International Ocean Discovery Program
Joides Resolution Science Operator
FY21 Q3 Operations and Management Report

1 April–30 June 2021

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Submitted by the JRSO

to

The National Science Foundation

and

The *JOIDES Resolution* Facility Board

9 August 2021

JOIDES Resolution Science Operator

IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM

NSF

Contents

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)	N/A	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. Briais	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
Non-IODP (Transit and maintenance) (6 October–6 December 2021) (61 days)							M. Malone
Walvis Ridge Hotspot	391	Cape Town, South Africa	6 December 2021–5 February 2022	61 (5/56)	56 (11/45)	W. Sager K. Hoernle	T. Hoefig
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	L. Childress
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

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 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

The Expedition 378 postcruise editorial meeting was completed during the quarter.

Expedition 395E: Complete SAT Reentry Installations

Planning

Expedition 395E was scheduled to complete installation of the reentry systems for the South Atlantic Transect (SAT) expeditions (joint Expeditions 390 and 393). A kick-off webinar was held on 5 April, and JRSO staff completed crossovers via Zoom.

Staffing

Expedition 395E took place with limited JRSO staff and no science party. All JRSO staff made it to the ship, and COVID Mitigation Protocols Established for Safe JR Operations (COPE) protocols were observed. The Co-Chief Scientists and Expedition Project Manager (EPM) assisted with operational and science decisions from shore.

Figure 2.1. Expedition 395E site map

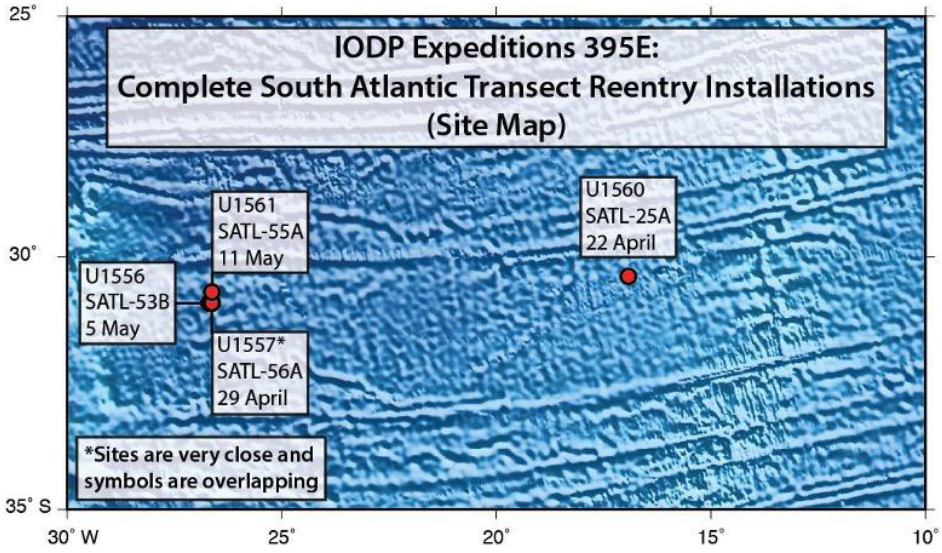


Table 2.2. Expedition 395E coring summary

Site	Hole	Latitude	Longitude	Water depth (mbrf)	Cores (*N*)	Interval cored (m)	Core recovered (m)	Recovery (%)
U1556	U1556B	30°56.5244’S	26°41.9472’W	5013.1	0	0.0	0.00	0.0
Site U1556 totals					**0**	**0.0**	**0.00**	**0.0**
U1557	U1557D	30°56.4651’S	26°37.7892’W	4920.8	0	0.0	0.00	0.0
Site U1557 totals					**0**	**0.0**	**0.00**	**0.0**
U1560	U1560A	30°24.2064’S	16°55.3718’W	3734.8	16	122.5	119.04	97.2
	U1560B	30°24.2057’S	16°55.3702’W	3734.8	0	0.0	0.00	0.0
Site U1560 totals					**16**	**122.5**	**119.04**	**97.2**
U1561	U1561A	30°43.2902’S	26°41.7162’W	4920.8	9	48.9	45.41	92.9
	U1561B	30°43.2902’S	26°41.7162’W	4920.8	1	9.5	9.63	101.4
	U1561C	30°43.2902’S	26°41.7162’W	4920.8	1	9.5	10.20	107.4
Site U1561 totals					**11**	**67.9**	**65.24**	**96.1**
Expedition 390E totals					**27**	**190.4**	**184.28**	**96.8**

