International Ocean Discovery Program

JOIDES Resolution Science Operator

FY23 Q1 Operations and Management Report

1 October–31 December 2022

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Submitted by the JRSO

to

The National Science Foundation

and

The *JOIDES Resolution* Facility Board

27 January 2023

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) FY23 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
Transit and Return to Walvis Ridge Hotspot	397T	Cape Town, South Africa	10 September–11 October 2022	31 (2/29)	29 (22/7)	W. Sager K. Hoernle	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. Ronge
Transit/tie up (maintenance) 398P (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
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
Transit/tie up (dry dock) 400T (12 October–10 December 2023; St. John's, Canada, to Amsterdam, Netherlands) (59 days)							
Mediterranean-Atlantic Gateway Exchange	401	Amsterdam, Netherlands	10 December 2023–9 February 2024	61 (3/58)	58 (10/48)	R. Flecker E. Ducassou	T. Williams

Expedition		Port (origin)[1]	Dates[2]	Total days (port/ sea)	Days at sea (transit[3]/ ops)	Co-Chief Scientists	Expedition Project Manager/ Contact
Tyrrhenian Continent-Ocean Transition	402	Napoli, Italy	9 February–8 April 2024	59 (5/54)	54 (2/52)	N. Zitellini A. Malinverno	E. Estes
Transit/tie up (maintenance) 402T (8 April–4 June 2024; Napoli, Italy, to Reykjavík, Iceland) (57 days)							
Eastern Fram Strait Paleo-archive	403	Reykjavík, Iceland	4 June–2 August 2024	59 (5/54)	54 (10/44)	R.G. Lucchi K. St. John	T. Ronge
Arctic-Atlantic Gateway Paleoclimate	404	Reykjavík, Iceland	2 August–30 September 2024	59 (5/54)	54 (8/46)	W. Geissler J. Brigham-Grette	C. Alvarez Zarikian

Notes: NA = not applicable.
[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).

Expeditions 390 and 393: South Atlantic Transect 1 and 2

Postexpedition activities

The postcruise editorial and hard rock sampling parties were held 7–18 November 2022 at the Gulf Coast Repository (GCR) at TAMU. A postcruise sediment sampling party is planned for 16–21 January 2023 at the Bremen Core Repository (BCR) at the University of Bremen.

Expedition 397T: Transit and Return to Walvis Ridge Hotspot

Staffing

Table 2.2 Expedition 397T science party staffing breakdown

Member country/consortium	Participants	Co-Chief Scientists
USA: United States Science Support Program (USSSP)	3	1
Japan: Japan Drilling Earth Science Consortium (J-DESC)		
Europe and Canada: European Consortium for Ocean Research Drilling (ECORD) Science Support and Advisory Committee (ESSAC)	2	
Republic of Korea: Korea Integrated Ocean Drilling Program (K-IODP)		
People's Republic of China: IODP-China		
Australia and New Zealand: Australia/New Zealand IODP Consortium (ANZIC)		
India: Ministry of Earth Science (MoES)	1	

Note: The scientists who sailed were chosen from the Expedition 391 science party. The group included one US outreach officer. One of the Namibian observers from Expedition 391 also sailed.

Clearance, permitting, and environmental assessment activities

As part of the Expedition 391 Marine Science Research (MSR) Clearance Application, the *Preliminary Report* for Expedition 397T was submitted to the State Department in December 2022.

