

International Ocean Discovery Program
JOIDES Resolution Science Operator
FY21 Q2 Operations and Management Report

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and
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1. Introduction

This quarterly operations and management report reflects activities and deliverables outlined in the International Ocean Discovery Program (IODP) *JOIDES Resolution* Science Operator (JRSO) FY21 Annual Program Plan to the National Science Foundation (NSF), as implemented by Texas A&M University (TAMU), acting as manager and science operator of the research vessel *JOIDES Resolution* as a research facility for IODP. Administrative services in support of JRSO activities are provided by the Texas A&M Research Foundation (TAMRF) through TAMU Sponsored Research Services (SRS).

2. Expedition operations

This section provides information on the following aspects of JRSO expedition support:

- Planning (including logistics and engineering development);
- Staffing (including a staffing table for expeditions under way during this quarter);
- Clearance, permitting, and environmental assessment activities;
- Expedition operations (including a site map for each expedition under way during this quarter, a coring summary table for each expedition completed during the quarter, and preliminary science results for each expedition completed during this quarter); and
- Postexpedition activities (including postcruise editorial meetings).

Table 2.1. JRSO expedition schedule

Expedition		Port (origin) ¹	Dates ²	Total days (port/sea)	Days at sea (transit ³ /ops)	Co-Chief Scientists	Expedition Project Manager
Non-IODP (Tie-up) (5 December 2020—6 April 2021) (122 days)							M. Malone
Complete SAT Reentry Installations	395E	Cape Town, South Africa	6 April–6 June 2021	61 (5/56)	56 (32/24)	NA	T. Williams
Reykjanes Mantle Convection and Climate: Crustal Objectives	395C	Reykjavík, Iceland	6 June–6 August 2021	61 (5/56)	56 (3/53)	R. Parnell-Turner A. Briaes	L. LeVay
Mid-Norwegian Continental Margin Magmatism	396	Reykjavík, Iceland	6 August–6 October 2021	61 (5/56)	56 (7/49)	C. Berndt S. Planke	C. Alvarez Zarikian
Hole U1309D Remediation	396T	Kristiansand, Norway	6 October–6 December 2021	61 (TBD)	TBD	NA	P. Blum
Walvis Ridge Hotspot	391	Cape Town, South Africa	6 December 2021–5 February 2022	61 (5/56)	56 (11/45)	W. Sager K. Hoernle	K. Petronotis
Agulhas Plateau Cretaceous Climate	392	Cape Town, South Africa	5 February–7 April 2022	61 (5/56)	56 (6/50)	G. Uenzelmann-Neben S. Bohaty	D. Kulhanek

Expedition		Port (origin) ¹	Dates ²	Total days (port/ sea)	Days at sea (transit ³ / ops)	Co-Chief Scientists	Expedition Project Manager
South Atlantic Transect 1	390	Cape Town, South Africa	7 April–7 June 2022	61 (5/56)	56 (14/42)	R. Coggon J. Sylvan	E. Estes
South Atlantic Transect 2	393	Montevideo, Uruguay	7 June–7 August 2022	61 (5/56)	56 (14/42)	D. Teagle G. Christeson	T. Williams

Notes: TBD = to be determined, NA = not applicable, SAT = South Atlantic Transect.

¹ Ports subject to change, pending issues related to the COVID-19 pandemic.

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

³ Preliminary total estimated transit (i.e., to and from operational area and between sites).

Expedition 378: South Pacific Paleogene Climate

Postexpedition activities

Because of COVID-19 travel restrictions, the Expedition 378 postcruise editorial meeting is being conducted online using Google Drive collaboration tools. The editorial meeting began 15 October and is ongoing, with the goal of completing the work in April. The sample party was completed by onsite JRSO staff in March.

Expedition 390C: South Atlantic Transect Reentry Installations

Postexpedition activities

Following Expedition 390C, the Expedition 390 and 393 scientists were updated on progress on casing and reentry system installations via a webinar on 4 February, and the micropaleontology laboratory group members were sent samples to construct a preliminary biostratigraphy. Expedition 395E (April–June 2021) is slated to complete reentry system installations. Expeditions 390 and 393 are scheduled for 2022.

Expedition 395P: Complete SAT Reentry Installations

Planning

Expedition 395P was scheduled to finish installing the reentry systems for the South Atlantic Transect (SAT) expeditions, but the expedition was canceled because of COVID-19 cases aboard the ship. The expedition became a tie-up period, and the work was rescheduled to be completed during Expedition 395E (see below). The COVID Mitigation Protocols Established for Safe JR Operations (COPE) Protocol was revised accordingly.

Expedition 395E: Complete SAT Reentry Installations

Planning

Expedition 395E was previously planned to complete remediation work on Hole U1309D and conduct engineering testing. However, the expedition will now attempt to finish installing the reentry systems for the SAT expeditions, operations that were originally planned for the February–April window. Hole

U1309D remediation and engineering testing was postponed and portions may be completed during Expedition 396T (see below). Expedition 395E will start in Cape Town, South Africa, on 6 April and will then transit north to conclude on 6 June in Reykjavík, Iceland.

Expedition 395C: Reykjanes Mantle Convection and Climate: Crustal Objectives

Planning

Discussions with the Expedition 395 Co-Chief Scientists, the *JOIDES Resolution* Facility Board (JRFB) chair, and NSF resulted in the decision to postpone the expedition but conduct operations that can be accomplished without an onboard Science Party. The EPM and Co-Chief Scientists developed a revised set of prioritized coring and logging operations. Additionally, meetings between the EPM, Co-Chief Scientists, and technical staff will be held to finalize laboratory measurements and sampling requirements. During the expedition, JRSO staff will curate the cores and run them through the whole-core and split-track systems. Postexpedition description and sampling are tentatively planned for this fall at the Gulf Coast Repository (GCR) in College Station, Texas, subject to pandemic-related restrictions.