Note: mbrf = meters below rig floor.

Science summary

Expedition 395E was previously planned to complete remediation work on Hole U1309D and conduct engineering testing. However, the expedition objectives were adjusted to finish installing the reentry systems for the SAT expeditions, operations that were originally planned for the cancelled Expedition 395P. Expedition 395E installed three reentry systems for Expeditions 390 and 393 at three primary sites, and additional operation time allowed coring at an alternate site. No discrete samples were taken. Core description and additional analysis will be conducted during Expeditions 390 and 393.

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

Planning

The revised operations plan was finalized. Expedition 395C will focus on drilling, coring, and downhole logging operations at sites where the primary objectives are related to mantle convection and crustal composition. As time allows, casing and reentry systems will be installed at the sediment drift localities. These sites are important for paleoceanographic and paleoclimatic research, and full operations at the sites will be deferred to the rescheduling of Expedition 395. Virtual science party meetings occurred regularly. All laboratory measurements and sampling plans were finalized in April. Preparations for surface and air freight were completed, and the shipments were dispatched.

Staffing

Expedition 395C will take place with limited JRSO staff and no science party. The Expedition 395 Co-Chief Scientists and science party will assist with operational and science decisions from shore.

Expedition 396: Mid-Norwegian Continental Margin Magmatism

Planning

Following the current COPE protocol, JRSO determined that the expedition will take place with a reduced science and technical party complement based on the current status of the pandemic and vaccine availability. The EPM, Co-Chief Scientists, Norwegian observer, and 16 scientists are expected to sail. All of the operations are still scheduled as planned. Meetings between the EPM, Co-Chief Scientists, and technical staff will be held to finalize laboratory measurements and sampling. Programmatic X-ray fluorescence (XRF) measurements will take place at the Gulf Coast Repository (GCR) in College Station, TX, in October. The postexpedition sampling party is currently planned for April 2022 at the Bremen Core Repository in Bremen, Germany, but this will depend on COVID-19 travel restrictions. Additional core description may also be needed, but the location remains to be determined. Virtual science party meetings occurred regularly.

Staffing

Expedition 396 will take place with a reduced science party of 20 members. The official Norway observer from the Norwegian Petroleum Directorate was assigned and accepted the invitation to sail. Travel reservations are being finalized.

Clearance, permitting, and environmental assessment activities

Authorization from Norway to conduct research in the Norwegian Exclusive Economic Zone was obtained on 1 June.

Expedition 391: Walvis Ridge Hotspot

Planning

Expedition 391 sample and data requests and research plans were received. Meetings between the EPM, Co-Chief Scientists, and technical staff will be held to review laboratory measurements and sampling. Due to an internal JRSO staffing change, there was a change in EPM for this expedition. A meeting was held with the new EPM, and the science party was informed.

Staffing

One petrologist withdrew and will not be replaced. Three physical properties specialists (Japan Drilling Earth Science Consortium [J-DESC], European Consortium for Ocean Research Drilling Science Support and Advisory Committee, and United States Science Support Program) had to withdraw from Expedition 391, and at least two of the positions will need to be replaced. Additionally, the necessity of a special call for a geochronology specialist is under discussion among the expedition management team. The Australia/New Zealand IODP Consortium (ANZIC) special call did not attract any additional applicants. A finalized science party list is expected in late July/early August.

