

International Ocean Discovery Program
JOIDES Resolution Science Operator
FY22 Q2 Operations and Management Report

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Cooperative Agreement OCE-1326927

Submitted by the JRSO
to
The National Science Foundation
and
The *JOIDES Resolution* Facility Board

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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) FY22 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/Contact
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 (17/39)	R. Coggon J. Sylvan	E. Estes
South Atlantic Transect 2	393	Cape Town, South Africa	7 June–7 August 2022	61 (5/56)	56 (17/39)	D. Teagle J. Reece	T. Williams
Non-IODP (Tie up and maintenance) (7 August–10 September 2022) (34 days)							
Transit	397T	Cape Town, South Africa	10 September–11 October 2022	31 (2/29)	29 (22/7)	NA	P. Blum
Iberian Margin Paleoclimate	397	Lisbon, Portugal	11 October–11 December 2022	61 (5/56)	56 (4/52)	D. Hodell F. Abrantes	C. Alvarez Zarikian
Hellenic Arc Volcanic Field	398	Tarragona, Spain	11 December 2022–10 February 2023	61 (5/56)	56 (6/50)	T. Druitt S. Kutterolf	T. Hoefig
Non-IODP (Transit and maintenance) (10 February–12 April 2023; Heraklion, Greece to Ponta Delgada, Portugal) (61 days)							
Building Blocks of Life, Atlantis Massif	399	Ponta Delgada, Portugal	12 April–12 June 2023	61 (5/56)	56 (8/48)	A. McCaig S. Lang	P. Blum

Expedition		Port (origin) ¹	Dates ²	Total days (port/sea)	Days at sea (transit ³ /ops)	Co-Chief Scientists	Expedition Project Manager/Contact
Reykjanes Mantle Convection and Climate	395	Ponta Delgada, Portugal	12 June–12 August 2023	61 (5/56)	56 (11/45)	R. Parnell-Turner A. Briais	L. LeVay
NW Greenland Glaciated Margin	400	St. John's, Canada	12 August–12 October 2023	61 (5/56)	56 (13/43)	P. Knutz A. Jennings	L. Childress

Notes: NA = not applicable.

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

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

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

Expedition 396: Mid-Norwegian Continental Margin Magmatism

Postexpedition activities

The Expedition 396 postcruise editorial meeting was held 28 February–4 March in College Station, Texas. A postcruise sampling party is planned for 21–28 April at the Bremen Core Repository (BCR) at the University of Bremen in Germany.

Expedition 391: Walvis Ridge Hotspot

Planning

The postcruise editorial meeting will be held next quarter in College Station, Texas, and a sampling party for a few scientists who were not able to sail will take place at the BCR in June. JRSO began making plans for coring operations during Expedition 397T to drill two sites that were not drilled during Expedition 391 because of lost time.

Table 2.2. Expedition 391 science party staffing breakdown

Member country/consortium	Participants*	Co-Chief Scientists
USA: United States Science Support Program (USSSP)	10	1
Japan: Japan Drilling Earth Science Consortium (J-DESC)	1	
Europe and Canada: European Consortium for Ocean Research Drilling (ECORD) Science Support and Advisory Committee (ESSAC)	9	1
Republic of Korea: Korea Integrated Ocean Drilling Program (K-IODP)	1	
People's Republic of China: IODP-China	2	
Australia and New Zealand: Australia/New Zealand IODP Consortium (ANZIC)	0	
India: Ministry of Earth Science (MoES)	1	

* Seven scientists were not able to sail because of problems associated with the COVID-19 Omicron variant. In addition, two Namibian observers sailed as members of the science party.