Figure 2.1 Expedition 397T site map

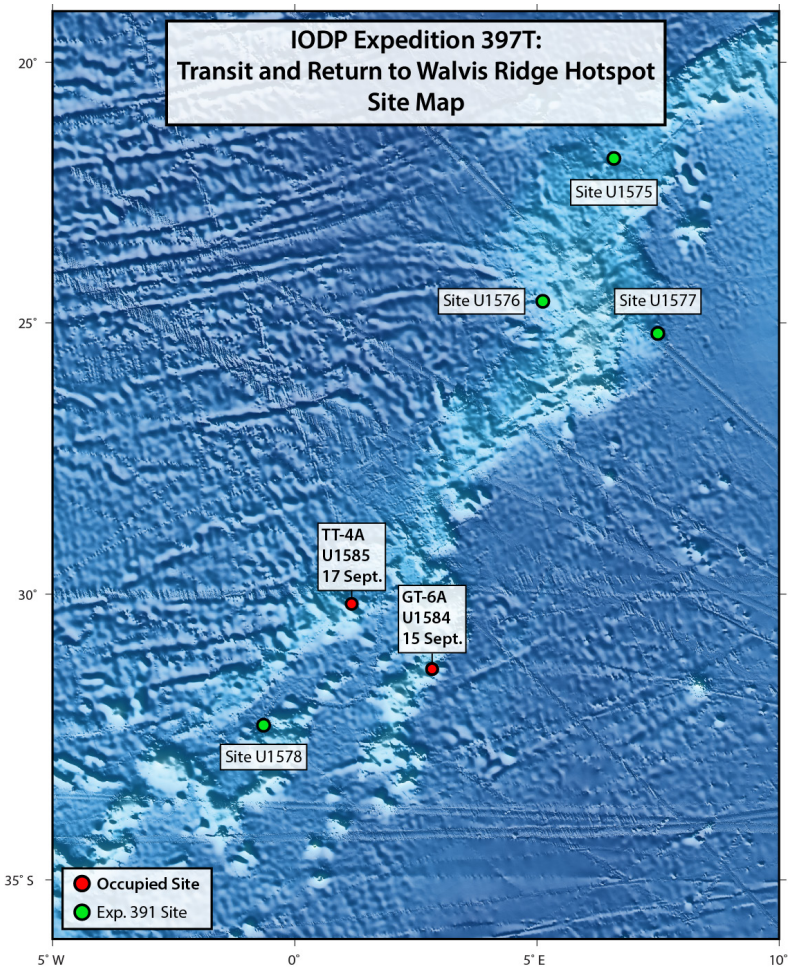

Table 2.3. Expedition 397T coring summary

Site	Hole	Latitude	Longitude	Water depth (mbsl)	Cores (*N*)	Total penetration (DSF)	Interval cored (m)	Core recovered (m)	Recovery (%)
U1584	U1584A	31°20.322′S	2°50.221′E	2305	8	208.2	75.2	23.68	31
Site U1584 totals					**8**	**208.2**	**75.2**	**23.68**	**31**
U1585	U1585A	30°10.016′S	1°10.649′E	3457	38	498.8	355.6	217.73	61
Site U1585 totals					**38**	**498.8**	**355.6**	**217.73**	**61**
Expedition 397T totals					**46**	**707**	**430.8**	**241.41**	**56**

Science summary

Expedition 397T sought to address the shortage of drilling time caused by COVID-19 mitigation during Expedition 391 (Walvis Ridge Hotspot) by drilling at two sites omitted from the earlier cruise. A week of coring time was added to a transit from Cape Town, South Africa, to Lisbon, Spain, which would cross Walvis Ridge on its way north. These two sites were located on two of the three seamount trails that emerge from the split in Walvis Ridge morphology into several seamount chains at 2°E. Site U1584 (proposed Site GT-6A) sampled the Gough track on the east, and Site U1585 (proposed Site TT-4A) sampled the Tristan track on the west. Together with Site U1578, drilled on the Center track during Expedition 391, they form a transect across the northern Walvis Ridge Guyot Province.

The goal was to core seamount basalts and associated volcanic material for geochemical and isotopic, geochronologic, paleomagnetic, and volcanologic study. Scientifically, one emphasis was to better understand the split in geochemical and isotopic signatures that occurs at the morphologic split. Geochronology would add to the established age progression but also give another dimension to understanding Walvis Ridge seamount formation by giving multiple ages at the same sites. The paleomagnetic study seeks to establish paleolatitudes for Walvis Ridge sites for comparison with those published from hotspot seamount chains in the Pacific, in particular to test whether a component of true polar wander affects hotspot paleolatitude.

Expedition 397: Iberian Margin Paleoclimate

Planning

The science party and crew boarded the vessel on 13 October after a 4-day hotel quarantine, and surface and air freight shipments were delivered.

Staffing

Table 2.4 Expedition 397 science party staffing breakdown

Member country/consortium	Participants	Co-Chief Scientists
USA: United States Science Support Program (USSSP)	11	
Japan: Japan Drilling Earth Science Consortium (J-DESC)	2	
Europe and Canada: European Consortium for Ocean Research Drilling (ECORD) Science Support and Advisory Committee (ESSAC)	6	2
Republic of Korea: Korea Integrated Ocean Drilling Program (K-IODP)		
People's Republic of China: IODP-China	2	
Australia and New Zealand: Australia/New Zealand IODP Consortium (ANZIC)	1	
India: Ministry of Earth Science (MoES)	1	

Note: One observer sailed from Portugal.

Clearance, permitting, and environmental assessment activities

In late September, the Portuguese Navy requested we provide a timetable of when we will occupy primary sites 14A and 04C (and alternate sites 16B and 17A) because these are on the line of passage for Navy submarines. In addition to providing the timetable, the expedition also reported their location to the Portuguese Navy every day. JRSO received the Portuguese Authorization on 11 October.