Clearance, permitting, and environmental assessment activities

The Marine Scientific Research (MSR) application was submitted to the US State Department on 28 May, and the US State Department submitted the application and diplomatic note to the Namibian government on 2 June.

Expedition 392: Agulhas Plateau Cretaceous Climate

Planning

Small group webinars covering specific topics are being held throughout the spring and summer. The Co-Chief Scientists are interested in using the Ultrasonic Borehole Imager (UBI) tool, and Schlumberger was contacted about this. Because of a staffing change, there was a change in EPM for this expedition. A meeting was held with the new EPM, and the science party was informed.

Staffing

The EPM and Co-Chief Scientists are working to reconfirm participation, and most scientists have confirmed their participation. The ANZIC special call was successful, and one applicant was invited and accepted the invitation to sail. Three scientists expressed their intent to participate but are awaiting approval due to a new employer or a change in Program Member Office (PMO).

Clearance, permitting, and environmental assessment activities

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

Expeditions 390 and 393: South Atlantic Transect 1 and 2

Planning

Following completion of Expeditions 390C and 395E, an addendum to the *Scientific Prospectus* will describe the work left to be completed. The science party can access data collected during Expeditions 390C and 395E from the database. A revised operations plan for Expeditions 390 and 393 is being developed and will build on the installation of the reentry cones completed during Expeditions 390C and 395E. The installation of the reentry cones ahead of the expeditions will support deeper basement drilling at the oldest crust site along the transect and coring an additional hole to support microbiology and paleoceanography objectives. Work began on the microbiology samples from Expeditions 390C and 395E, and biostratigraphers hope to have an initial age model developed by the end of the summer.

Staffing

Science party members were asked to reconfirm participation for Expeditions 390 and 393. However, graduate students and postdocs were given an extension to account for new positions or locations. The ANZIC special call did not attract any additional applicants. The J-DESC nannofossil call was successful, and one applicant was invited and accepted the invitation to sail. In addition, one petrologist and one sedimentologist will likely be invited from a pool of scientists who applied in 2020.

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 second quarter of FY21 (January–March) was submitted to NSF on 11 May (**http://iodp.tamu.edu/publications/AR/FY21/FY21_Q2.pdf**).

Liaison activities

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

Planning meetings

Brad Clement (JRSO Director) and Mitch Malone (JRSO Assistant Director) attended monthly meetings of the JRFB Working Group on Science Framework Proposal Requirements and Assessments. This working group concluded their meetings in May.

Project portfolio management

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

JRSO made progress in template manager and data-capture programming, catalog-content creation based on the review of 40 years of Ocean Drilling Program (ODP)/Integrated Ocean Drilling Program/IODP core description, and preparations for external user testing. The estimated project completion date was revised to April 2022.

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 Laboratory Officer).

Status

JRSO completed this project in May.

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. 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

Alternative TDI linescan X-ray cameras are being investigated to assess image quality and ensure that replacement parts are readily available. The placement of the XSCAN on the ship was investigated using a full-scale mockup, with a subsequent Slack channel meeting to discuss the preferred location. The instrument will be tested thoroughly on shore prior to being sent to the ship for installation. 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 to align 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 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

This is a very complex project with many unknowns. 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

This project remains on track for completion in late summer.

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

Resource constraints postponed completion of project activities. The estimated project completion date is now December.

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

This project remains on track for completion in August.

Sample and Data Request Replacement

Scope and deliverables

The scope of this project is to design and implement a replacement program for the current IODP sample and data request replacement (SaDR) application. This project will be used for pre-expedition research planning, along with all postexpedition sample requests, including XRF-scanning and education and outreach requests. All existing SaDR functions will be carried over to the replacement program. Some additional functions will be added to overcome shortcomings of SaDR. Work on this project will be conducted in four main phases: creating new requests; administrative functions; integration with SPLAT; and data migration from SaDR to the replacement. The project manager is Michelle Penkrot (GCR Curator).

