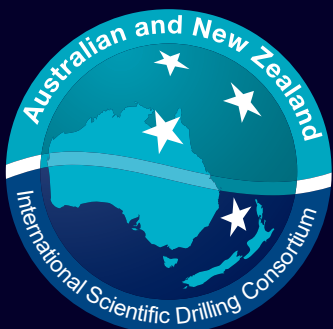




**ANNUAL REPORT**



# Australian & New Zealand International Scientific Drilling Consortium

**2024**



## ANZIC Office

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[iodp.org.au](http://iodp.org.au)

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Above: Chris Lyons, IODP, Sarah Kachovich.

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# ANZIC Chair's Overview

Through 2024, ANZIC has continued to adapt to the changing national and international environment through a period defined by both 'lasts' and new beginnings. With the conclusion of the International Ocean Discovery Program (IODP) and the emergence of fresh opportunities, 2024 stands as a testament to our community's resilience, collaboration, and commitment to discovery.

As we enter 2025, the ANZIC community is driven by a clear sense of purpose. Our robust local and international network ensures effective participation and leadership in the global dialogue on the future of ocean drilling through international partnerships. I am confident that ANZIC is well-positioned to continue its vital role in international drilling infrastructure and research.

Australia has now joined the International Continental Scientific Drilling Program (ICDP), alongside New Zealand and over 20 other countries. This membership extends the ANZIC remit, offering new opportunities for collaboration and a broader perspective on the key scientific challenges for our region.

Our ANZIC office team, based at the Australian National University, has experienced some changes this year but has continued to operate effectively despite transitional arrangements. I want to thank the team for their dedication

and professionalism in maintaining a vibrant, connected, and efficient operating environment through these changes.

This year, ANZIC proudly supported six participants on four major expeditions to the Arctic, Antarctica, Japan Trench and the Mediterranean. These journeys, undertaken by our scientists and outreach officers, exemplify the spirit of exploration and knowledge-sharing that underpins our mission. Each expedition not only advanced marine geoscience but also amplified Australia and New Zealand's presence in crucial global research initiatives. Our delegates continue to foster international partnerships, ensuring ANZIC remains at the forefront of ocean discovery.

2024 marked a significant evolution in our support for research with the introduction of CORE funding, formerly known as AILAF grants. ANZIC awarded grants to 15 projects across Australia and New Zealand, enabling a diverse array of innovative research. These grants have directly supported early-career scientists, established researchers, and cross-disciplinary teams, catalysing new insights into our marine environments. The impact of CORE funding is already evident in the breadth of studies underway, strengthening ANZIC's reputation for fostering excellence and collaboration across borders.



Our commitment to education and capacity-building has delivered two successful Marine Geoscience Masterclasses, engaging 46 students in hands-on learning and advanced training. These masterclasses, delivered in partnership with leading institutions, have inspired the next generation of marine scientists and built enduring networks within our community. Additionally, ANZIC funded seven students to participate in international training opportunities, expanding their horizons and equipping them with essential leadership skills. Our support for the JR Academy enabled five First Nations students and three mentors to take part in this transformative program.

As we mark the end of IODP (October 2013 – September 2024), it is fitting to reflect on a program that has shaped global marine geoscience for over a decade. In collaboration with 21 countries, ANZIC contributed to 58 expeditions, sent 81 expeditioners into the field, and helped recover an astonishing 98,915 metres of core. These accomplishments have deepened

our understanding of Earth's history, climate, and ocean dynamics, cementing our reputation as a leader in international research. The many 'lasts' noted in this year's annual report – such as the final voyage of the *JOIDES Resolution* – are poignant reminders of the enduring legacy of IODP and the new chapter now unfolding. We remain steadfast in our commitment to scientific excellence, diversity, and international partnership.

On behalf of the ANZIC Executive and the broader consortium, I extend heartfelt thanks to our members, community, staff, partners, and supporters. Your passion, expertise, and collaboration have made 2024 a landmark year. Thank you for your ongoing commitment to advancing marine geoscience and for your invaluable role in shaping our future together.

Dr Jonathon Law  
ANZIC Chair

# ANZIC Director's Report

2024 was undoubtedly another successful year for ANZIC. Our numerous achievements were, however, tempered by some major changes, most notably the retirement of the revered scientific drilling vessel *JOIDES Resolution* and the end of the decade-long International Ocean Discovery Program (IODP). There were three final *JR* expeditions in 2024 and during the final IODP Forum, held in Shizuoka, Japan, in September, the community resolved to maintain opportunities for collaboration and coordination, and to build a vision for a future unified scientific ocean drilling program.