Figure 2.1 Expedition 391 site map

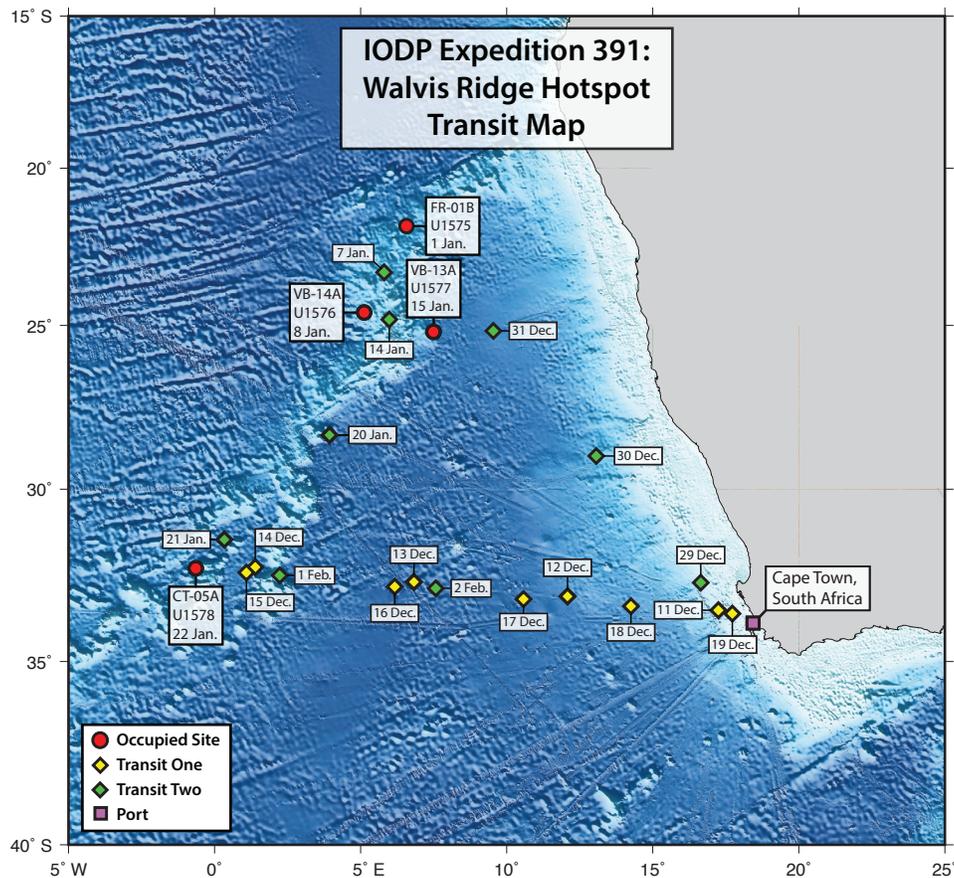


Table 2.2 Expedition 391 coring summary

Site	Hole	Latitude	Longitude	Water depth (mbsl)	Cores (N)	Total penetration (mbsf)	Interval cored (m)	Core recovered (m)	Recovery (%)
U1575	U1575A	21°51.9659'S	6°35.4369'E	3231	41	332.3	332.3	185.15	55.7
Site U1575 totals					41	332.3	332.3	185.15	55.7
U1576	U1576A	24°35.7520'S	5°7.3163'E	3032	42	398.1	398.1	309.32	77.7
	U1576B	24°35.7711'S	5°7.5513'E	3027	16	450.3	85.3	66.33	77.8
Site U1576 totals					58	848.4	483.4	375.65	77.7
U1577	U1577A	25°12.1439'S	7°29.8140'E	3940	26	193.9	193.9	152.89	78.9
Site U1577 totals					26	193.9	193.9	152.9	78.9
U1578	U15785A	32°19.6836'	0°38.5876'W	3794	65	486.4	486.4	239.87	49.3
Site U1578 totals					65	486.4	486.4	239.87	49.3
Expedition 391 totals					190	1,861.0	1,496.0	953.57	63.7

Science summary

Hotspot tracks provide important records of plate motions, as well as mantle geodynamics, magma flux, and mantle source compositions. The Tristan-Gough-Walvis Ridge (TGW) hotspot track, which extends from the active volcanic islands of Tristan da Cunha and Gough through a province of guyots and then along Walvis Ridge to the Etendeka flood basalt province, forms one of the most prominent and complex

global hotspot tracks. The TGW hotspot track displays a tight linear age progression in which ages increase from the islands to the flood basalts (covering ~135 My). The plan for Expedition 391 was to drill at six sites, three along Walvis Ridge and three in the seamount (guyot) province, to gather igneous rocks to better understand the formation of track edifices, the temporal and geochemical evolution of the hotspot, and the variation in paleolatitudes at which the volcanic edifices formed.

After a delay of 18 days to address an outbreak of the COVID-19 virus, Expedition 391 drilled at four of the proposed sites: three sites on Valdivia Bank, an ocean plateau that comprises the northeastern part of the ridge, and one site on the lower flank of a guyot in the Center track. One hole was drilled at Site U1575, located on a low portion of the northeastern Walvis Ridge north of Valdivia Bank. At this location, 209.9 m of sediment and 122.4 m of igneous basement were cored. Two holes were drilled at Site U1576 on the west flank of Valdivia Bank, recovering a remarkable ~380 m thick sedimentary section consisting mostly of chalk covering a nearly complete sequence from Paleocene to Late Cretaceous (Campanian). These sediments display short and long cyclic color changes that imply astronomically forced and longer term paleoenvironmental changes. Coring at Site U1577, on the extreme eastern flank of Valdivia Bank, penetrated a 154 m thick sedimentary section, the bottom ~108 m of which is Maastrichtian–Campanian (possibly Santonian) chalk with vitric tephra layers. Site U1578, located on a Center track guyot, provided a long and varied igneous section, coring through 184.3 m of pelagic carbonate sediments mainly consisting of Eocene and Paleocene chalk followed by 302.1 m of igneous basement.

Although the igneous penetration was only two-thirds of the planned amount, drilling during Expedition 391 obtained samples that will lead to a deeper understanding of the evolution of the Tristan-Gough hotspot and its track. Relatively fresh basalts with good recovery provide ample samples for geochemical, geochronologic, and paleomagnetic studies, and the recovered Late Cretaceous and early Cenozoic chalk successions provide samples for paleoenvironmental studies.