Figure 2.2 Expedition 397 site map

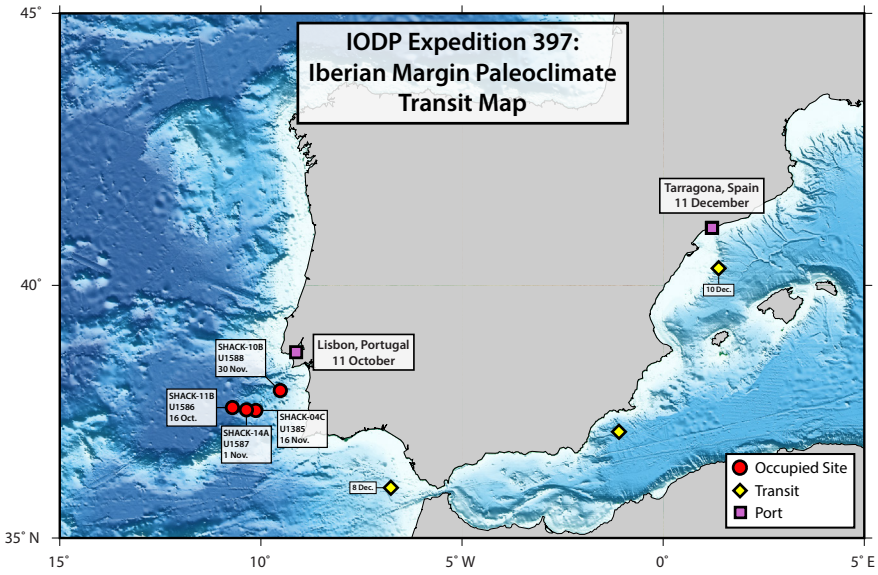

Table 2.5. Expedition 397 coring summary

Site	Hole	Latitude	Longitude	Water depth (mbsl)	Cores (N)	Total penetration (DSF)	Interval cored (m)	Core recovered (m)	Recovery (%)
U1586	U1586A	37°37.3108′	10°42.5987′	4691.07	42	350.0	350.0	339.56	97
	U1586B	37°37.3478′	10°42.5506′	4690.45	40	350.0	350.0	335.13	96
	U1586C	37°37.2911′	10°42.6216′	4692.41	38	349.1	349.1	334.37	96
	U1586D	37°37.2835′	10°42.6289′	4693.59	38	350.0	350.0	337.79	97
Site U1586 totals					**158**	**1399.1**	**1339.1**	**1346.85**	**96**
U1587	U1587A	37°34.8602′	10°21.5400′	3480.54	53	500.0	500.0	478.13	53
	U1587B	37°34.8650′	10°21.5314′	3478.00	59	547.8	547.8	534.27	59
	U1587C	37°34.8750′	10°21.5205′	3478.99	61	567.9	567.9	553.34	61
Site U1587 totals					**173**	**1615.7**	**1615.7**	**1575.74**	**97**
U1385	U1385F	37°33.9999′	10°07.6587′	2589.08	32	400.00	303.1	290.79	96
	U1385G	37°34.0108′	10°07.6656′	2592.39	42	397.3	397.3	396.3	100
	U1385H	37°34.0223′	10°07.6641′	2592.39	31	399.2	284.6	284.97	100
	U1385I	37°34.0205′	10°07.6505′	2589.14	16	152.5	152.5	145.37	95
	U1385J	37°34.0103′	10°07.6513′	2593.14	43	400.0	400.0	397.77	99
Site U1385 totals					**164**	**1749.0**	**1537.5**	**1515.2**	**99**
U1586	U1588A	37°57.6044′	9°30.9961′	1339.30	49	353.0	353.0	378.37	107
	U1588B	37°57.6149′	9°30.9956′	1339.30	64	350.0	350.0	456.08	130
	U1588C	37°57.6160′	9°30.9814′	1339.29	53	353.6	261.6	345.04	132
	U1588D	37°57.6023′	9°30.9820′	1338.54	76	412.5	412.5	569.44	138
Site U1586 totals					**164**	**1469.1**	**1377.1**	**1748.93**	**127**
Expedition 397 totals					**495**	**6232.9**	**5929.4**	**6176.72**	**104**

Science summary

Expedition 397 sought to recover the Late Miocene–Pleistocene sediment archive located offshore Portugal in a range of water depths to document past changes in vertical water mass structure and its relation to global climate change. By producing multiproxy time series at each site and placing them on an integrated stratigraphy, these sediments will provide the information needed to study millennial climate variability over the Pliocene–Pleistocene and understand its underlying causes and evolving contextuality.

Expedition 397 recovered a total of 6176.7 m of core (104% recovery) at four sites (U1588, U1385, U1587, and U1586) from the Promontorio dos Principes de Avis, a plateau located on the Portuguese continental slope that is elevated above the Tagus Abyssal Plain and isolated from the influence of turbidites. The drill sites were arranged along a bathymetric transect (1339, 2590, 3479, and 4691 m below sea level, respectively) to intersect each of the major subsurface water masses of the eastern North Atlantic. Multiple holes were drilled at each site to ensure complete spliced composite sections, which will be further refined postcruise by X-ray fluorescence core scanning.

Expedition 398: Hellenic Arc Volcanic Field

Planning

The port call logistics were finalized. All surface and air freight shipments, medical exams, and precruise safety training were completed. The science party and crew boarded the vessel on 13 December after a 4-day hotel quarantine.

Expedition 399: Building Blocks of Life, Atlantis Massif

Planning

Meetings between the Expedition Project Manager (EPM), Co-Chief Scientists, and technical staff were held to review laboratory measurements and sampling. Research plans and laboratory preparations are ongoing.

Clearance, permitting, and environmental assessment activities

The Expedition 399 Environmental Evaluation was approved by NSF.

Expedition 395: Reykjanes Mantle Convection and Climate

Planning

An addendum to the *Scientific Prospectus* is in progress. Several meetings were held to discuss Expedition 395C samples. Research plans and laboratory preparations are ongoing.

Clearance, permitting, and environmental assessment activities

In addition to sites in Greenland's Exclusive Economic Zone (a sovereign state of Denmark), some sites are now within Iceland's new Extended Continental Shelf submission. Therefore, the clearance application included both Denmark and Iceland as coastal states. The MSR application was prepared and submitted to the US State Department on 11 November.

Expedition 400: NW Greenland Glaciated Margin

Planning

The sample and data request instructions were sent out to the science party. Staffing was completed during the quarter.

Clearance, permitting, and environmental assessment activities

The MSR application was prepared and submitted to the US State Department on 21 December.