Status

The JRSO management team approved the project charter in May and began reviewing the project management plan.

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 meets 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 during port calls on *JOIDES Resolution* during the quarter because of restrictions related to COVID-19. During Expedition 395E, JRSO staff made social media posts on Facebook and Twitter, conducted two video outreach events, and facilitated a Facebook Live event with the Expedition 390 and 393 Co-Chief Scientists.

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.

Analytical systems

SPECIM FX10 hyperspectral imaging logger

Denise Kulhanek (JRSO EPM) continued experimenting with a rented SPECIM hyperspectral imaging logger. TAS will assist with these experiments and perform additional ones to evaluate the technology as a possible replacement for the contact-based integration sphere color method. This technology could be an answer to 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 core section imager project

The XSCAN project progressed as noted above in Project portfolio management. JRSO continued to target the October port call for installation in the core laboratory. The original X-ray imager remains operational on board for the interim.

Scanning electron microscope–energy dispersive spectrophotometer

The NanoImages SNE-4500M (equipped with a Brüker XFLASH 630 Mini energy dispersive spectrophotometer [EDS]) 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. Application developers started work on the data structures to hold and to report these data. This system will replace the Hitachi TM-3000 scanning electron microscope (SEM) on the ship, and the older SEM will be transferred to College Station, TX, where it will be available for use by staff and visiting scientists.

Carbon-hydrogen-nitrogen-sulfur analyzer

JRSO postponed shipping the new carbon-hydrogen-nitrogen-sulfur analyzer to allow troubleshooting of a leak. Shipping is now targeted for the 396T port call or tie-up period in South Africa.

Handheld/portable X-ray fluorescence spectrometer

Work continued on developing the workflow, data upload, and data download procedures with the new Brüker AXS Tracer-5g pXRF. The vendor is making adjustments to their output format to report all of the data needed for data reduction.

Epifluorescence microscopes

The new microbiology epifluorescence microscopes were received and installed at the JRSO facility in College Station, TX, and staff were trained on the new features of these advanced microscopes. The microscopes will be shipped to the vessel soon.

Agico MFK2-FA dual-frequency KappaBridge magnetic susceptibility meter

Testing of the new Agico MFK2-FA dual-frequency magnetic susceptibility meter was completed, and JRSO is shipping it to the Expedition 396 (Norwegian Margin) port call.

Laboratory working groups

The laboratory working groups (LWGs) provide oversight, research direction, and quality assurance for the methods, procedures, and analytical systems both on *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.

No LWGs met this quarter. No major issues occurred on the vessel, and we have had no science party cruise evaluations this quarter.

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 395E were added to the LIMS database on shore this quarter. These data are currently under moratorium and available only to the Expedition 390/393 scientists. Data from Expedition 382 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

	Janus database		LIMS database	
Rank	Country	Visitor sessions	Country	Visitor sessions
1	USA	633	USA	1,203
2	China	615	China	684
3	United Kingdom	218	Japan	235
4	Australia	158	Germany	208
5	Germany	69	United Kingdom	177
6	Japan	66	Canada	140
7	France	49	Australia	118
8	Canada	38	France	91
9	Italy	37	Italy	51
10	Netherlands	37	India	33
	Others	350	Others	418
	Total	**2,270**	**Total**	**3,358**

Note: This table does not include expedition data accessed through the Zenodo repository.