Expedition 392: Agulhas Plateau Cretaceous Climate

Planning

Expedition 392 port call logistics were finalized during the quarter. Preparations for air freight were completed, and the shipments were dispatched. The COPE protocol revision was completed on 18 January. The revision focused on further reducing the transmission of COVID-19 during port call activities and aboard the *JOIDES Resolution*. The science party and crew arrived in Cape Town, South Africa, on 31 January and, after a 7-day hotel quarantine, boarded the vessel on 7 February. The updated COPE protocols were followed. The vessel departed Cape Town on 10 February and completed operations at four sites.

Staffing

Four scientists were not able to sail because of problems associated with the COVID-19 Omicron variant. In addition, one South African observer sailed as a member of the science party.

Clearance, permitting, and environmental assessment activities

JRSO requested and received approval to collect surface water samples in the South African Exclusive Economic Zone (EEZ).

Expeditions 390 and 393: South Atlantic Transect 1 and 2

Planning

The Expedition 390 port call was changed from Montevideo, Uruguay, to Cape Town, South Africa, after concerns about not being able to implement the COPE protocol. Because of the slightly longer transit times, a revised operations plan was completed. Meetings between the Expedition Project Managers (EPMs), Co-Chief Scientists, and technical staff were held to review laboratory measurements and sampling plans. The Expedition 390 port call logistics were finalized. Preparations for air freight were completed, and the shipments were dispatched.

Staffing

Several staffing changes happened during the quarter for Expedition 390. A micropaleontologist withdrew but was not replaced, and a physical properties specialist/stratigraphic correlation specialist was invited and accepted the invitation to sail. The Outreach Officer withdrew, and the position was quickly restaffed. Three scientists withdrew from sailing after they did not receive institutional approval to travel (two from China and one from Japan). Finally, at the end of the quarter, JRSO was notified that two scientists tested positive for COVID-19 as they were preparing to travel to Cape Town, South Africa (one from the US and one from Europe). There was not sufficient time to restaff those positions, so Expedition 390 will sail without those scientists. Three scientists were restaffed for Expedition 393 in sedimentology, inorganic geochemistry, and paleomagnetism. The Outreach Officer position will be restaffed next quarter.

Expedition 397T: Transit

Planning

Following a 1 month maintenance period in Cape Town, South Africa, the transit to Lisbon, Portugal, offered the opportunity to conduct operations at two Walvis Ridge sites that were not drilled as a result of time lost during Expedition 391. The Co-Chief Scientists prepared a packet for review by the *JOIDES Resolution* Facility Board (JRFB).

Clearance, permitting, and environmental assessment activities

The clearance permit JRSO obtained for Expedition 391 covers these dates, and Namibia approved the request to revisit the sites in September. Additional requests to the Environmental Protection and Safety Panel (EPSP) and possibly Namibia will be submitted in the next quarter in an effort to maximize the limited operations days available.

Expedition 397: Iberian Margin Paleoclimate

Planning

The Expedition 397 *Scientific Prospectus* was published on 14 February. The expedition schedule was changed slightly; the dates are now 11 October to 11 December.

Staffing

JRSO sent out the second round of invitations in mid-January, and all of the scientists responded. The science party staffing is complete. The Outreach Officer position is at the interview stage and will be finalized early next quarter.

Clearance, permitting, and environmental assessment activities

A depth extension for one site was approved at the February EPSP meeting. The Marine Scientific Research (MSR) application was completed, and the application was submitted to the US State Department on 10 March.

Expedition 398: Hellenic Arc Volcanic Field

Planning

The Expedition 398 *Scientific Prospectus* was published on 17 March. The expedition schedule was changed slightly; the dates are now 11 December 2022 to 10 February 2023.

Staffing

The Program Member Office (PMO) nominations were received, and the first round of invitations was issued. Additionally, special calls were issued for a seismologist/stratigraphic correlator and two micro-paleontologists. The Outreach Officer position applications were received, and the applicants are being reviewed. The US Science Support Program (USSSP) inquired about the potential of adding a second US Outreach Officer; this will be decided closer to the expedition based on available berths.

Clearance, permitting, and environmental assessment activities

The MSR application will be submitted next quarter. An Environmental Evaluation (EE) will be required due to acoustic activity associated with check shot surveys. An ecological research company was contacted and will provide the EE in the next quarter.

Expedition 399: Building Blocks of Life, Atlantis Massif

Planning

The Expedition 399 precruise meeting took place as a set of virtual meetings and was completed on 2 March. The *Scientific Prospectus* is expected to be published next quarter. The expedition schedule was changed slightly; the dates are now 12 April to 12 June 2023.

Staffing

PMO nominations are expected in early April, and staffing is expected to be completed in the next quarter. The Outreach Officer application is open and will close on 20 May. USSSP inquired about the potential of adding a second US Outreach Officer; this will be decided closer to the expedition based on available berths.

Clearance, permitting, and environmental assessment activities

An EE will be required due to acoustic activity associated with check shot surveys. An ecological research company was contacted and will provide the EE by the end of the fiscal year.

Expedition 395: Reykjanes Mantle Convection and Climate

Planning

The Expedition 395 schedule was changed slightly; the dates are now 12 June to 12 August 2023. A revised operations plan that takes into account operations that have already been completed will be

included in the Expedition 395 *Scientific Prospectus Addendum*. The Co-Chief Scientists are proposing a new site and preparing a packet for the JRFB. A core description and hard rock sampling party is planned for 9–27 May at the Gulf Coast Repository (GCR).