Expedition 401: Mediterranean-Atlantic Gateway Ocean Transition

Planning

The precruise meeting will be held 4–6 January in College Station, Texas. The call for applications closed on 19 December.

Clearance, permitting, and environmental assessment activities

Clearance will need to be requested from Portugal, Spain, and Morocco.

Expedition 402: Tyrrhenian Continent-Ocean Transition

Planning

The precruise meeting was held 30 November–1 December in College Station, Texas. The Co-Chief Scientists are currently working on the *Scientific Prospectus*. The call for applications closed on 19 December.

Clearance, permitting, and environmental assessment activities

Clearance will need to be requested from Italy.

Expedition 403: Eastern Fram Strait Paleo-archive

Planning

The EPM and Co-Chief Scientists started preliminary planning. The call for applications will open on 6 January.

Clearance, permitting, and environmental assessment activities

Clearance will need to be requested from Norway.

Expedition 404: Arctic-Atlantic Gateway Paleoclimate

Planning

Most planning activities are being deferred pending NSF's FY24 guidance. Two Co-Chief Scientists were invited and accepted the invitation to sail.

Clearance, permitting, and environmental assessment activities

Clearance will need to be requested from Denmark (Greenland) and Norway.

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 fourth quarter of FY22 (July–September) was submitted to NSF on 27 October (**http://iodp.tamu.edu/publications/AR/FY22/FY22_Q4.pdf**), and the JRSO FY22 Annual Report was published on 21 December (**https://iodp.tamu.edu/publications/AR/FY22AR.pdf**).

Liaison activities

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

Project portfolio management

JRSO continued work on the GEODESC, X-Ray Linescan Core Imager, New Rig Instrumentation System, and Sample and Data Request Replacement projects and maintained the GCR Core Storage Expansion, Core Orientation, and Google Migration projects on hold.

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 Expedition Project Manager [EPM]).

Status

JRSO deployed the GEODESC application on the *JOIDES Resolution* on 11 October for operational testing and for use during Expedition 397 in place of DESClogik. The Expedition 397 scientists' evaluations were quite favorable, and their input throughout the expedition guided developers in fixing bugs and improving the software in real time. JRSO will continue working on key components, including the Catalog Manager, which is needed to complete the functionality of GEODESC. The estimated project completion date was changed to 30 June 2023.

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

The XSCAN project experienced an imaging setback, which was ultimately resolved after extensive hardware troubleshooting. Imaging optimization and software adjustments are in progress. The estimated project completion date remains March 2023.

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. The project completion date remains open ended.

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 to fine-tune the New Rig Instrumentation System (iRIS), monitor its use on the *JOIDES Resolution*, collect data, and gather feedback. JRSO is developing a reporting module following a meeting with stakeholders and continues work on user and developer documentation. The estimated project completion date remains April 2023.

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 development work on major components is almost complete, except for a few known bugs. Rigorous testing resumed in December, and developers began migrating data from the old program to the new program. Final acceptance testing is scheduled to begin in February in preparation for an operational release in March. The estimated project completion date was changed to March 2023.

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

This project was placed on hold pending TAMU action.

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

This project remains on hold pending availability of TAMU IT engineering resources.

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 was received and will be 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

There are several outreach activities planned for the duration of Expedition 398, and there are several plans for outreach activities for when the ship docks in Greece.

Expedition 398P will have two United States Science Support Program (USSSP)-funded outreach activities during the transit and tie up. An 11-day JR Academy activity is planned for the transit between Heraklion, Greece, and Tarragona, Spain (12–22 February), and an 8-day School of Rock activity is planned during part of the Tarragona tie-up (24 February–3 March).

Other projects and activities

In December, four JRSO staff worked at the IODP/USSSP booth at the American Geophysical Union (AGU) Fall Meeting and provided demos of the Merlin digital asset management system that includes thousands of photos and documents.

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

The instrument was returned from the vendor after repair. Different lenses and filters were purchased to try to resolve the spectral distortion at low wavelengths.

X-ray Core Section Imager

Work is ongoing to complete the XSCAN in January and assess its readiness to deploy in March.

Scanning electron microscope–energy dispersive spectrophotometer

Expedition 397 scientists and technicians conducted image-resolution tests on the new NanoImages scanning electron microscope–energy dispersive spectrophotometer (SEM-EDS), which was installed on the ship at the end of September. Their tests illustrated that the resolution was significantly lower than for the old Hitachi TM-3000 SEM. Additional vibration-isolation measures will be tested to see if the image resolution can be improved. The Hitachi TM-3000 instrument will remain on board and be available for use until the image issues with the new SEM are resolved.

Handheld/portable X-ray fluorescence spectrometer (pXRF)

The Brüker AXS Tracer-5g portable X-ray fluorescence spectrometer (pXRF) was returned to the vessel and is in use on the current expedition.

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 met this quarter to discuss ongoing issues as well as those arising from Expedition 393.

Expedition 393

- The Foldio imaging system was used during Expeditions 390 and 393 to image pieces of core before they were destructively sampled for microbiology. Collecting the images can be tedious, but the results were viewed favorably. These images are kept in the DATA1 volume and are available through a data librarian request.
    - Each expedition will need to determine the imaging requirements prior to destructive sampling. This may be as basic as the standard overhead images or more complex imaging using the Foldio.
- Destructive rock sampling on the expedition is loud and containing pieces to the work area is challenging, so alternate approaches are desirable.
    - A Dremel tool is available that may help with this, but protocols will have to be established to sterilize it in between samples.
    - TAS will investigate a small rock-crushing press that might be able to be placed either in a hood or within the KOACH Clean Bench laminar flow.