Change fortunately tends to bring new beginnings and, for ANZIC, new opportunities do exist.

In early 2024, Australia became a member of the International Continental Scientific Drilling Program (ICDP), finally catching up with New Zealand, who joined in 2009. To give this new membership the best chance of a flying start, we held a successful ICDP-Australia planning workshop in Adelaide in June.

Throughout 2024, planning for the Europe/Japan led International Ocean Drilling Programme (IODP<sup>3</sup>) continued. ANZIC was well represented at a proposal planning workshop in the picturesque seaside town of Nachikatsuura, Japan, in March. Ideas that we brought to

the workshop are progressing to proposals, including under the new 'Scientific Projects using Ocean Drilling Archives' (SPARC) initiative, which will support projects utilising legacy core materials and data.

Meanwhile, the US National Science Foundation is progressing plans to establish a new Scientific Ocean Drilling Coordination Office and first steps were taken towards a long-term plan to replace the *JOIDES Resolution*.

Following the launch of China's new scientific drilling vessel, *Meng Xiang*, in late 2024, we eagerly await their decadal strategy that will capture science priorities through to the middle of the next decade.

Through all of this, the Australian component of ANZIC commenced the transition from funding through the Australian Research Council Linkage Infrastructure Equipment and Facilities program to new funding, through AuScope, from the Australian Government's National Collaborative Research Infrastructure Strategy.

As a consortium, both Australia and New Zealand have continued to support our scientists, particularly those early in their careers, to participate in training opportunities both locally



and globally. A highlight in 2024 has been the establishment of a collaboration with CSIRO's Marine National Facility and the University of Tasmania's Institute of Marine and Antarctic Studies that will see the return of the CAPSTAN postgraduate at-sea training initiative on *R/V Investigator*. My predecessor in this role, Leanne Armand, would be proud that an innovative program that she worked so hard to initiate will be returning in 2025.

The ANZIC Office did not escape change. After several years as ANZIC Administrator, Kelly Kenney made the tough call mid-year to move to new challenges. Liz Arnold jumped onto the steep ANZIC learning curve in November as she took on the slightly revamped ANZIC Coordinator role. Kelly-Ann Lawler also made a significant contribution during her six months with us while our Program Manager, Sarah Kachovich, redirected her energy to the excitement of parenthood.

ANZIC's own Forum in 2024 celebrated the long-term success of ANZIC IODP Legacy Analytical Funding, which has seen us grant \$2.3 million to 126 projects since 2013.

For me personally, 2024 ended with seven weeks of excitement aboard *DV Chikyu* as part of the science team on Expedition 405 to the Japan Trench. It was a real thrill to be there as the final IODP core was brought on deck and I now have first-hand experience of why so many in this community put so much energy and passion into our efforts to secure precious samples from below the Earth's seafloor and surface.

Dr Ron Hackney  
ANZIC Director



# GeoDiscoveryNZ Report

It's been an incredible honour to serve as the GeoDiscoveryNZ Chair for the past eight years and to contribute to the vibrant Aotearoa New Zealand Earth science community. I'm proud to have strengthened the partnership with Australia through ANZIC and advanced international collaborations to deepen our understanding of climate systems and natural hazards. These initiatives have ensured New Zealand leads in Earth science innovation and inspires the next generation of scientists.

This year has been especially exciting for GeoDiscoveryNZ, with participation in expeditions, workshops driving proposal development, awarding grants, and championing leadership opportunities. We also contributed to shaping the future by submitting recommendations to the Science System Advisory Group tasked with advising the New Zealand Government.

Māori science students Pianina Kahui-McConnell (Auckland University of Technology *Te Wānanga Aronui o Tāmaki Makau Rau*) and Rāwinia Wikaira (The University of Otago *Ōtākou Whakaihu Waka*), along with their mentor Jesse-James Pickery, joined First Nations participants from Australia, North, and South America aboard the JR Academy (Expedition 402T) in April. This reimagined JR Academy marked a groundbreaking initiative for IODP, blending Indigenous and Western scientific perspectives through education and communication. Focused on fostering cross-cultural learning and collaboration, the expedition underscored the power of shared knowledge among undergraduate students. Building on the experiences aboard *JOIDES Resolution*, GeoDiscoveryNZ is exploring with New Zealand

and Australian participants co-creating forums to cultivate a vibrant trans-Tasman and trans-Pacific (including Pasifika) scientific community.