Staffing

Because the expedition was rescheduled, all science party members were asked to reaffirm their participation. All but two scientists have confirmed their intention to sail. The stratigraphic correlator and physical properties/downhole measurements specialist positions will be restaffed. The Outreach Officer application is open and will close on 20 May. USSSP inquired about the potential of adding a second US Outreach Officer; this will be decided closer to the expedition based on available berths.

Clearance, permitting, and environmental assessment activities

The Co-Chief Scientists are proposing a new site within the Greenland EEZ. This will require a Greenland/Denmark MSR application to be submitted. An EE was already created for the originally scheduled dates and has been amended to include the new site.

Expedition 400: NW Greenland Glaciated Margin

Planning

The Expedition 400 schedule was changed slightly; the dates are now 12 August to 12 October 2023. An in-person precruise meeting is scheduled for 2–4 May in College Station, Texas.

Staffing

The call for applications will be open from 1 April to 1 June. USSSP inquired about the potential of adding a second US Outreach Officer; this will be decided closer to the expedition based on available berths.

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 JRFB operations and management report for the first quarter of FY22 (October–December) was submitted to NSF on 27 January (http://iodp.tamu.edu/publications/AR/FY22/FY22_Q1.pdf).

Liaison activities

JRFB reports to and liaises with funding agencies and IODP-related agencies (e.g., 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>).

Project portfolio management

JRSO successfully completed the Quality Control (QC) Data Viewer project; maintained the Core Orientation project on hold; continued work on the GEODESC, X-Ray Linescan Core Imager, New Rig Instrumentation System, Sample and Data Request Replacement, and GCR Core Storage Expansion Projects; and initiated the Google 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 core description tool set. The project manager is Peter Blum (JRSO EPM).

Status

Testing and bug-fix activities increased significantly in March, and work on the final application is 50 percent complete. The team is preparing for two live-testing deployments: one on shore in May and the other on the ship during the September transit. The estimated project completion date was changed to October 2022.

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

JRSO test-fitted new camera cooling components and commenced user testing by re-imaging some Expedition 382 (Iceberg Alley and Subantarctic Ice and Ocean Dynamics) cores that were originally X-ray imaged on the ship with the prototype area-scan logger, XMAN. JRSO's camera remains on order, so Hamamatsu Photonics is allowing JRSO to use its loaner camera until April. The estimated project completion date is May 2022.

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 project remains on hold pending completion of the Rig Instrumentation System project. 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 QC viewer program to visualize QC data acquired during IODP expeditions. The project manager is David Houpt (JRSO Supervisor of Analytical Systems).

Status

JRSO successfully completed this project in January.

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

JRSO continued testing and fine-tuning the new Rig Instrumentation System during Expeditions 391 and 392. Additional operational tests are needed on two more expeditions. The estimated project completion date was changed to December 2022.

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 X-ray fluorescence (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 the Sample Planning Tool (SPLAT), and data migration from SaDR to the replacement.

Status

JRSO implemented the capability to review a sample request and change its status to approved/revised/rejected/retired/completed and also implemented a way for each repository to mark their portion of the request as completed for a multi-repository request. Email notification functionality was added, and JRSO completed testing on the creating new request function, which caught many bugs and highlighted features that still need to be developed. The project team also investigated how to best implement many of the TAMU Information Technology (IT) security requirements. The estimated project completion date was changed to May 2022.

GCR Core Storage Expansion

Scope and deliverables

The scope of this project is to plan expansion of the core storage facilities within the GCR. This planning will consider how to provide the best long-term storage and preservation of core material while maximizing available space within the GCR at a reasonable budget.

Status

Progress slowed this quarter as a result of resource commitments for other projects. TAMU Environmental Health and Safety approved JRSO's request to store gas bottles in an enclosure outside within the gated generator yard. The estimated project completion date is September 2022.

Google Migration

Scope and deliverables

The scope of this project is to migrate all Google applications including Drive, Sites, Calendar files, and objects from the Google scientific-ocean-drilling.org domain to the Google TAMU.edu domain. Included in this migration is the transfer of responsibility for Google audit and compliance to TAMU's Division of IT.

Status

JRSO launched a project questionnaire in February to gauge current use and met with TAMU Cloud Services in March to plan the migration. The estimated project completion date is May 2022.

4. Subcontract activities

JRSO continued to interact with ODL AS to ensure efficient and compliant operations of *JOIDES Resolution*. JRSO management meets with ODL AS weekly to discuss evolving travel/shipping restrictions as the pandemic progresses.

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, shipping, and maintenance activities. A new high-temperature cable will be received and shipped to the vessel in the next quarter.

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

An Onboard Outreach Officer sailed during Expeditions 391 and 392, and support was provided for social media postings, videoconferences, and other activities.