Expedition 396: Mid-Norwegian Continental Margin Magmatism

Planning

The Expedition 396 *Scientific Prospectus* was completed and published in February. The Ultrasonic Borehole Imager (UBI) tool was confirmed with Schlumberger Technology Corporation (Schlumberger) for Expedition 396, in addition to the already-planned Expedition 395C. The sites coordinate system was updated from the original ED50 to WGS84, and the site coordinates were corrected in the Site Survey Databank and in all other expedition-related documents.

Staffing

Applications for the special calls were filled, and the Science Party staffing was completed. The Onboard Outreach Officer was invited and accepted the invitation to sail.

Clearance, permitting, and environmental assessment activities

The marine scientific research (MSR) application was submitted to the US State Department on 5 February, and the US State Department submitted the application and diplomatic note on 17 February. One scientist expressed interest in collecting microbiological data, so Nagoya Protocol requirements are being reviewed. NSF approved the Environmental Evaluation (EE) required for Expedition 396 acoustic activity associated with check shot surveys. To account for any possible changes to the schedule, the EE encompasses June 2021–October 2022.

Expedition 396T: Hole U1309D Remediation

Planning

The operations originally scheduled for Expedition 395E were tentatively moved to Expedition 396T, which is scheduled for 6 October–6 December. JRSO is working with ODL to assess maintenance and repair requirements for this interval, which is followed by four consecutive expeditions, to determine if it feasible to conduct the remediation activities and still accomplish the important maintenance tasks.

Expedition 391: Walvis Ridge Hotspot

Planning

A reduced measurement plan was created in case the COPE protocol has to be implemented with a reduced Science Party. Virtual Science Party meetings were held regularly during the quarter. Minor updates were made to the site coordinates related to reassessment of the navigation data, and an addendum to the *Scientific Prospectus* was published in February. Research plans were received, and JRSO began working with Science Party members to assess requirements for shipboard work.

Staffing

A reduced Science Party was scoped for the COPE protocol, but normal operations for the expedition are planned for now. Because of additional incremental funding and improvement in COVID conditions, the Australia/New Zealand IODP Consortium (ANZIC) decided to staff the four FY22 expeditions and issued calls for applications for Expedition 391. The Onboard Outreach Officer was invited and accepted the invitation to sail. One scientist had to withdraw and was replaced. Another scientist is waiting on approval from their current employer, and a special call will be sent out if the scientist's request is denied.

Clearance, permitting, and environmental assessment activities

Because the expedition was rescheduled, the MSR application will be updated and resubmitted next quarter.

Expedition 392: Agulhas Plateau Cretaceous Climate

Planning

A virtual kick-off meeting to discuss updated research plans was held 17 and 18 March. Other virtual Science Party meetings were held regularly during the quarter.

Staffing

Because of additional incremental funding and improvement in COVID conditions, ANZIC decided to staff the FY22 expeditions. ANZIC issued calls for applications for Expedition 392, and the deadline was set for late March. The EPM and Co-Chief Scientists worked to reconfirm participation, and most scientists confirmed their participation. Two scientists withdrew, and three others who changed employer or location are awaiting approval.

Clearance, permitting, and environmental assessment activities

Because the expedition was rescheduled, the MSR application will be updated and resubmitted.

Expeditions 390 and 393: South Atlantic Transect 1 and 2

Planning

Following Expedition 390C, the Expedition 390 and 393 scientists were updated on progress on casing and reentry system installations via a webinar on 4 February, and the micropaleontology laboratory group members were sent samples to construct a preliminary biostratigraphy. Expedition 395E is scheduled to finish setting the reentry systems for the SAT expeditions. Following completion of Expeditions 390C and 395E, an addendum to the *Scientific Prospectus* will describe the work completed and present

a revised operations plan for Expeditions 390/393. Additionally, the Science Party can access other data collected during Expedition 390C via the database.

Staffing

Science Party members were asked to reconfirm participation for Expeditions 390/393 by 15 January. However, graduate students and postdocs were given an extension to account for new positions or relocations to be assessed. Three scientists withdrew from Expedition 390, and one scientist was replaced. A special call for a petrologist and a micropaleontologist for Expedition 390 was released. A sedimentologist from the previous US special call accepted the invitation to sail during Expedition 393. Because of additional incremental funding and improvement in COVID conditions, ANZIC decided to staff the four FY22 expeditions and issued calls for applications for Expeditions 390 and 393.

3. Management and administration

Management and administration (M&A) activities include planning, coordinating (with other IODP-related entities), overseeing, reviewing, monitoring, assuring compliance for, and reporting on IODP activities.

Progress reporting

The JRSO operations and management report for the first quarter of FY21 (October–December) was submitted to NSF on 8 February (http://iodp.tamu.edu/publications/AR/FY21/FY21_Q1.pdf).

Liaison activities

JRSO reports to and liaises with funding agencies and IODP-related agencies (e.g., JRFB, JRFB advisory panels, Program Member Offices [PMOs], and other national organizations and facility boards) and participates in facility board, advisory panel, and IODP Forum meetings. Minutes from the facility board meetings are available online (<http://iodp.org/boards-and-panels/facility-boards>).