Table 7.2. Top 20 database web queries

	Janus database		LIMS database*	
Rank	Query	Views	Query	Views
1	Paleontology species	4,248	Sample	1,229
2	XRD	3,949	Images—core photos	1,080
3	Images—core photos	3,422	Hole summary	789
4	Site summary	2,886	2 Images—LSIMG	680
5	Images—prime data	2,227	Section summary	581
6	Sample	1,796	Core summary	482
7	Hole summary	1,400	Chemistry—IW	321
8	Physical properties—GRA	1,360	Chemistry—carbonates	266
9	Core summary	1,283	Physical properties—GRA	259
10	Images—core closeups	1,263	Reflectance	259
11	Physical properties—MS	1,192	Physical properties—GRA	237

Rank	Janus database		LIMS database*	
	Query	Views	Query	Views
12	Physical properties—MAD	1,159	Physical properties—MAD	214
13	Paleontology—range charts	1,073	XRF	187
14	Physical properties—PWL	828	ICP-AES	149
15	Physical properties—TCON	764	XRD	143
16	Physical properties—PWS	732	Chemistry—gas	128
17	Physical properties—NGR	650	SRM	125
18	Chemistry—carbonates	631	Images—core closeups	111
19	Chemistry—gas	602	Affine/splice	97
20	Rock evaluation	545	Physical properties—NGR	90
	Others	6,271	Others	2,353
	Total	**38,281**	**Total**	**9,780**

Note: This table does not include expedition data accessed through the Zenodo repository.

Table 7.3. Data requests to the TAMU Data Librarian

Requests	Total
How to	2
High-resolution images	2
IODP public-relations photos	1
Forwarded to other organizations	2
Data not available	4
Total	**11**

Country	Total
Germany	4
USA	3
Australia	1
Canada	1
China	1
Italy	1
Total	**11**

Network systems operation, maintenance, and security

JRSO kicked off the annual IT risk assessment process in June.

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

This quarter, JRSO began planning and coordinating efforts for hosting a core description and sampling party at the GCR in the fall for Expedition 395 science party members for cores collected during Expedition 395C.

Sample and curation strategies

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

Sample requests and core sampling

The following table provides a summary of the 4,066 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 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
086695IODP, Mohan, India	104	0
086761IODP, Kasbohm, USA	511	0
086816IODP, Winkelbauer, United Kingdom	11	0
086908IODP, Titelboim, United Kingdom	51	0
087205IODP, Wang, USA	119	0
086412IODP, Gai, China	272	0
087417IODP, Stoll, Switzerland	36	0
087424IODP, Mendes, Germany	15	0
087416IODP, Abe, Japan	29	0
087605IODP, Lacerra, USA	120	0
087690IODP, Sawai, Japan	4	0
087724IODP, Izaguirre, USA	17	0
087760IODP, Middleton, USA	52	0
087829IODP, Seki, Japan	321	0
087869IODP, Hoogakker, United Kingdom	44	0
087942IODP, Jicha, USA	7	0
087751IODP, Nirenberg, USA	211	0
085617IODP, Pallone, USA	86	0
087998IODP, Kimble, USA	0	1
088077IODP, Burke, USA	41	0
0887077IODP, Hoffman, China	90	0
088094IODP, Reilly, USA	0	1
088026IODP, Barrett, United Kingdom	16	0
088120IODP, Glock, Germany	112	0
088144IODP, Rafter, USA	37	0
088149IODP, Davidson, USA	41	1
088175IODP, Keisuke, Japan	539	0
088170IODP, Doucet, Australia	3	0
088224IODP, Kodama, USA	1	0
088239IODP, Sheward, Germany	105	0
088293IODP, Farley, USA	157	0
088418IODP, Kulhanek, USA	1	1
088438IODP, Dwyer, USA	14	0
088452IODP, Varma, Netherlands	8	0
088463IODP, Plank, USA	0	0
088468IODP, Reghelin, Italy	493	0
088485IODP, Kulhanek, USA	1	0
088550IODP, Scott, New Zealand	1	0
088590IODP, Blumm, USA	16	0
088643IODP, McClelland, USA	48	0