Other projects and activities

Leah LeVay (JRSO Supervisor of Science Support) continued to work on an NSF EarthCube grant to integrate IODP data with the paleobiology database (eIODP), supervised five student workers for this effort, hosted a “Coding the Column” seminar associated with the grant, and is helping coordinate the June EarthCube meeting. Trevor Williams (JRSO EPM) taught a climate change class this semester and worked on preparations for the Antarctic Core School that is scheduled for 23–27 May at the Marine and Geology Repository at Oregon State University. Laurel Childress (JRSO EPM) supported the Pop-Up/Drill-Down Exhibit as a Co-Principal Investigator on that NSF grant. Emily Estes (JRSO EPM) participated in the Ocean Sciences meeting with a virtual talk and is a member of the College of Geosciences Diversity and Climate Committee. All EPMs are involved with the JRSO Diversity, Equity, and Inclusion Working Group, which aims to improve inclusion and diversity at TAMU and on the *JOIDES Resolution*. Finally, the EPM group supervised research projects for three undergraduate and two graduate students.

6. Technical and analytical services

The 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

UIC CM5017 Coulometers

Two new coulometers were tested in College Station, TX, confirmed to work with our existing JRSO-built software, and sent to the vessel, where they will be installed during an upcoming port call. The older CM5015 units will be returned to JRSO Headquarters to be available to staff and visiting scientists.

SPECIM FX10 Hyperspectral Imaging Logger

TAS continued experiments with the FX10 camera and was able to acquire images of core sections and color standards. Work continues on calibration and data acquisition, and some spectrally-anomalous data have been sent to the vendor for discussion.

X-ray Core Section Imager

The XCSAN project has been delayed by supply chain issues; the TDI X-ray camera vendor (Hamamatsu) has still not delivered the camera. TAS continues to work on and test XSCAN using a loaner Hamamatsu camera.

Scanning Electron Microscope—Energy Dispersive Spectrophotometer

The Scanning Electron Microscope—Energy Dispersive Spectrophotometer (SEM-EDS) project continues to be stalled because of a hardware failure with the Brüker XFLASH 630 Mini EDS, which was sent back to the factory for repair. This system will eventually replace the Hitachi TM-3000 SEM on the ship, and the older SEM will be transferred to JRSO headquarters and made available for use by visiting scientists and staff.

Carbon-hydrogen-nitrogen-sulfur analyzer

The new carbon-hydrogen-nitrogen-sulfur (CHNS) analyzer is in the outgoing freight and will be installed on the ship once it arrives. The older unit will be installed at the GCR for use by visiting scientists and staff; the fact that only one furnace is functioning is not an issue on shore where the instrument could be repaired.

Handheld/portable X-ray fluorescence spectrometer

Work continues with the new Brüker AXS Tracer-5g portable X-ray fluorescence spectrometer (pXRF) to develop the workflow, data upload, and data download procedures. The vendor made the adjustments to their output format that we requested, and TAS is now working with applications developers to modify the uploader and LORE report accordingly. Brüker returned the instrument with the added air calibration (meaning no He purge is necessary) for geology.

Icefield MI-5 core orientation tools

The two Icefield MI-5 tools that had faults were repaired and sent back to the ship in the freight going to the Expedition 390 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.

Curation and Core Handling

The Curation LWG did not meet this quarter because there were no curatorial issues raised in recent cruise evaluations.

Geochemistry and Microbiology

The Geochemistry LWG did not meet this quarter but will meet next quarter to discuss ongoing issues and recent cruise evaluations.

Geology

The Geology LWG did not meet this quarter but will meet next quarter to discuss ongoing issues and recent cruise evaluations.

Geophysics

The Geophysics LWG met this quarter to discuss several issues.

- The JRSO engineers presented mockups of a new advanced piston corer temperature (APCT) tool design and sought advice from the LWG as well as the science community (IODP expedition scientists Heesemann, Harris, Fisher, Becker, and Villinger). The consensus was that moving the sensor farther up the APC frame would decrease the quality of the temperature measurement and that new heat modeling would be required to update the TP-Fit software that reduces the APCT-3 data. The engineers will consider the advice given and continue to look for ways to make the tool perform better and lower ongoing maintenance costs.
- The JRSO proposed a modification to the Vertical Seismic Imager (geophone) tool to have a more robust caliper arm when the borehole is too wide for the standard arm. The LWG requested more information, especially about reliability concerns if the original design is modified.
- The LWG received an update on the XSCAN project, specifically that the device is working at JRSO headquarters, albeit with the on-loan Hamamatsu camera, and can be tested by JRSO staff on core sections in the GCR collection.
- The LWG received a report on the Magnetic Susceptibility Sonde tools that were sent back to JRSO headquarters for testing late last year. Despite the engineering team's best efforts, the tools did not produce reliable data and were returned to the ship to be tested within the Schlumberger tool string.
- The LWG received a report on Version 4 of the Correlator software, which was tested on the ship during Expedition 392. The new version can utilize images as well as other data and has other user-driven improvements.

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 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 391 were added to the LIMS database on shore this quarter. These data are currently under moratorium and available only to the Expedition 391 scientists. Data from Expedition 378 were released from moratorium during this quarter.