Project portfolio management

JRSO continued work on the New Rig Instrumentation System, SampleMaster Replacement, GEODESC, QC Data Viewer, X-Ray Linescan Core Imager, and Core Orientation projects and kicked off the Digital Asset Management Migration Project.

GEODESC

Scope and deliverables

The purpose of this project is to replace the DESClogik IODP core description interface, with the principal goal of increasing performance and reliability. The GEODESC project proposes to design, build, and deliver a new and improved GEODESC tool set. The project manager is Peter Blum (JRSO EPM).

Status

Resource constraints and design changes will likely extend this project by several months. A more detailed estimate will be provided next quarter after impacts are fully understood.

SampleMaster Replacement

Scope and deliverables

The purpose of this project is to replace the SampleMaster application with a modular program. SampleMaster is an application that provides for all initial IODP data entry into the Laboratory Information Management System (LIMS) database. This interface is used across the organization by a wide range of people who fall into groups of users that perform specific tasks. The project manager for the Catwalk Module is Chieh Peng (JRSO Lab Officer).

Status

Reduced shipboard operations slowed project completion. JRSO estimates the catwalk module will be completed by June.

X-Ray Linescan Core Imager

Scope and deliverables

The purpose of this project is to design and fabricate a standalone X-Ray Linescan Imager (XSCAN) to replace the prototype X-Ray Imager that has been in use since Expedition 379 (Amundsen Sea West Antarctic Ice Sheet History). Like the prototype, the XSCAN will provide the fundamental 2-D X-ray images for scientists to observe structures or objects such as dropstones, lamination, shells, burrows, faults, and fractures that might aid in the interpretation of geologic processes, depositional settings, environmental conditions, alteration, and tectonics. Similarly, it will produce images that might aid in core-splitting decisions aimed at targeting specific material for sampling or minimizing damaging or disturbing important structures or objects. Unlike the prototype, the XSCAN will be capable of producing line-scanned X-ray images of each core section that can be viewed in the LIVE application or used for stratigraphic correlation or other analyses similar to the images produced by the Section Half Imaging Logger (SHIL). Additionally, the XSCAN will be able to rotate the source and detector around the core, which will provide different angular views of structures within the sections and could also be incorporated into volume estimates to be used to improve other datasets. The project manager is Margaret Hastedt (JRSO Research Specialist).

Status

The team worked on assembling the back shielding for the logger, and all sides of the polycarbonate panels were frosted to add adhesion for the transfer tapes and increase aesthetics. Testing and debugging the software eliminated some vertical streaking and improved image quality. Work on the safety interlock system commenced. The instrument will be tested thoroughly on shore prior to being sent to the ship for installation. Additional information is provided in Analytical systems. The estimated project completion date is October.

Core Orientation

Scope and deliverables

The purpose of this project is to (1) develop a new nonmagnetic orientation tool that will be directly attached to the core barrel and (2) improve methods used in aligning the core liner within the core barrel. Specifically, a new gyroscopic orientation tool (GOT) will be developed in house that will be attached directly to the core barrel, avoiding possible problems with misalignment between the sinker bars and

core barrel. Because the GOT does not use the magnetic field for orientation, the large magnetic fields associated with the drill string are irrelevant. To improve the alignment of the core liner, JRSO will investigate whether it is possible to modify the advanced piston corer (APC) core barrels to allow the core liner to be aligned and attached at both ends. Currently, the top of the liner is oriented and attached to the core barrel with a screw but the bottom of the liner is free to twist, which it might do as sediment enters the liner. The project manager is Bill Rhinehart (JRSO Operations Engineer).

Status

JRSO is finishing the managed power supply and chassis work for testing purposes. This is a very complex project with many unknowns, so the project completion date remains open ended.

QC Data Viewer

Scope and deliverables

The purpose of this project is to design and implement a quality control (QC) viewer program to visualize QC data acquired during IODP expeditions. The project manager is David Houpt (JRSO Supervisor of Analytical Systems).

Status

Resource constraints postponed completion of project activities, so the estimated project completion date was pushed back to July.

New Rig Instrumentation System

Scope and deliverables

This project will provide a drilling/coring driller's display system (DDS) that will replace the existing RigWatch/Tru-VU with a modular DDS that meets the performance and end user experience-related requirements as determined during the design and review phases of the project lifecycle. As much as possible, the system will use the sensor, cabling, computing, and data display infrastructure currently installed on the *JOIDES Resolution* rig instrumentation system. The project manager is John Van Hyfte (JRSO Supervisor of Engineering and Logistics Support).

Status

This project remains on track for completion in the late fall.

Digital Asset Management Migration

Scope and deliverables

The scope of this project is to migrate the current Cumulus taxonomy and assets to MerlinOne. The scope involves developing system and taxonomy migration plans and allocating the resources to migrate them. Additionally, the project will find alternative solutions for shipboard Cumulus activities so that Cumulus may be removed from the ship. The scope includes taxonomy development, metadata, database, and asset migration. The project manager is Michael Berardi (JRSO Configuration Manager).

Status

JRSO estimates this project will be completed in August.

4. Subcontract activities

JRSO continued to interact with ODL AS to ensure efficient and compliant operations of *JOIDES Resolution*. JRSO continued to interact with Schlumberger to ensure that wireline logging operations aboard *JOIDES Resolution* continue in an efficient and compliant manner. JRSO and Schlumberger worked successfully to streamline travel and shipping activities. These efforts continued to be complicated by the effects of the COVID-19 pandemic. JRSO management is meeting with ODL AS weekly to discuss evolving travel/shipping restrictions as the pandemic progresses.