Sample request number, name, country	Number of samples taken	Number of visitors
088675IODP, Fung, USA	68	0
088688IODP, Liu, USA	17	1
088693IODP, Jiang, USA	12	0
088753IODP, Wensrich, USA	20	0
088503IODP, Siddoway, USA	40	0
088864IODP, Dwyer, USA	26	0
088817IODP, Dove USA	54	0
088862IODP, Hoogakker, United Kingdom	13	0
088981IODP, Plank, USA	11	0
088986IODP, Christensen, USA	0	1
089031IODP, Ibanez-Mejia, USA	11	0
089157IODP, Hastie, United Kingdom	1	0
089167IODP, Worne, United Kingdom	10	0
089153IODP, Zhang, China	49	0
Tours/demonstrations (6)	2	2
Totals	**4,066**	**8**

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. The GCR hosted two tours this quarter for TAMU employees to showcase IODP and the GCR facilities. A documentary film crew led by Director Sharon Shattuck (Picture a Scientist), in collaboration with TAMU post-doc Raquel Bryant, also visited the GCR to shoot footage for a trailer for an upcoming film.

Onshore XRF scanning

During this quarter, 375 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	72		72	
Personal	385, Hoefig, USA		15	15	
Personal	138, Kimble, USA		138	138	
Programmatic	382, Reilly, USA		55		
Personal	356, Christensen, USA	81			
Personal	170, Plank, USA		142		
Totals		**153**	**222**	**225**	**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, 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	Other
Preliminary Report	10.14379/iodp.pr.390C.2021	
Expedition Reports	10.14379/iodp.proc.382.101.2021 10.14379/iodp.proc.382.102.2021 10.14379/iodp.proc.382.103.2021 10.14379/iodp.proc.382.104.2021 10.14379/iodp.proc.382.105.2021 10.14379/iodp.proc.382.106.2021 10.14379/iodp.proc.382.107.2021	10.14379/OmanDP.proc.2020: Chapter 16, Site BA2 Chapter 19, Microbiology Chapter 14, Introduction to Science Theme 3 Chapter 10, Site CM1 Chapter 15, Site BA1
Data Reports	10.14379/iodp.proc.369.204.2021 10.14379/iodp.proc.369.203.2021	
Technical Note		10.14379/iodp.tn.4.2021

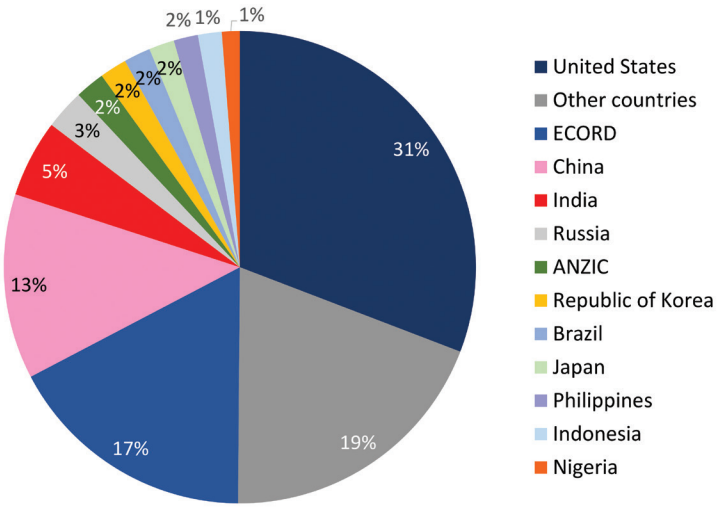
Note: There were no ESO or MarE3 publications published during the quarter.