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	USA	689	USA	971
2	United Kingdom	264	China	758
3	China	262	United Kingdom	558
4	Germany	180	Germany	188
5	France	109	Japan	180
6	Australia	66	Canada	118
7	Japan	53	France	89
8	Italy	51	Australia	78
9	Netherlands	48	India	60
10	Israel	43	New Zealand	50
11	Other	381	Other	595
	Total	2,146	Total	3,645

Table 7.2. Top 20 database web queries

Rank	Janus database		LIMS database*	
	Query	Views	Query	Views
1	Imaging—core photo	2,109	Imaging—section line scans	1,757
2	Site summary	1,324	Sample report	1,275
3	Sample	1,264	Imaging—core photos	1,228
4	Core summary	1,123	Section summary	1,073
5	Xray—XRD	904	Hole summary	796
6	Hole summary	630	Core summary	646
7	Special holes	517	Chemistry—interstitial water	488
8	Images—prime data images	460	Physical properties—MAD	428
9	Chemistry—carbonates	429	Physical properties—GRA	316
10	Chemistry—interstitial water	393	Chemistry—carbonates	312
11	Physical properties—MAD	360	Magnetism—MS	307
12	Physical properties—GRA	344	Physical properties—NGR	234
13	Physical properties—MS	336	Physical properties—color reflectance	221
14	Imaging—closeup	322	Imaging—thin sections	180

Rank	Janus database		LIMS database*	
	Query	Views	Query	Views
15	Physical properties—color reflectance	267	Portable X-ray fluorescence	178
16	Physical properties—smear slide	252	Chemistry—ICPAES	177
17	Xray—XRD	239	Imaging—microimages	174
18	Xray—XRF	222	Physical properties—PWL	167
19	Paleontology—age model	207	Magnetism—MSPOINT	163
20	Paleomagnetism—cryomagnetometer	206	Magnetism—SRM	157
	Other	2,729	Other	3,369
	Total	14,637	Total	13,646

Table 7.3. Data requests to the TAMU Data Librarian

Requests	Total	Country	Total
How to	11	USA	9
Data corrections	2	United Kingdom	2
Data not available	2	New Zealand	2
Forwarded—GCR	1	China	1
Photo	1	Australia	1
		France	1
		Italy	1
Total	17	Total	17

Network systems operation, maintenance, and security

JRSO conducted routine system maintenance in accordance with the TAMU IT security policy.

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.

Sample and curation strategies

This quarter, JRSO planned sample and curation strategies for Expedition 392. GCR staff also helped prepare samples for the Expedition 396 sample party at the BCR in April.

Sample requests and core sampling

The following table provides a summary of the 5,699 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
090429IODP, Seki, Japan	813	0
091553IODP, Traphagan, USA	300	0
091927IODP, Strachan, New Zealand	0	0
091954IODP, Sandbrink, Germany	362	0
092019IODP, Sandbrink, Germany	405	0
092051IODP, Dwyer, USA	32	0
092064IODP, Ram, India	468	0
092110IODP, Lamymán, United Kingdom	26	0
092472IODP, Ubide, Australia	21	0
092554IODP, Zhou, China	130	0
092761IODP, Karas, Chile	31	0
092799IODP, Zhong, China	771	0
092906IODP, Graham, United Kingdom	59	0
092929IODP, Wang, USA	100	0
092953IODP, Hoogakker, United Kingdom	101	0
092884IODP, Laureijs, Canada	39	0
093017IODP, Strachan, New Zealand	29	0
093056IODP, Rigalleau, Germany	169	0
093128IODP, Sproson, Japan	13	0
093104IODP, Mejia, Germany	24	0
093206IODP, Kimble, USA	529	0
093204IODP, Bahr, Germany	155	0
093141IODP, Defliese, Australia	30	0
093322IODP, Rosengard, USA	65	0
093308IODP, Zhou, China	102	0
093376IODP, Ravelo, USA	22	0
092260IODP, Hopkins, United Kingdom	66	0
093419IODP, Nirenberg, USA	344	0
093479IODP, Zheng, China	391	0
093520IODP, Storling, Sweden	8	0
093541IODP, Leckie, USA	27	0
093531IODP, Ross, United Kingdom	25	0
093607IODP, Rafter, USA	14	0
093826IODP, Xu, China	14	0
093970IODP, Houpt, USA	0	1
094036IODP, McCartney, USA	7	0
092465IODP, Schaefer, Germany	7	0
094561IODP, Lembke-Jene, Germany	0	2
Tours/demonstrations (#)	10	60
Totals	5,699	63

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. This quarter, tours were given to new JRSO employees, scholars visiting TAMU, representatives from the TAMU Division of Research, a TAMU Galveston marine geology class, and the TAMU Oceans Club. In addition, 12 students from a local secondary school visited the repository and did a hands-on exercise featuring cores recording the K/Pg boundary.