5. Science operations

The Science Operations (SciOps) department provides scientific, operational, engineering, and logistical planning and implementation for *JOIDES Resolution* drilling expeditions in response to the IODP science planning structure. JRSO is responsible for scoping, planning, managing, and implementing science expeditions (see Expedition operations); conducting long-range operational planning for out-year JRSO expeditions; providing services and materials for the platform and oversight to drilling and logging contractors; and utilizing IODP resources to oversee engineering development projects.

Expedition outreach support

No outreach events were conducted on *JOIDES Resolution* during the review period because of restrictions related to COVID-19.

6. Technical and analytical services

The Technical and Analytical Services (TAS) department develops, maintains, and operates a diverse array of scientific equipment for analyzing cores and core samples; staffs the shipboard laboratories with skilled technicians; provides support for shipboard scientists; assists with downhole tools and measurements; and facilitates shipboard core curation, handling, and shipping.

Maintenance period activities

The following maintenance activities were completed in the shipboard laboratories during the Expedition 390R and 395P tie-up periods:

- The core-splitting table was repaired and recoated.
- Wooden countertops were sanded and resurfaced throughout the laboratories.
- A new television and entertainment system was installed in the gym to make it compatible with the rest of the ship's entertainment system.
- Core reefer and gym floors were repaired and painted.
- A nonslip floor area was created in the chemistry laboratory.
- Gym benches were reupholstered.

Analytical systems

SPECIM FX10 Hyperspectral Imaging Logger

Denise Kulhanek (JRSO EPM) is conducting experiments with a rented SPECIM hyperspectral imaging logger. TAS is assisting her with these experiments and will perform additional experiments to evaluate the

technology as a possible replacement for the contact-based integration sphere color reflectance method. This technology could address one of the recommendations of the 2016 Color Workshop report to eliminate the spectral distortion caused by the GLAD Wrap film that covers each section half.

X-Ray Linescan Core Imager

The XSCAN project continues to progress as noted above in Project portfolio management. JRSO continues to target the October port call for installation in the core laboratory.

Scanning Electron Microscope—Energy Dispersive Spectrophotometer

The NanoImages SNE-4500M scanning electron microscope (SEM; equipped with a Bruker XFLASH 630 Mini EDS [energy dispersive spectrophotometer]) was installed, and staff continued the process of defining workflows to allow the upload of images and data from the device into the LIMS database. This system will replace the Hitachi TM-3000 SEM on the ship, and the older SEM will be transferred to JRSO headquarters in College Station, where it will be available for use by visiting scientists and staff. As with all onsite work, this project has slowed because of limited access to workspaces during the pandemic.

Carbon-hydrogen-nitrogen-sulfur analyzer

JRSO will install the new carbon-hydrogen-nitrogen-sulfur analyzer (CHNS) during the Expedition 395C (Reykjanes Ridge) port call.

Handheld/portable X-ray fluorescence spectrometer

JRSO staff continued working to develop the workflow, data upload, and data download procedures for the new Brüker AXS Tracer-5g handheld/portable X-ray fluorescence (pXRF) spectrometer.

Epifluorescence microscopes

JRSO received and installed new microbiology epifluorescence microscopes in College Station, Texas, and JRSO staff were trained on the new features of these advanced microscopes. These microscopes will be shipped to the vessel soon for installation in the microbiology and micropaleontology laboratories.

Agico MFK2-FA dual-frequency KappaBridge magnetic susceptibility meter

Testing of the new Agico MFK2-FA dual-frequency magnetic susceptibility meter was completed. The instrument will be shipped to the vessel in the near future.

Laboratory working groups

The laboratory working groups (LWGs) provide oversight, research direction, and quality assurance for the methods, procedures, and analytical systems both on the *JOIDES Resolution* and on shore. The groups meet regularly to review cruise evaluations, expedition technical reports, and any concerns raised by the IODP Issues Management Team to provide advice on corrective actions and potential developments for laboratories.

As was true last quarter, no full science expeditions occurred this quarter that required review by the LWGs. The Geochemistry and Microbiology LWG held an informal email discussion about postcolumn ultraviolet-visible (UV-VIS) techniques that could be added to the existing Metrohm ion chromatograph (IC). This could allow JRSO to analyze NH_4^+ , NO_2^- , and NO_3^- on a regular basis on all interstitial water samples using the same techniques used during Expedition 329 (South Pacific Gyre Subseafloor Life).

7. Development, IT, and Databases

The Development, IT, and Databases (DITD) department manages data supporting IODP activities, operates and maintains shipboard and shore-based computer and network systems, and monitors and protects JRSO network and server resources to ensure safe, reliable operations and security for IODP data and information technology (IT) resources. Additional activities include managing expedition and postexpedition data, providing long-term archival access to data, and supporting JRSO IT services.

Expedition data

LIMS database

Data from Expedition 390C were added to the LIMS database on shore this quarter. These data are currently under moratorium and available only to the scientists who sailed on the expedition. Data from Expedition 379 were released from moratorium during this quarter.