In November, the Sensitivity of the West Antarctic Ice Sheet to 2°C warming (SWAIS-2C) ICDP team deployed to Antarctica for its second drilling season under the co-leadership of Richard Levy (GNS and Victoria University, Wellington). Antarctica NZ delivered all equipment to the drill site at the Kamb Ice Stream. In late-December, the team broke through the 580 m thick ice shelf with their state of the art hot-water drilling system and collected several cores before serious technical challenges halted progress (see page 28).

GeoDiscoveryNZ proudly supported student attendance at Northern Hemisphere Summer Schools providing transformative opportunities to deepen knowledge, gain hands-on experience, and build global academic networks. This year we supported participation in the ECORD Urbino Summer School in Paleoclimatology, the GLASS programme on glacial sedimentation, and the ECORD Summer School on Downhole Logging. I invite you to dive into the participants' feedback, [provided in this Report](#) (see pages 50-51), to appreciate the invaluable insights gained from engaging with global experts and analysing real-world data.

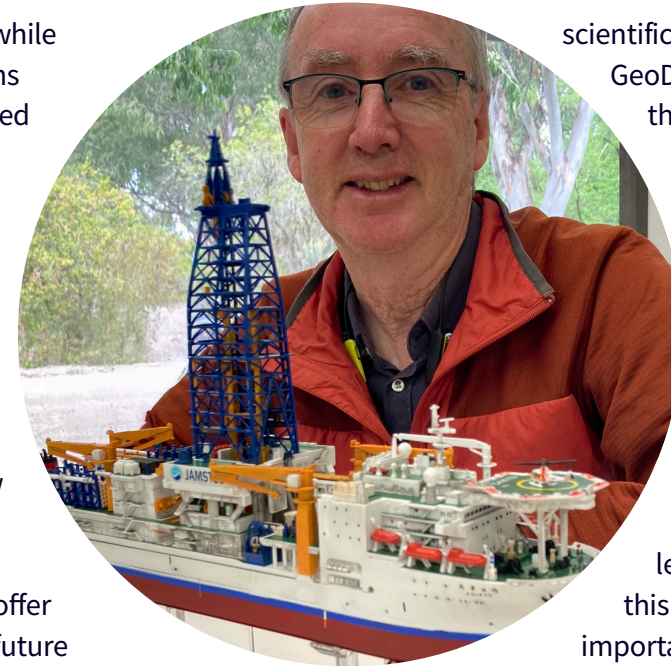
Craig Miller (GNS) and Rupert Sutherland (Victoria University, Wellington) participated in the inaugural ICDP Australia Workshop held in Adelaide in June (see page 60). Drawing on New Zealand's long-standing involvement with ICDP, Craig shared insights from establishing the 'Connections Among Life, Geo-Dynamics and Eruptions in a Rifting Arc'

(CALDERA) ICDP Project, while Rupert reflected on lessons learned from the completed Alpine Fault Deep Fault Drilling Project (DFDP). New Zealand's location on an active plate boundary provides a compelling modern counterpart to the ancient tectonics of the Australian continent. New Zealand's young climate records, active tectonics, and geothermal systems offer exceptional potential for future comparative ICDP proposals.

The GeoDiscoveryNZ and ANZIC CORE Funding program supports projects leveraging decades of ocean and continental drilling samples and data. This year's grants funded diverse initiatives, including a bathymetry exploration kit, studies on organic carbon export in fjords, earthquake records in Fiordland sediment cores, and shifts in Pacific Plate subduction at the Hikurangi Margin over the past 1 million years.

We're thrilled to have supported the next generation of students in attending the ANZIC Masterclass in Queensland (January and December). This exciting geo-education course, focused on scientific drilling, is tailored for top-performing undergraduate students. Participants included students from three member universities, and we were delighted to extend sponsorship to an additional student from Waikato University, a non-member, for the January session.