Ongoing Issues

- Tracer Pumping
    - We have traditionally pumped perfluorocarbon tracers (PFTs) downhole for microbiological contamination testing purposes. The older compound, perfluoromethylcyclohexane (C_7F_{14}, or PFMCH) was so volatile because of its low boiling point that the entire compartment would become flooded with the vapors. A heavier compound, perfluoromethyldecalin ($C_{11}F_{20}$, or PFMD) was introduced later and appears to have excellent chromatographic performance and does not have the volatility problem. PFMD is purchased as a mixture of the cis- and trans- isomers of the compound, which resolve as two separate peaks, and in addition is contaminated with perfluorodecalin ($C_{10}F_{18}$, or PFD) as part of its manufacturing process. PFD also has the two isomers, so the PFMD presents as four distinct peaks, making chromatographic identification quite effective.
    - The cost of PFMCH, PFMD, and PFD has been increasing steadily over the recent years, and the cost of PFT testing is now quite high. It would be useful to decrease the amount pumped from a nominal 1000 ppb (w/v) to a lower concentration.
    - A detection limit study was recently performed on the JR using the EPA method detection limit (MDL) protocols. The study found that the gas chromatograph (GC) has an MDL slightly below 1 part per billion (w/v), which is considerably lower than the older GC used during ODP and the Integrated Ocean Drilling Program (estimated at ~5–10 ppb [w/v]). This implies that JRSO could reduce the amount pumped and still detect the PFT for contamination evaluation purposes.
    - To test this hypothesis, PFT will be pumped at different ratios (relative to the mud pump) during Expedition 398 to evaluate the effective detection limit in recovered material.
- Hydrofluoric acid use on board the JR represents a variety of safety concerns, including the transportation, storage, use, and the disposal of hazardous wastes on the ship. It also requires special medical supplies to be procured (with relatively short expiration dates) and maintained by the ship's doctor. TAS has asked the LWG to revisit the use of hydrogen fluoride (HF) on the JR.
    - The LWG recommended that a set of guidelines previously produced by the LWG and endorsed by JRSO management be reviewed by EPMs, TAS, and the scientists requesting HF before expeditions.
- The LWG also recommended that the use of HF should be limited to instances where it aids in making drilling decisions, such as when HF methods provide ages that are not available from other dating methods. In such cases, the requestor will need to provide evidence that alternative non-HF methods are ineffective. If HF is not required for making drilling decisions, it will not be used onboard.

Geology

The Geology LWG met this quarter to discuss ongoing issues as well as those arising from Expeditions 390/393, 391/397T, and 392.

Expeditions 390/393, 391/397T, and 392

- The Mac used by the stratigraphic correlator needs to be upgraded. This is now on the Technology Services replacement schedule. In addition, the correlator developer is working to port the latest version of the software to run on PCs.
- The paleontologists requested that we open the computers for each microscope to the internet so that they can access critical resources. JRSO will permanently enable those computers to access

specific sites (e.g., NannoTax), but simply opening them to full internet capability was deemed a risk to the instrument software.

Ongoing Issues

- The temperature in the core laboratory was considered too cold by some scientists. TAS measured temperatures in various core-deck laboratory spaces and compared them against the Siem thermostat setpoints. All temperatures were as expected. It is impossible to set temperatures that will satisfy all of our participants, as more granular control of temperature would require a complete overhaul of the HVAC system.
- The LWG discussed image brightness and other image quality issues on the Section-Half Imaging Logger (SHIL). The issue here is that the brightness, gamma, and contrast of the JPG can be altered by the user so the image shows up better on screen or on a printout, and so the JPG images may not be appropriate for color analysis. A suggestion was put forward to create a third JPG, with no user-caused changes, so that this JPG would match the TIF image characteristics. This will be considered by TAS.
- The LWG discussed the poor performance of the new Nanoimages SEM on the ship (see above).
- The LWG discussed the need to replace the older SPOT cameras. There was a consensus that TAS should do so using Zeiss cameras, which will also require creating a new microimage workflow for the scientists.
- The LWG discussed the use of the DMT core imager used during Expeditions 390 and 393. The consensus was that this should not be a permanent tool on the JR. It takes up a lot of space and takes a lot of scientist time to keep it fed and running. The current 360-degree imaging techniques do create distorted images, but their purpose (to compare to Formation MicroScanner [FMS] logs, for example) is fulfilled by the existing images.

Geophysics

The Geophysics LWG met this quarter to discuss ongoing issues as well as those arising from Expeditions 390/393, 391/397T, and 392.

Expeditions 390/393, 391/397T, and 392

- The Agico JR-6A spinner magnetometer had mechanical issues, which were eventually isolated during Expedition 393 and corrected permanently.
- The controls for the ASC Scientific thermal demagnetizer are placed quite high, which is challenging for some scientists. TAS will look for places to relocate the controls, but options are limited.
- The physical properties scientists had problems with the TeKa Berlin TK-04 thermal conductivity system, which was originally attributed to the needle probes. This was eventually traced to a loose ribbon cable internally to the system, and it is now working normally.