Expedition data requests

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

Table 7.1. Top 10 countries accessing JRSO web databases

Rank	Janus database		LIMS database	
	Country	Visitor sessions	Country	Visitor sessions
1	China	1,031	USA	1,253
2	USA	871	China	567
3	United Kingdom	441	United Kingdom	259
4	France	165	Germany	197
5	Unknown	144	Unknown	184
6	Germany	135	Canada	162
7	Canada	82	Japan	135
8	Italy	80	France	96
9	Netherlands	76	Netherlands	79
10	Brazil	64	Hong Kong	75
	Others	442	Others	348
	Total	3,531	Total	3,355

Table 7.2. Top 20 database web queries

Rank	Janus database		LIMS database	
	Query	Views	Query	Views
1	XRD	6,310	Images—core photos	3,367
2	Core summary	5,591	Sample	1,131
3	Sample	5,537	Hole summary	717
4	Paleontology—species	5,522	Images—LSIMG	621
5	Hole summary	4,937	Section summary	563
6	Site summary	4,330	Core summary	481
7	Images—core photos	3,780	Chemistry—carbonates	280
8	Physical properties—GRA	2,491	Chemistry—IW	264

Rank	Janus database		LIMS database	
	Query	Views	Query	Views
9	Physical properties—MAD	1,738	XRF	260
10	Images—core closeups	1,589	Physical properties—MS	233
11	Physical properties—MSL	1,576	Physical properties—GRA	227
12	Images—prime data	1,564	Physical properties—RSC	201
13	Physical properties—PWS	1,297	Images—core closeups	191
14	Physical properties—TCON	1,168	XRD	186
15	Cryomag	1,167	Physical properties—MAD	145
16	Physical properties—PWL	1,076	Physical properties—NGR	115
17	Physical properties—smear slides	1,028	Cryomag	113
18	Physical properties—NGR	925	Physical properties—MSPoint	96
19	Paleontology—investigations	865	Physical properties—PWL	93
20	Paleontology—range charts	856	Chemistry—gas	85
	Others	8,543	Others	1,984
	Total	61,890	Total	11,353

Table 7.3. Data requests to the TAMU Data Librarian

Requests	Total	Country	Total
How to	6	USA	7
Seismic and/or navigation	3	United Kingdom	4
Forwarded	3	Germany	2
Ages, thermal	2	Canada	1
IODP CORKS	1	China	1
Other	3	Greece	1
		Italy	1
		Unknown	1
Total	18	Total	18

Network systems operation, maintenance, and security

JRSO completed its annual TAMU IT risk assessment in early March. The TAMU System (TAMUS) Audit Team began its audit of JRSO IT in late November and is currently wrapping up its fieldwork phase. Areas under review include information security awareness training, identity and account management, risk assessment, change management, disaster recovery, and data privacy/data loss protection. The audit is scheduled to be completed by June.

Tie-up activities

JRSO conducted system maintenance on shipboard information resources, including server and workstation software patches and upgrades throughout the ship.

8. Core curation

JRSO provides services in support of Integrated Ocean Drilling Program and IODP core sampling and curation of the core collection archived at the GCR.

Sampling parties and curation policies and procedures

JRSO curation and technical staff collected 13,694 samples during the Expedition 378 sample party. Because of the COVID-19 pandemic, Science Party members were not able to travel to the GCR to participate in sample collection.

Sample and curation strategies

This quarter, JRSO planned sample and curation strategies for Expedition 395E.

Sample requests and core sampling

The following table provides a summary of the 2,205 samples taken at the GCR during this quarter. Sample requests that show zero samples taken may represent cores that were viewed by visitors during this quarter, used for educational purposes, or requested for X-ray fluorescence (XRF) analysis. For public relations or educational visits/tours, the purpose of the visit is shown in brackets in the “Sample request number, name, country” column, and no number is recorded in the “Number of samples taken” column if no new samples were taken.

Table 8.1. GCR sample requests

Sample request number, name, country	Number of samples taken	Number of visitors
085115IODP, Rafter, USA	10	
085256IODP, Bruno, Mexico	252	
085695IODP, Bell, USA	131	
085715IODP, Zhang, Switzerland	17	
085635IODP, Xia, China	36	
086098IODP, Evangelinos, France	64	
086149IODP, Yao, USA	18	
086164IODP, Griffith, USA	14	
086204IODP, Straub, USA	0	
086184IODP, Duncan, New Zealand	102	
086227IODP, Kimble, USA	100	
086235IODP, Varol, United Kingdom	3	
086251IODP, Guevel, France	82	
086277IODP, Auderset, Germany	67	
086296IODP, Scher, USA	304	
086370IODP, Chen, China	357	
086379IODP, Varma, Netherlands	27	
086422IODP, Xiaodong, China	14	
086597IODP, Archontikis, United Kingdom	185	
086603IODP, Haynes, USA	51	
086611IODP, Kulhanek, USA	0	
086630IODP, Ross, United Kingdom	20	
086540IODP, LeBlanc, USA	58	
086668IODP, Kulhanek, USA	0	
086714IODP, Tzanova, USA	148	
086773IODP, Olivetti, Italy	6	

Sample request number, name, country	Number of samples taken	Number of visitors
086941IODP, Marquardt, Norway	103	
087417IODP, Stoll, Switzerland	36	
TAMU GEOS 101, Tour	0	10
TAMU Geosciences Living-Learning Community, Tour	0	4
Totals	2,205	14

Use of core collection and education and outreach support

JRSO promotes outreach use of the GCR core collection by conducting tours of the repository and providing materials for display at meetings and museums. The repository and core collection are also used for classroom exercises. Two groups of TAMU students visited the GCR this quarter, one as part of a geology course and one as part of the Geosciences Living-Learning Community. Visitors to the GCR were limited this quarter because of COVID-19.

Onshore XRF scanning

During this quarter, 28 core sections and discrete samples were scanned on the XRFs at the GCR. Documentation relating to the operation, advanced configurations, maintenance, and troubleshooting of the XRF is available at <https://sites.google.com/scientific-ocean-drilling.org/xrf-iodp/home>.