GeoDiscoveryNZ advocated for a fully funded, inclusive, and globally connected Science, Innovation, and Technology System in our May submission to the New Zealand Governments Science System Advisory Group. As a consortium representing New Zealand in the international



scientific drilling organisations, GeoDiscoveryNZ highlighted the value of international partnerships and investments in world-class research infrastructure. These efforts advance understanding of key geological processes, support high-impact research on earthquake dynamics and climate change, and foster collaborations with global leaders. To sustain and grow this impact, we emphasised the importance of long-term support for research infrastructures, data and sample curation, and the development of diverse talent, including early-career, Māori, and Pasifika scientists.

GeoDiscoveryNZ was present at the Geosciences Society of New Zealand annual conference (25-28 November), held in Ōtepoti Dunedin. Our vibrant booth highlighted the diverse and exciting activities we support.

I want to extend my heartfelt thanks to the members of the GeoDiscoveryNZ Committee, Marianna Terezow (GNS), Jenny Woodward (GNS legal), Nida Templonuevo (GNS Finance), the Aotearoa New Zealand Earth science community, and our trans-Tasman partners for your unwavering dedication to advancing our combined research efforts. Know that your commitment to turning scientific drilling into impactful action for people and the planet is valued and continues to make a profound difference.

Handwritten signature of S. Henrys.

Dr Stuart Henrys  
New Zealand Lead Representative and  
GeoDiscoveryNZ Chair

# About ANZIC

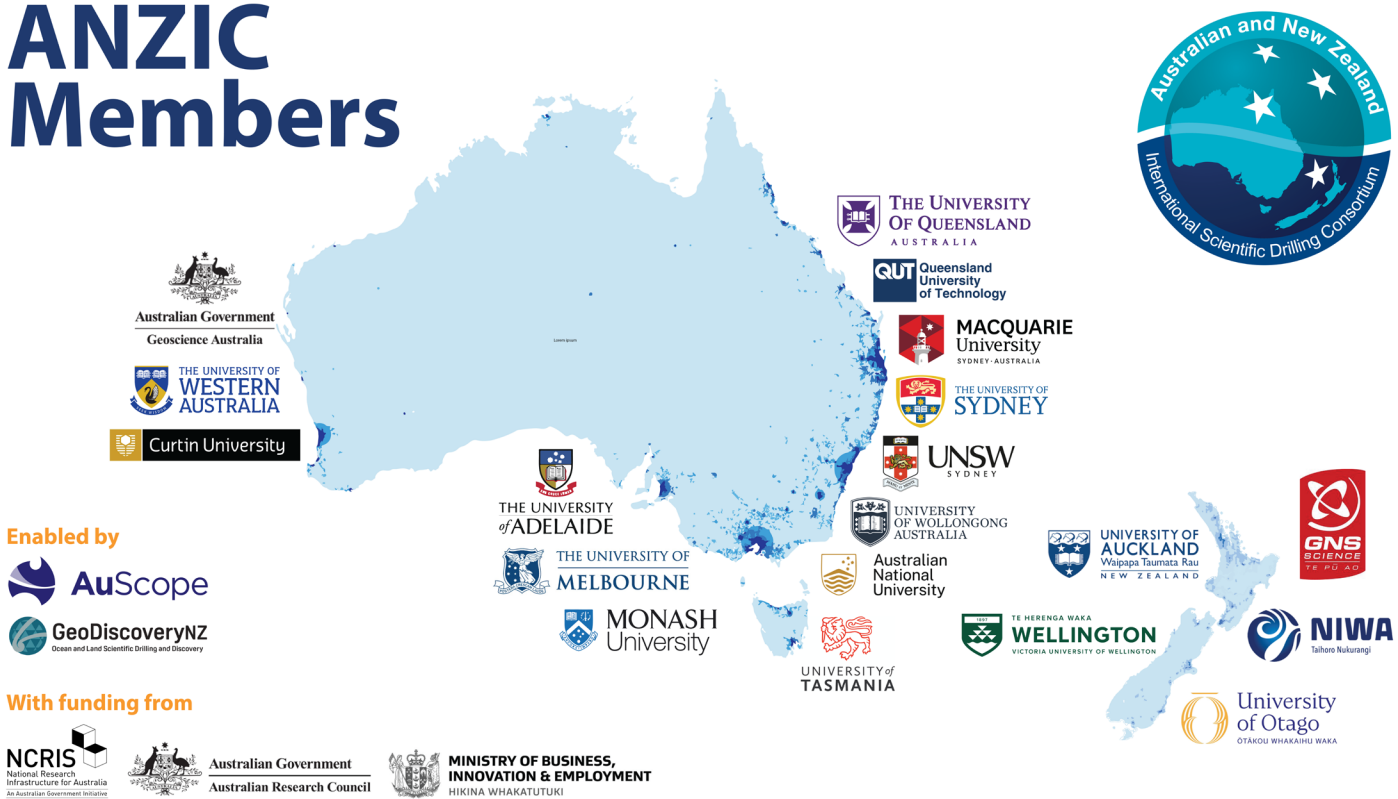
ANZIC is the Australian & New Zealand International Scientific Drilling Consortium. ANZIC gives scientists in Australia and New Zealand access to international projects harnessing state-of-the-art scientific drilling infrastructure, so they can address fundamental questions about Earth’s dynamic history, processes, structure and future.