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 300,676 page views and 35,659 site visits and the IODP Publications website received 237,338 page views and 22,906 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 Q3 page views*	FY21 Q3 site visits*
www-odp.tamu.edu	199,215	37,231
www.odplegacy.org	3,498	1,906
www.deepseadrilling.org	36,679	5,677
Total	**239,392**	**44,814**

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

Publications coordination

Data reports related to Expeditions 334, 346, 363, 369, 372A, 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	April 2021	May 2021	June 2021	FY21 Q3 total
IODP	10.14379	6,892	8,692	7,134	**22,718**
Integrated Ocean Drilling Program	10.2204	6,113	8,474	7,095	**21,682**
ODP/DSDP	10.2973	21,211	44,660	17,893	**83,764**

Table 9.4. Top 10 IODP DOIs resolved during FY21 Q3

DOI (10.14379)	Resolutions	Title
10.14379/IODP.PROC.367368.2018	358	Volume 367/368: South China Sea Rifted Margin
10.14379/IODP.SP.396.2021	322	Expedition 396 Scientific Prospectus: Mid-Norwegian Continental Margin Magmatism
10.14379/IODP.PROC.379.2021	287	Volume 379: Amundsen Sea West Antarctic Ice Sheet History
10.14379/IODP.PROC.382.2021	257	Volume 382: Iceberg Alley and Subantarctic Ice and Ocean Dynamics
10.14379/OMANDP.PROC.2020	241	Oman Drilling Project
10.14379/IODP.PR.385.2020	218	Expedition 385 Preliminary Report: Guaymas Basin Tectonics and Biosphere
10.14379/IODP.PROC.369.2019	169	Volume 369: Australia Cretaceous Climate and Tectonics
10.14379/IODP.PROC.349.2015	155	Volume 349: South China Sea Tectonics
10.14379/IODP.PR.390C.2021	150	Expedition 390C Preliminary Report: South Atlantic Transect Reentry Systems
10.14379/IODP.SP.395.2020	111	Expedition 395 Scientific Prospectus: Reykjanes Mantle Convection and Climate

Table 9.5. Top 10 Program DOIs resolved during FY21 Q3

DOI (10.14379, 10.2204, 10.2973)	Resolutions	Title
10.2973/ODP.PROC.IR.154.108.1995	1,728	Volume 154 Initial Report: Site 929
10.14379/IODP.PROC.367368.2018	358	Volume 367/368: South China Sea Rifted Margin
10.14379/IODP.SP.396.2021	322	Expedition 396 Scientific Prospectus: Mid-Norwegian Continental Margin Magmatism
10.14379/IODP.PROC.379.2021	287	Volume 379: Amundsen Sea West Antarctic Ice Sheet History
10.14379/IODP.PROC.382.2021	257	Volume 382: Iceberg Alley and Subantarctic Ice and Ocean Dynamics
10.14379/OMANDP.PROC.2020	241	Oman Drilling Project
10.14379/IODP.PR.385.2020	218	Expedition 385 Preliminary Report: Guaymas Basin Tectonics and Biosphere
10.2973/ODP.PROC.IR.110.102.1988	193	Volume 110 Initial Report: Introduction and Explanatory Notes
10.2204/IODP.PROC.323.2011	192	Volume 323: Bering Sea Paleoceanography
10.14379/IODP.PROC.369.2019	169	Volume 369: Australia Cretaceous Climate and Tectonics

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
FY21 Q3	0	8,713	291	1,853	0
Total to date	**758**	**12,880**	**—**	**—**	**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
FY21 Q3	4,030	10,539	63,881	18,155	33,202
Total to date	**9,009**	**32,132**	**—**	**—**	**84,356**

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 338, 363, 362, and 372B/375.

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, 303/306, 311, 317, 319, 320/321, 323, 329, 331, 333, 334, 336, 337, 338–341, 346, 347, and 349 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	April 2021	May 2021	June 2021	FY21 Q3 total
Searches	307	850	331	**1,488**
Citation views	147	153	183	**483**

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 bibliography lists 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

- Lund, S., **Acton, G.**, **Clement, B.**, Okada, M., and Keigwin, L., 2020. On the relationship between paleomagnetic secular variation and excursions—records from MIS 8—ODP Leg 172. Geophysical Journal International, 225(2):1129–1141. **https://doi.org/10.1093/gji/ggaa564**

Appendix: JRSO quarterly report distribution

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