Table 8.2. Core sections scanned

Request type	Expedition, name, country	XRF 1	XRF 2	SHIL	WRMSL*
Personal	188, Kulhanek, USA	26		26	
Personal	170, Plank, USA		2		
Totals		26	2	26	0

Notes: XRF = X-ray fluorescence, SHIL = Section Half Imaging Logger, WRMSL = Whole-Round Multisensor Logger.

*The WRMSL is currently unavailable because it is serving as the development track for a new X-ray system.

9. Publication services

The Publication Services (Pubs) department provides publication support services for IODP riserless and riser drilling expeditions (see Expedition operations) and editing, production, and graphics services for required Program reports (see Management and administration), technical documentation (see Technical and analytical services), and scientific publications as defined in the JRSO cooperative agreement with NSF. The Pubs department also maintains legacy access and archiving of Integrated Ocean Drilling Program, Ocean Drilling Program (ODP), and Deep Sea Drilling Project (DSDP) publications.

Scientific publications

Table 9.1. Newly published content on the IODP Publications website

Reports and publications	JRSO	MarE3	Other
<i>Scientific Prospectus</i>	10.14379/iodp.sp.396.2021 10.14379/iodp.sp.391add.2021		

Reports and publications	JRSO	MarE3	Other
Expedition Reports	10.14379/iodp.proc.379.101.2021 10.14379/iodp.proc.379.102.2021 10.14379/iodp.proc.379.103.2021 10.14379/iodp.proc.379.104.2021		10.14379/OmanDP.proc.2020: Chapter 11, Site CM2 Chapter 9, Introduction to Science Theme 1B
Data Reports	10.14379/iodp. proc.372B375.206.2021 10.14379/iodp. proc.372B375.205.2021 10.14379/iodp.proc.362.205.2021 10.14379/iodp.proc.363.204.2021	10.2204/iodp.proc.338.208.2021	

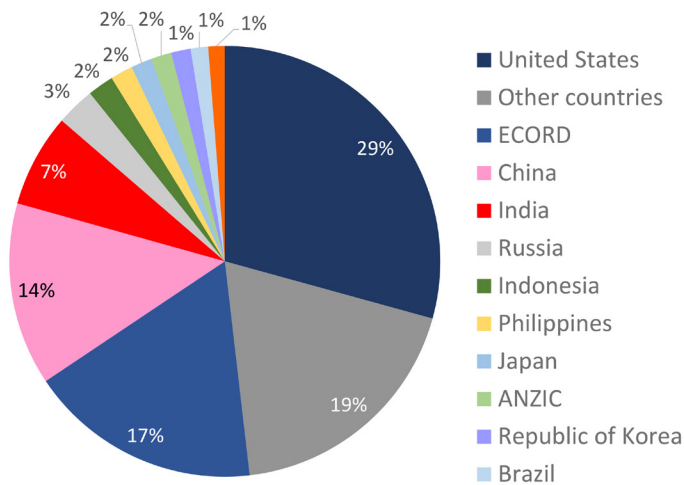
Note: There were no ESO publications published during the quarter.

Web services

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

During the last quarter, the IODP TAMU website received 292,216 page views and 33,513 site visits and the IODP Publications website received 357,347 page views and 24,505 site visits. Where possible, visits by JRSO employees and search engine spiders were filtered out of the counts. Visitors to the IODP TAMU website came from more than 210 countries.

Figure 9.1. Top 12 countries/consortia of visitors to the IODP TAMU website



Notes: ECORD = European Consortium for Ocean Research Drilling, ANZIC = Australia/New Zealand IODP Consortium. ECORD countries include Austria, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

The ODP science operator, ODP legacy, and DSDP publications websites are hosted at TAMU. Key data, documents, and publications produced during DSDP and ODP are preserved in these legacy websites that highlight the scientific and technical accomplishments of these ground-breaking precursors to

the Integrated Ocean Drilling Program and IODP. These legacy websites contain downloadable documents that cover a wide spectrum of Program information, from laboratory and instrument manuals to Program scientific publications, journals, and educational materials.

Table 9.2. Legacy website statistics

Legacy website	FY21 Q2 page views*	FY21 Q2 site visits*
www-odp.tamu.edu	236,544	31,024
www.odplegacy.org	3,499	2,020
www.deepseadrilling.org	60,441	6,114
Total	300,484	39,158

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

Publications coordination

Data reports related to Expeditions 338, 346, 362, 363, 369, and 372B/375 were received, sent to peer review, accepted, and/or published this quarter.

Discovery and accessibility

Digital object identifiers

IODP is a member of CrossRef, the official digital object identifier (DOI) registration agency for scholarly and professional publications. All IODP scientific reports and publications are registered with CrossRef and assigned a unique DOI that facilitates online access. CrossRef tracks the number of times a publication is accessed, or resolved, through the CrossRef DOI resolver tool. Program statistics for this quarter are shown in the tables below.