Ongoing Issues

- One of the two FMS resistivity imaging tools that Schlumberger keeps on board was damaged recently, and we have no backup. The LWG discussed a number of potential replacement tools, including slimline versions of some of the current tools, but JRSO is waiting for further information from Schlumberger before exploring those options.

- A new wireline heave compensator (WHC) was installed during the Cape Town, South Africa, tie up, and JRSO will work with the Schlumberger engineers on a test plan to ensure it's working smoothly.
- The LWG received an update on the revised advanced piston corer temperature tool (APCT-3) engineering development; this is nearing a prototype stage that can be tested during upcoming cruises.
- The LWG received an update on the XSCAN linescan X-ray imaging project.
- The LWG discussed the Magnetic Susceptibility Sonde (MSS) tool, which continues to have issues.
- The LWG was updated on the hyperspectral linescan camera experimentation (see above).

7. TAMU Technology Services

All employees in the former Development, IT, and Databases (DITD) department transitioned to a unified TAMU Technology Services organization on 1 September 2022. Technology Services oversees JRSO data collection/storage, management, and archiving; maintains IT infrastructure on ship and shore; develops and maintains instrument-specific software for data acquisition; and manages the Program's extensive databases.

Expedition data

LIMS database

Data from Expedition 397T and 397 were added to the LIMS database on shore this quarter. These data are currently under moratorium and available only to the Expedition 391 and 397T scientists and 397 scientists, respectively. No data from 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	1,000	USA	872
2	China	423	China	578
3	Germany	192	United Kingdom	255
4	United Kingdom	114	Germany	208
5	Norway	52	Japan	153
6	France	47	Italy	116
7	Netherlands	44	Canada	93
8	Canada	43	France	81
9	Japan	42	India	50
10	Italy	30	South Korea	48
11	Other	252	Other	296
	Total	**2,239**	**Total**	**2,750**

Table 7.2. Top 20 database web queries

Rank	Janus database		LIMS database*	
	Query	Views	Query	Views
1	Images—core photo	1,549	Samples	1,729
2	Site summary	1,106	Images—core photo	887
3	Physical properties—MAD	1,016	Section summary	758
4	Samples	753	Images—section photo	643
5	Physical properties—GRA	750	Hole summary	575
6	Physical properties—AVS	749	Chemistry—carbonates	554
7	Core summary	716	Core summary	452
8	Physical properties—MSL	677	Physical properties—MAD	350
9	Chemistry—carbonates	657	Physical properties—GRA	305
10	Physical properties—NGR	530	Physical properties—MS	295
11	Chemistry—rock eval	521	Chemistry—interstitial water	263
12	Physical properties—PWL	463	Physical properties—NGR	243
13	Hole trivia	429	X-ray—XRF	187
14	Physical properties—TCON	421	Chemistry—ICP-AES	155
15	Hole summary	419	Paleomag—MSPOINT	144
16	Chemistry—interstitial water	384	Paleomag—SRM-section	131
17	Special holes summary	366	Physical properties—color reflectance	119
18	Sediments—smear slide	329	Chemistry—SRA	106
19	Chemistry—gas	316	Images—thin section	102
20	Physical properties—PWS	309	Images—closeups	102
	Other	2,524	Other	2,263
	Total	**14,984**	**Total**	**10,363**

Table 7.3. Data requests to the TAMU Data Librarian

Requests	Total
How to	3
Data not available	2
High-resolution images	3
Data	1
Seismic and/or Nav	1
Total	**10**

Country	Total
USA	6
Germany	2
France	1
UK	1
Total	**10**

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 Expeditions 397T and 397. The GCR also planned postexpedition sampling for Expeditions 390 and 393 for their basalt sample party, held at the GCR 7–13 November, and for their sediment sample party, to be held at the BCR 16–22 January. Additionally, postexpedition sediment sampling planning was completed for Expedition 395C.

Sample requests and core sampling

This quarter, the GCR hosted a sample party to sample basalt cores collected during Expeditions 390 and 393 during 7–13 November. A total of 27 science party members visited the GCR for the sample party and 2,689 basalt samples were collected. Postexpedition sediment sampling was partially completed this quarter for Expedition 395C scientists, with 1,402 samples collected.

The following table provides a summary of the 3,763 non–sample party 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
097780IODP, Mohan, India	897	2
098400IODP, Klein, USA	33	2
098317IODP, Farley, USA	88	0
098773IODP, Li, China	109	0
098873IODP, Mohan, India	648	0
098856IODP, Chengzhen, China	36	0
098936IODP, Hu, China	369	0
099208IODP, Yu, China	197	0
098835IODP, Kasuya, Japan	133	0
099354IODP, Liu, China	116	0
099390IODP, Bova, USA	151	0
099462IODP, Novak, USA	78	0
099564IODP, Hoogakker, UK	141	0
099602IODP, Chen, China	94	0
099637IODP, Shuai, China	70	0
099696IODP, Si, USA	36	0
099731IODP, Black, USA	46	0
099496IODP, Mershon, USA	21	0
099886IODP, Liu, China	85	0

Sample request number, name, country	Number of samples taken	Number of visitors
099925IODP, Ford, UK	61	0
099986IODP, Liu, China	0	0
100059IODP, Basak, USA	323	0
100271IODP, Leckie, USA	30	0
100538IODP, Himmer, USA	1	0
100484IODP, Harwood, USA	171	1
Tours/demonstrations (6)	6	21
Totals	**3,934**	**26**

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, the GCR had three groups of congressional staffers and Texas A&M University officials, including the university president and chancellor, tour the facilities. Additionally, three groups of Texas A&M student and visiting scientists toured the GCR.