Onshore XRF scanning

During this quarter, 599 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*
Programmatic	396, Alvarez-Zarikian, Morris, Yager, USA	232	153	0	0
Programmatic	395C, LeVay, O'Connell, Providence, Fenton-Samuels, USA	0	90	3	0
Personal	383, Lembke-Jene, Rigalleau, Germany	124	0	0	0
Totals		356	243	3	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	Other
<i>Scientific Prospectuses</i>	10.14379/iodp.sp.397.2022 10.14379/iodp.sp.398.2022	
<i>Preliminary Reports</i>	10.14379/iodp.pr.396.2022 10.14379/iodp.pr.395C.2022	
Expedition Reports	10.14379/iodp.proc.378.101.2022 10.14379/iodp.proc.378.102.2022 10.14379/iodp.proc.378.103.2022	

Reports and publications	JRSO	Other
Data Reports	10.14379/iodp.proc.374.201.2022 10.14379/iodp.proc.372B375.209.2022 10.14379/iodp.proc.367368.203.2022	10.2204/iodp.proc.340.208.2022

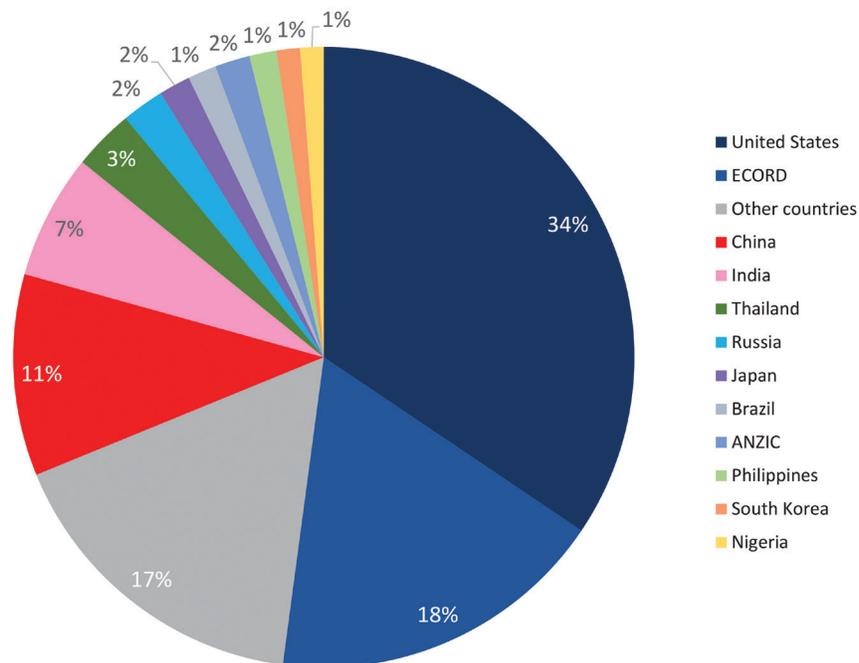
Notes: Other = European Consortium for Ocean Research Drilling Science Operator (ESO), The Institute for Marine-Earth Exploration and Engineering (MarE3), Integrated Ocean Drilling Program US Implementing Organization (USIO), and Oman expedition publications.

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 454,670 page views and 49,491 site visits, and the IODP Publications website received 399,365 page views and 26,336 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	FY22 Q2 page views*	FY22 Q2 site visits*
www-odp.tamu.edu	226,593	26,911
www.odplegacy.org	3,026	1,542
www.deepseadrilling.org	52,044	8,166
Total	281,663	36,619

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

Publications coordination

Data reports related to Expeditions 340, 358, 359, 362, 367/368, 374, 372/375, 376, and 378 were submitted, sent to peer review, accepted, and/or published this quarter. In addition, peer-reviewed post-cruise research result publications related to Expeditions 349, 351–353, 356, 358–364, 366–372B/375, 374–376, 385, and 390/393 were added to the publications database.

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 2022	February 2022	March 2022	FY22 Q2 total
IODP	10.14379	10,282	11,595	10,801	32,678
Integrated Ocean Drilling Program	10.2204	9,177	7,507	8,973	25,657
ODP/DSDP	10.2973	19,902	20,578	22,428	62,908

Table 9.4. Top 10 IODP DOIs resolved during FY22 Q2

DOI (10.14379)	Resolutions	Title
10.14379/IODP.PROC.385.2021	486	Proceedings Volume 385: Guaymas Basin Tectonics and Biosphere
10.14379/IODP.PR.396.2022	395	Preliminary Report: Expedition 396 Mid-Norwegian Margin Magmatism and Paleoclimate Implications
10.14379/OMANDP.PROC.2020	378	Proceedings Volume: Oman Drilling Project
10.14379/IODP.SP.390393.2020	351	Scientific Prospectus: Expedition 390/393 South Atlantic Transect
10.14379/IODP.PROC.378.2022	329	Proceedings Volume 378: South Pacific Paleogene Climate
10.14379/IODP.PR.390C.2021	282	Preliminary Report: Expedition 390C South Atlantic Transect Reentry Systems
10.14379/IODP.SP.397.2022	217	Scientific Prospectus: Expedition 397 Iberian Margin Paleoclimate

DOI (10.14379)	Resolutions	Title
10.14379/IODP.SP.392.2020	154	Scientific Prospectus: Expedition 392 Agulhas Plateau Cretaceous Climate
10.14379/IODP.SP.396.2021	144	Scientific Prospectus: Expedition 396 Mid-Norwegian Continental Margin Magmatism
10.14379/IODP.PR.360.2016	121	Preliminary Report: Expedition 360 Southwest Indian Ridge Lower Crust and Moho