Table 9.3. Number of online DOI resolutions

Reports and publications	DOI prefix	January 2021	February 2021	March 2021	FY21 Q2 total
IODP	10.14379	7,411	6,541	8,809	22,761
Integrated Ocean Drilling Program	10.2204	6,819	5,443	7,975	20,237
ODP/DSDP	10.2973	46,512	19,002	25,141	90,655

Table 9.4. Top 10 IODP DOIs resolved during FY21 Q2

DOI (10.14379)	Resolutions	Title
10.14379/IODP.SP.396.2021	306	Expedition 396 Scientific Prospectus: Mid-Norwegian Continental Margin Magmatism
10.14379/IODP.PR.385.2020	289	Expedition 385 Preliminary Report: Guaymas Basin Tectonics and Biosphere
10.14379/IODP.PROC.379.2021	244	Volume 379: Amundsen Sea West Antarctic Ice Sheet History
10.14379/IODP.SP.395.2020	242	Expedition 395 Scientific Prospectus: Reykjanes Mantle Convection and Climate
10.14379/IODP.PROC.363.2018	212	Volume 363: Western Pacific Warm Pool
10.14379/IODP.PROC.367368.2018	203	Volume 367/368: South China Sea Rifted Margin
10.2204/IODP.PROC.302.2006	186	Volume 302: Arctic Coring Expedition
10.2204/IODP.PROC.323.2011	184	Volume 323: Bering Sea Paleocyanography

DOI (10.14379)	Resolutions	Title
10.14379/IODP.SP.385.2018	180	Expedition 385 Scientific Prospectus: Guaymas Basin Tectonics and Biosphere
10.2204/IODP.PROC.346.2015	177	Volume 346: Asian Monsoon

Table 9.5. Top 10 Program DOIs resolved during FY21 Q2

DOI (10.14379, 10.2204, 10.2973)	Resolutions	Title
10.2973/DSDP.PROC.78A.107.1984	1229	DSDP Volume 78A: The Lesser Antilles Island Arc: Structure and Geodynamic Evolution
10.2973/ODP.PROC.SR.124.163.1991	950	ODP Volume 124, Geochemistry and Isotopic Dating of Cenozoic Volcanic Arc Sequences Around the Celebes and Sulu Seas
10.14379/IODP.SP.396.2021	306	Expedition 396 Scientific Prospectus: Mid-Norwegian Continental Margin Magmatism
10.14379/IODP.PR.385.2020	289	Expedition 385 Preliminary Report: Guaymas Basin Tectonics and Biosphere
10.14379/IODP.PROC.379.2021	244	Volume 379: Amundsen Sea West Antarctic Ice Sheet History
10.14379/IODP.SP.395.2020	242	Expedition 395 Scientific Prospectus: Reykjanes Mantle Convection and Climate
10.14379/IODP.PROC.363.2018	212	Volume 363: Western Pacific Warm Pool
10.14379/IODP.PROC.367368.2018	203	Volume 367/368: South China Sea Rifted Margin
10.2973/ODP.PROC.IR.110.102.1988	190	ODP Volume 110: Introduction and Explanatory Notes
10.2204/IODP.PROC.302.2006	186	Volume 302: Arctic Coring Expedition

ScienceOpen

Integrated Ocean Drilling Program and IODP expedition reports and data reports are indexed at ScienceOpen. JRSO deposited data reports from Volumes 347 and 363 into ScienceOpen this quarter.

Table 9.6. ScienceOpen *Proceedings of the International Ocean Discovery Program* collection statistics (https://www.scienceopen.com/collection/IODP_Publications)

Period	Articles added	Article views	Altmetric score (collection)	Number of authors	Referenced articles
FY19–FY20	747	10,921	238	1,827	8,776
FY21 Q1	9	616	261	1,848	2
FY21 Q2	2	214	275	1,853	0
Total to date	758	11,751	—	—	8,873

Table 9.7. ScienceOpen Scientific Ocean Drilling Expedition Research Results collection statistics (<https://www.scienceopen.com/collection/8b0582f6-47bf-4988-b90a-8533135e6fcc>)

Period	Articles added	Article views	Altmetric score (collection)	Number of authors	Referenced articles
FY19–FY20	4,732	18,801	40,733	11,895	47,235
FY21 Q1	107	1,603	42,374	12,070	1,294
FY21 Q2	140	1,189	46,053	12,426	2,625
Total to date	4,979	21,593	—	—	51,154

Altmetric.com

JRSO contributes publications metadata to TAMU's Symplectic Elements database, which feeds data to <http://altmetric.com>, a platform that enables monitoring of the online activity surrounding academic research. This quarter, JRSO uploaded DOIs of Integrated Ocean Drilling Program data reports for Expeditions 347 and 363.

Legacy activities

Closeout

Integrated Ocean Drilling Program publications closeout activities continued during the reporting period. Data reports published during this quarter in the *Proceedings of the Integrated Ocean Drilling Program* are listed above in Scientific publications. In addition, peer-reviewed postcruise research result publications related to Expeditions 302, 308, 314/315/316, 322, 331, 333, 334, 338, 341, 346, and 347 were added to the publications database.

Publications archiving

The main IODP publications website (<http://publications.iodp.org/index.html>), which includes full content from all Integrated Ocean Drilling Program and IODP volumes, and other publications pages are archived at the Internet Archive, a long-term archive specializing in full website backups. Quarterly crawls incrementally update the archive with new files. Currently, our collection houses 1.4 TB of data and over 7.1 million files.

Citation management

IODP Pubs contracts with the American Geosciences Institute (AGI) to maintain the Scientific Ocean Drilling Citation Database, a subset of the GeoRef database that contains more than 37,000 records for Program-related scientific ocean drilling publications from 1969 to the present. This quarter, IODP Pubs sent 166 expedition-related publication citations for consideration for inclusion in the database.

Table 9.8. Scientific Ocean Drilling Bibliographic Database statistics

Program-related publications	January 2021	February 2021	March 2021	FY21 Q2 total
Searches	1,787	1,659	731	4,177
Citation views	494	593	362	1,449

Downloadable IODP bibliographies

IODP Pubs also maintains a current PDF list of publications and conference presentations/abstracts authored by JRSO staff and Research Information Systems (RIS)-format citation data lists for IODP program publications and staff-authored journal articles (<http://iodp.tamu.edu/staffdir/indiv.html>). RIS is a standardized tag format that enables citation programs to exchange data. Users can import the content of the RIS files into most bibliographic software. RIS-format citation data lists are also available for expedition-related bibliographies for Expeditions 301–395. The IODP program publication, JRSO staff-authored publication, and expedition-related bibliography lists are updated quarterly. Expedition-related bibliographies are updated monthly.