Onshore XRF scanning

During this quarter, 854 core sections and discrete samples were scanned on the XRFs at the GCR. All of this scanning was programmatic scanning for joint Expeditions 390 and 393, including cores collected at their sites during Expeditions 390C and 395E. 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	390/390C/393/395E, Lowery, Reece, Guerin, Wang, McIntyre, Robustelli Test, Lam, Koorapati, Kaplan, Amadori, Routledge, Villa, Estes, Sylvan, Williams, Thompson, Yeon, Wee	276	578	14	0
Totals		**276**	**578**	**14**	**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
Scientific Prospectuses		
Preliminary Reports	10.14379/iodp.pr.397T.2022 10.14379/iodp.pr.390.2022	
Expedition Reports		
Data Reports	10.14379/iodp.proc.367368.204.2022 10.14379/iodp.proc.353.203.2022 10.14379/iodp.proc.385.201.2022	

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 fourth quarter of FY22, the IODP TAMU website received 348,306 page views and 34,696 site visits, and the IODP Publications website received 551,042 page views and 60,517 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.

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 Q4 page views*	FY22 Q4 site visits*
www-odp.tamu.edu	348,652	34,777
www.odplegacy.org	4,458	3,361
www.deepseadrilling.org	73,137	11,598
Total	**426,247**	**49,736**

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

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	October 2022	November 2022	December 2022	FY23 Q1 total
IODP	10.14379	12,260	12,612	13,630	**38,502**
Integrated Ocean Drilling Program	10.2204	11,640	13,851	14,958	**40,449**
ODP/DSDP	10.2973	33,304	27,420	29,562	**90,286**

Table 9.4. Top 10 IODP DOIs resolved during FY23 Q1

DOI (10.14379)	Resolutions	Title
10.14379/IODP.PROC.385.2021	440	*Proceedings* Volume 385: Guaymas Basin Tectonics and Biosphere
10.14379/IODP.PROC.378.2022	437	*Proceedings* Volume 378: South Pacific Paleogene Climate
10.14379/IODP.PROC.367368.2018	411	*Proceedings* Volume 367/368: South China Sea Rifted Margin
10.14379/IODP.PR.396.2022	376	*Preliminary Report:* Expedition 396 Mid-Norwegian Margin Magmatism and Paleoclimate Implications
10.14379/IODP.SP.397.2022	305	*Scientific Prospectus*: Expedition 397 Iberian Margin Paleoclimate
10.14379/IODP.PR.390.2022	295	*Preliminary Report*: South Atlantic Transect 1
10.14379/IODP.PROC.363.2018	292	*Proceedings* Volume 363: Western Pacific Warm Pool
10.14379/IODP.SP.398.2022	292	*Scientific Prospectus*: Expedition 398 Hellenic Arc Volcanic Field
10.14379/OMANDP.PROC.2020	224	Oman Drilling Project
10.14379/IODP.PROC.382.2021	212	*Proceedings* Volume 382: Iceberg Alley and Subantarctic Ice and Ocean Dynamics

ScienceOpen

Integrated Ocean Drilling Program and IODP expedition reports and data reports are indexed at ScienceOpen.

Table 9.5. 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	Number of authors	Referenced articles
Proceedings of the International Ocean Discovery Program collection	816	22,253	2,001	9,541
Scientific Ocean Drilling Expedition Research Results collection	9,629	52,730	20,913	98,886

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.

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 1.8 TB of data and more than 8.1 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 40,500 records for Program-related scientific ocean drilling publications from 1969 to the present.

Table 9.6. Scientific Ocean Drilling Bibliographic Database statistics

Program-related publications	October 2022	November 2022	December 2022	FY23 Q1 total
Searches	283	325	177	**785**
Citation views	165	259	103	**527**

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 301–399. 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**).

American Geophysical Union Fall Meeting

- Bova, S.C., Rosenthal, Y., Riechelson, H, Karas, N., Clementi, V.J., **Childress, L.B.**, and Expedition 379T Participants. Abrupt changes in southeast Pacific surface and intermediate water properties during Termination 2. Presented at the American Geophysical Union Fall Meeting, 12–16 December, Chicago, IL.
- Brachfeld, S., Libman-Roshal, O., Hodge, A., Doherty, C., Nichols-O'Neill, S., Reilly, B.T., Tauxe, L., Weber, M., Raymo, M.E., Peck, V.L., **Williams, T.**, Bailey, I., Hemming, S.R., O'Connell, S., Kaplan, M.R., Licht, K., and IODP Expedition 382 Scientists, 2022. Late Pleistocene atmosphere-ocean-ice sheet coupling in the Scotia Sea: unraveling the magnetic susceptibility-ice core dust correlation. Presented at the American Geophysical Union Fall Meeting, 12–16 December, Chicago, IL.

