow. *BBC News*, 28 August 2013. <http://www.bbc.co.uk/news/science-environment-23855436>
- Sager, W.W., Zhang, J., Korenaga, J., Sano, T., Koppers, A.A.P., Widdowson, M., and Mahoney, J.J., 2013. An immense shield volcano within the Shatsky Rise oceanic plateau, northwest Pacific Ocean. *Nat. Geosci.*, 6:976–981. doi:10.1038/ngeo1934
- Staff, 2013. East Antarctic ice may be more vulnerable to global warming than previously thought. *Physics Today*, 22 July 2013. <http://blogs.physicstoday.org/newspicks/2013/07/east-antarctic-ice-may-be-more-vulnerable-to-global-warming-than-previously-thought/>
- Staff, 2013. World's largest volcano discovered beneath Pacific. *BBC*, 8 September 2013. <http://www.bbc.co.uk/news/science-environment-24007339>

## LEGACY DOCUMENTATION

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

### Legacy digital archive

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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 the aforementioned press releases and the Summer 2013 issue of *Core Discoveries*.

## **APPENDIX A: FINANCE REPORT**

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Please contact [info@oceanleadership.org](mailto:info@oceanleadership.org) for hard copies of financial pages.



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APPENDIX B: TRAVEL

Purpose*	Category	Dates	Location	Institution: Personnel
Disaster Recovery Review meeting	Meeting	8 and 9 July 2013	College Station, TX	Consultants: R. Elumalai, M. Manickam
Expedition 345 Postcruise Meeting	Postexpedition Meeting	8–10 July 2013	College Station, TX	LDEO: G. Guerin
Expedition 350 Precruise Meeting	Preexpedition Meeting	9 and 10 July 2013	College Station, TX	LDEO: G. Guerin
Federation of Earth Science Information Partners (ESIP) Meeting	Meeting	9–12 July 2013	Chapel Hill, NC	Ocean Leadership: D. Fils
Expedition 351 Precruise Meeting	Preexpedition Meeting	10 July 2013	College Station, TX	LDEO: G. Guerin
Installing and Configuring Windows Server 2012 class	Training	14–19 July 2013	Houston, TX	TAMU: D. Ponzio
Chikyu IODP Board Meeting	Advisory Panels	23–25 July 2013	Yokohama, Japan	Ocean Leadership: D. Divins
17th International Symposia on Ostracoda	Conference	23–26 July 2013	Rome, Italy	TAMU: C. Alvarez Zarikian
Gas hydrate writing meeting	Meeting	23–27 July 2013	Washington, DC	TAMU: M. Malone
American Management Association (AMA) Voice of Leadership training course	Training	26 July–1 August 2013	Washington, DC	TAMU: K. Bogus
Expedition 341 port call activities	Port Call	27 July–2 August 2013	Valdez, AK	Ocean Leadership: D. Divins, M. Wright TAMU: B. Clement, K. Miller, J. Rosser, TAMRF: M. Strickland, T. Wilson
National Instrument NIWeek 2013 Conference	Conference	6–8 August 2013	Austin, TX	TAMU: L. Chen, T. Cobb, H. Evans, D. Ferrell, S. Herrmann, D. Hornbacher, A. Morgan, J. Rosser
LDEO site visit	Meeting	17 and 18 August 2013	Palisades, NY	Ocean Leadership: D. Divins
Expedition 352 Precruise Meeting	Preexpedition meeting	19 and 20 August 2013	College Station, TX	LDEO: S. Morgan
Delivery of data image files	Legacy preservation	19–22 August 2013	Boulder, CO	TAMU: D. Sims
AMA Voice of Leadership Training Course	Training	23–29 August 2013	New York, NY	TAMU: D. Kulhanek
JOIDES Resolution Facility Board Meeting	Meeting	26 and 27 August 2013	Arlington, VA	LDEO: D. Goldberg TAMU: B. Clement, M. Malone
13 International Congress of the Brazilian Geophysical Society	Conference	26–29 August 2013	Rio de Janeiro, Brazil	TAMU: M. Malone
Blohm & Voss facility elevator and drill pipe testing	Equipment testing	26–31 August 2013	Hamburg, Germany	LDEO: G. Iturrino TAMU: K. Grigar
11th International Conference on Paleooceanography	Conference	1–6 September 2013	Barcelona, Spain	LDEO: T. Williams
Metrohm Instrument training course	Training	9–12 September 2013	Houston, TX	TAMU: R. Gray

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Purpose*	Category	Dates	Location	Institution: Personnel
Gas chromatography installation training	Training	9–13 September 2013	College Station, TX	TAMU: Erik Moortgat
Export training	Training	9–13 September 2013	Milpitas, CA	TAMU: T. Brashear, S. Dillard TAMRF: M. Strickland
14th International Nannoplankton Association Meeting	Conference	12–22 September 2013	Reston, VA	TAMU: D. Kulhanek
S-135 drill pipe inspection	Equipment inspection	18 September 2013	Houston, TX	TAMU: R. Mitchell
Electronic Release System acceptance test	Equipment testing	24 September 2013	Webster, TX	TAMU: M. Meiring
Shipping training	Training	25–30 September 2013	Philadelphia, PA	TAMU: C. Peng
International Association of Hydrogeologists (IAH) 2013 Congress	Conference	15–20 September 2013	Perth, Australia	Ocean Leadership: M. Morell
TAMU site visit	Meeting	19 and 20 September 2013	College Station, TX	Ocean Leadership: D. Divins
Expedition 346 port call activities	Port Call	25 September–1 October 2013	Busan, Korea	Ocean Leadership: D. Divins, M. Wright TAMU: T. Cobb, B. Julson, M. Malone, D.J. Miller, J. Miller, J. Rosser

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

## APPENDIX C: USIO QUARTERLY REPORT DISTRIBUTION

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