Abstracts authored by JRSO staff

Abstracts of conference presentations during this quarter authored by JRSO staff include the following. Bold type indicates JRSO staff (<http://iodp.tamu.edu/staffdir/indiv.html>).

Australian Earth Sciences Convention

- George, S.C., Ausín, B., **Childress, L.B.**, Röhl, U., Thomas, D.J., Hollis, C.J., Crouch, E.M., and the IODP Expedition 378 Science Party, 2021. Hydrocarbons in a new early Paleocene sedimentary section recovered from the Campbell Plateau, south of New Zealand, by IODP Expedition 378. Australian Earth Sciences Convention (online), 9–12 February 2021.

UK Antarctic Science Conference

- Gales, J.A., Rebesco, M., Conte, R., De Santis, L., McKay, R., Laberg, J.S., Kim, S., et al. (including **D.K. Kulhanek**), 2021. Preconditioning and triggering of Antarctic submarine mega-slides. UK Antarctic Science Conference (online), 22–25 March 2021.
- King, M.V., Gales, J.A., Laberg, J.S., McKay, R.M., De Santis, L., **Kulhanek, D.K.**, Hosegood, P.J., Morris, A., Rebesco, M., and IODP Expedition 374 Scientists. Timing, frequency and nature of sedimentary processes operating on the eastern Ross Sea continental slope during the Pleistocene – a record from IODP Expedition 374. UK Antarctic Science Conference (online), 22–25 March 2021.

Articles authored by JRSO staff

- Beasley, C., Cotton, L., Al-Suwaidi, A., **LeVay, L.**, Sluijs, A., Ullmann, C.V., Hesselbo, S.P., and Littler, K., 2021. Triumph and tribulation for shallow water fauna during the Paleocene–Eocene transition: insights from the United Arab Emirates. *Newsletters on Stratigraphy*, 54(1):79–106. <https://doi.org/10.1127/nos/2020/0573>
- **Kachovich, S.**, and Aitchison, J.C., 2021. Middle Ordovician (middle Darriwilian) Archaeospicularia and Entactinaria (radiolarians) from the Table Cove formation, Piccadilly Quarry, Newfoundland, Canada. *Journal of Paleontology*. <https://doi.org/10.1017/jpa.2021.18>
- **Hertzberg, J.**, 2021. Palaeoclimate puzzle explained by seasonal variation. *Nature*, 589(7843):521–522. <https://www.nature.com/articles/d41586-021-00115-x>
- Koutsodendris, A., Nakajima, K., Kaboth-Bahr, S., Berke, M.A., Franzese, A.M., Hall, I.R., Hemming, S.R., et al. (including **L.J. LeVay**), 2021. A Plio-Pleistocene (c. 0–4 Ma) cyclostratigraphy for IODP Site U1478 (Mozambique Channel, SW Indian Ocean): Exploring an offshore record of paleoclimate and ecosystem variability in SE Africa. *Newsletters on Stratigraphy*, 54(2):159–181. <https://doi.org/10.1127/nos/2020/0608>
- McNamara, D.D., Behboudi, E., Wallace, L., Saffer, D., Cook, A.E., Fagereng, A., Paganoni, M., et al. (including **L.J. LeVay**, and **K.E. Petronotis**), 2021. Variable in situ stress orientations across the northern Hikurangi subduction margin. *Geophysical Research Letters*, 48(5):e2020GL091707. <https://doi.org/10.1029/2020GL091707>
- Pérez, L.F., Martos, Y.M., García, M., Weber, M.E., Raymo, M.E., **Williams, T.**, Bohoyo, F., et al., 2021. Miocene to present oceanographic variability in the Scotia Sea and Antarctic ice sheets dynamics: Insight from revised seismic-stratigraphy following IODP Expedition 382. *Earth and Planetary Science Letters*, 553:116657. <https://doi.org/10.1016/j.epsl.2020.116657>

- Starr, A., Hall, I.R., Barker, S., Rackow, T., Zhang, X., Hemming, S.R., van der Lubbe, H.J.L., et al. (including **L.J. LeVay**), 2021. Antarctic icebergs reorganize ocean circulation during Pleistocene glacials. *Nature*, 589(7841):236–241. <https://doi.org/10.1038/s41586-020-03094-7>
- Sugarman, P.J., Miller, K.G., Browning, J.V., McLaughlin, P.P., Jr., and **Kulhanek, D.K.**, 2021. Late Cretaceous (Turonian-Coniacian) sequence stratigraphy, sea level, and deltaic facies, Magothy Formation, U. S. Middle Atlantic Coastal Plain. *Stratigraphy*, 18(1):1–27. <https://www.micropress.org/microaccess/stratigraphy/issue-367/article-2220>
- Taylor, A.K., Berke, M.A., Castañeda, I.S., Koutsodendris, A., Campos, H., Hall, I.R., Hemming, S.R., et al. (including **L.J. LeVay**), 2021. Plio-Pleistocene continental hydroclimate and Indian Ocean sea surface temperatures at the southeast African margin. *Paleoceanography and Paleoclimatology*, 36(3):e2020PA004186. <https://doi.org/10.1029/2020PA004186>

Appendix: JRSO quarterly report distribution

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