- Chen, A.J., Hemming, S.R., **Williams, T.**, and Davis, E.P., 2022. Reconstructing East Antarctic Ice Sheet dynamics during the Late Miocene using iceberg-rafted detritus in ODP Site 1165. Presented at the American Geophysical Union Fall Meeting, 12–16 December, Chicago, IL.
- Coggon, R.M., Sylvan, J.B., Teagle, D.A.H., Reece, J.S., **Estes, E.R.**, **Williams, T.**, Christeson, G.L., and the South Atlantic Transect IODP Expedition 390 and 393 Scientists, 2022. The South Atlantic Transect: multidisciplinary experiments from ridge crest to margin drilled by joint IODP Expeditions 390/393. Presented at the American Geophysical Union Fall Meeting, 12–16 December, Chicago, IL.
- Jamson, K., Sessa, J.A., Fraass, A.J., **LeVay, L.**, and Peters, S.E., 2022. The extending Ocean Drilling Pursuits (eODP) project: spatial distribution of biogenic sediments through the Cenozoic. Presented at the American Geophysical Union Fall Meeting, 12–16 December, Chicago, IL.
- McKay, R.M., Patterson, M., Grant, G.R., Turton, N., van de Flierdt, T., Jimenez, F.J., Keller, E.D., Golledge, N.R., Naish, T., Levy, R.H., Dunbar, GB., Riesselman, C.R., Duke, G., Sullivan, N.B., Meyers, S.R., **Williams, T.**, and Escutia, C., 2022. Eccentricity modulation of East Antarctic Ice Sheet in Wilkes Land over the past 6 million years. Presented at the American Geophysical Union Fall Meeting, 12–16 December, Chicago, IL.
- N, L., Rahaman, W., Hemming, S.R., Hall, I.R., Goldstein, S.L., Meloth, T., Starr, A., Hines, S., Paul, A., Charles, C.D., Coenen, J., Prabhat, P., Gruetzner, J., Jimenez, F.J., **LeVay, L.**, Tarique, M., and Expedition 361 Scientists, 2022, Dramatic changes in deepwater circulation of the Southern Ocean since Late Miocene. Presented at the American Geophysical Union Fall Meeting, 12–16 December, Chicago, IL.
- **Penkrot, M.L.**, Roehl, U., Kubo, Y., **Percuoco, V.P.**, and **Broyles, C.**, 2022. Curation and accessibility of International Ocean Discovery Program cores, samples and data. Presented at the American Geophysical Union Fall Meeting, 12–16 December, Chicago, IL.
- Sessa, J., Fraass, A.J., **LeVay, L.J.**, Peters, S.E., and Jamson, K., 2022. The extending Ocean Drilling Pursuits (eODP) Project: Synthesizing scientific ocean drilling data. Presented at the American Geophysical Union Fall Meeting, 12–16 December, Chicago, IL.
- Sproson, A., Yokoyama, Y., Miyairi, Y., Aze, T., Clementi, V.J., Riechelson, H., Bova. S.C., Rosenthal, Y., **Childress, L.B.**, and Expedition 379T Scientists, 2022. Southern Hemisphere pacing of global climate during the Late Pleistocene. Presented at the American Geophysical Union Fall Meeting, 12–16 December, Chicago, IL.
- Tarabein, L., **Williams, T.**, Hemming, S.R., Jasper, C.E., Tessler, M., Raymo, M.E., Weber, M., and the Expedition 382 Science Party, 2022. Provenance of iceberg rafted detritus peaks during Termination 1 at Antarctica's Iceberg Alley Site U1537. Presented at the American Geophysical Union Fall Meeting, 12–16 December, Chicago, IL.

Articles authored by JRSO staff

- Armbrecht, L., Weber, M.E., Raymo, M.E., Peck, V.L., **Williams, T.**, Warnock, J., Kato, Y., Hernández-Almeida, I., Hoem, F., Reilly, B., Hemming, S., Bailey, I., Martos, Y.M., Gutjahr, M., Percuoco, V., Allen, C., Brachfeld, S., Cardillo, F.G., Du, Z., Fauth, G., Fogwill, C., Garcia, M., Glüder, A., Guitard, M., Hwang, J.-H., Iizuka, M., Kenlee, B., O'Connell, S., Pérez, L.F., Ronge, T.A., Seki, O., Tauxe, L., Tripathi, S., and Zheng, X., 2022. Ancient marine sediment DNA reveals diatom transition in Antarctica. Nature Communications, 13(1):5787. **https://doi.org/10.1038/s41467-022-33494-4**
- Gille-Petzoldt, J., Gohl, K., Uenzelmann-Neben, G., Grützner, J., Klages, J.P., and the IODP Expedition 379 Scientists [including **M. Penkrot**], 2022. West Antarctic Ice Sheet dynamics in the Amundsen Sea

sector since the Late Miocene—tying IODP Expedition 379 results to seismic data. Frontiers in Earth Science, 10. **https://doi.org/10.3389/feart.2022.976703**

- Yang, T., Dekkers, M.J., Zhao, X., **Petronotis, K.E.**, and Chou, Y.-M., 2022. Greigite formation modulated by turbidites and bioturbation in deep-sea sediments offshore Sumatra. Journal of Geophysical Research: Solid Earth, 127(11):e2022JB024734. **https://doi.org/10.1029/2022JB024734**

Appendix: JRSO quarterly report distribution

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