Table 9.5. Top 10 Program DOIs resolved during FY22 Q2

DOI (10.14379, 10.2204, 10.2973)	Resolutions	Title
10.14379/IODP.PROC.385.2021	486	Proceedings Volume 385: Guaymas Basin Tectonics and Biosphere
10.14379/IODP.PR.396.2022	395	Preliminary Report: Expedition 396 Mid-Norwegian Margin Magmatism and Paleoclimate Implications
10.14379/OMANDP.PROC.2020	378	Proceedings Volume: Oman Drilling Project
10.14379/IODP.SP.390393.2020	351	Scientific Prospectus: Expedition 390/393 The South Atlantic Transect
10.14379/IODP.PROC.378.2022	329	Proceedings Volume 378: South Pacific Paleogene Climate
10.14379/IODP.PR.390C.2021	282	Preliminary Report: Expedition 390C South Atlantic Transect Reentry Systems
10.2204/IODP.PROC.323.2011	233	Proceedings Volume 323: Bering Sea Paleoceanography
10.14379/IODP.SP.397.2022	217	Scientific Prospectus: Expedition 397 Iberian Margin Paleoclimate
10.2204/IODP.PROC.346.2015	207	Proceedings Volume 346: Asian Monsoon
10.2204/IODP.PROC.302.2006	195	Proceedings Volume 302: Arctic Coring Expedition (ACEX)

ScienceOpen

Integrated Ocean Drilling Program and IODP expedition reports and data reports are indexed at ScienceOpen. JRSO deposited data reports from Volumes 334, 363, and 372B/375 into ScienceOpen this quarter.

Table 9.6. ScienceOpen collection statistics (https://www.scienceopen.com/collection/IODP_Publications and <https://www.scienceopen.com/collection/8b0582f6-47bf-4988-b90a-8533135e6fcc>)

Collection	Number of articles	Article views	Altmetric score (collection)	Number of authors	Referenced articles
Proceedings of the International Ocean Discovery Program collection	800	19,326	319	1,954	9,551
Scientific Ocean Drilling Expedition Research Results collection	9,245	47,904	70,444	20,082	90,965

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 data reports for Volumes 334, 363, 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 301–306, 308, 311, 318–321, 324, 325, 327, 330, 333, 334, 336, 339, 341, and 346 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. Scheduled crawls incrementally update the archive with new files. Currently, our collection houses 1.5 TB of data and more than 7.7 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 39,669 records for Program-related scientific ocean drilling publications from 1969 to the present. This quarter, IODP Pubs sent 460 expedition-related publication citations for consideration for inclusion in the database.

Table 9.7. Scientific Ocean Drilling Bibliographic Database statistics

Program-related publications	January 2022	February 2022	March 2022	FY22 Q2 total
Searches	355	280	167	802
Citation views	294	139	122	555

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 301–396. The IODP program publication and JRSO staff-authored publication 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>).

Geological Society of America Northeastern Section Meeting

- King, A., Haynes, L.L., Röhl, U., and the Expedition 378 Scientists (including **L. Childress**), 2022. Foraminifera stable isotopes as indicators of water column temperature and carbon cycling during the Eocene. Presented at the GSA Northeastern Section Meeting, Lancaster, PA, 20–22 March 2022.
- Poniatoski, E., Haynes, L., Röhl, U., and the Expedition 378 Scientists (including **L. Childress**), 2022. Foraminifera population dynamics in the Southern Hemisphere during the Eocene hothouse. Presented at the GSA Northeastern Section Meeting, Lancaster, PA, 20–22 March 2022.
- Mucha, C., Haynes, L.L., Röhl, U., and the Expedition 378 Scientists (including **L. Childress**), 2022. Using benthic foraminifera to evaluate the relationship between Eocene hothouse climate fluctuations and orbital cyclicity. Presented at the GSA Northeastern Section Meeting, Lancaster, PA, 20–22 March 2022.

Ocean Sciences Meeting

- **Estes, E.**, Faz, N., Laaker, E., Oldham, V., Robinson, R., and Sylvan, J., 2022. Enzyme activity rates along oxygen and salinity gradients in the Gulf of Mexico and Mississippi River. Presented at the Ocean Sciences Meeting, online, 24 February–4 March 2022.

Articles authored by JRSO staff

- Liu, C., Stockli, D.F., Clift, P.D., Wan, S., Stockli, L.D., **Höfig, T.W.**, and Schindlbeck-Belo, J.C., 2022. Geochronological and geochemical characterization of paleo-rivers deposits during rifting of the South China Sea. *Earth and Planetary Science Letters*, 584:117427. <https://doi.org/10.1016/j.epsl.2022.117427>
- Romero, O.E., **LeVay, L.J.**, McClymont, E.L., Müller, J., and Cowan, E.A., 2022. Orbital and suborbital-scale variations of productivity and sea surface conditions in the Gulf of Alaska during the past 54,000 years: impact of iron fertilization by icebergs and meltwater. *Paleoceanography and Paleoclimatology*, 37(1):e2021PA004385. <https://doi.org/10.1029/2021PA004385>

Appendix: JRSO quarterly report distribution

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