## ANZIC Membership

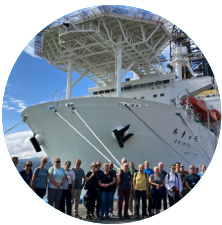
Hosted by the Australian National University, ANZIC is a strategic collaboration between 19 of Australia and New Zealand’s leading universities and scientific organisations.

Our thriving and passionate community is highly engaged, working in unison to advance geoscience in our region and beyond.

## ANZIC Members

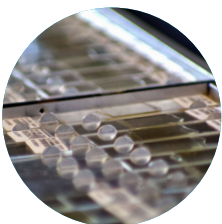


# What We Do



## Connect scientists with scientific drilling infrastructure

Participating in international expeditions of large, specialised coring vessels provides unique research opportunities to Australian and New Zealand scientists. We fund travel, berth costs, and up to \$40,000 for analytical work on the samples and cores obtained. In 2024, ANZIC-sponsored expeditioners participated in four expeditions, from the poles to the Mediterranean (see pages 18-29).



## Fund and support studies of previously-collected ocean drilling samples and data

Further analysis of legacy samples reveals answers to critical scientific questions and rapidly delivers research results in a wide variety of fields. In 2024, we enabled 15 groundbreaking projects by awarding nearly \$300,000 across Australia and New Zealand (see pages 34).



## Equip the next generation of scientists

Facilitating specialist international training opportunities for exceptional students and early career scientists ensures our region has the skills needed to continue to benefit from scientific drilling programs in the future. In 2024, we inspired 46 students in our Marine Geoscience Masterclasses, funded seven students to attend international training, and supported five First Nations students and three mentors on the transformative 'JR Academy' (see pages 42-52).



## Advocate for drilling proposals focused on our region

To align future international scientific drilling projects with the needs of Australian and New Zealand scientists and policy makers, ANZIC actively supports researchers to develop, submit and progress IODP & ICDP proposals (see pages 16-17).



## Nurture international scientific relations and synergies

We organise and attend global events (see pages 58-63 & 68-69) and represent our region on key collaborative boards (see pages 66-67).

## Expand our understanding of Earth

In 2024, ANZIC-affiliated researchers continued to expand the frontiers of our knowledge of Earth’s dynamic history, processes, structure and future, with hundreds of significant papers published using IODP & ICDP science.



# Australia Joins International Continental Drilling

Scientists in Australia now have access to a more complete understanding of our planet, with Australia becoming a member of the International Continental Scientific Drilling Program (ICDP).

After years of planning, the historic agreement was signed in May. Australia joins more than 20 other countries, including New Zealand, as members of ICDP – a monumental international scientific collaboration uncovering geological secrets from beneath our continents through targeted scientific drilling.

“This international effort is an exciting and significant moment. The Australian research community is eager to be part of continental drilling projects,” said Ron Hackney, ANZIC Director.

“Some important questions about our planet, environment and climate can’t be answered without the deep core samples accessed by this program.”

The commitment, amounting to \$1.2 million AUD over four years, is provided through AuScope who is enabled by the Australian Government’s National Collaborative Research Infrastructure Strategy (NCRIS).

“AuScope is very excited to enable Australian membership of ICDP. We see this is a critical opportunity for Australian researchers. It will

provide international collaborative opportunities for our geoscience research community who have a long history in deep Earth sampling in the Australian context,” said Dr Tim Rawling, CEO of AuScope.

“We are thrilled to welcome Australia to ICDP,” said ICDP Executive Director, Professor Marco Bohnhoff. “Their participation will enhance our collective efforts to unravel the Earth’s mysteries and address global challenges.”

“While there had been collaborations with Australian geoscientists on a project level in the past, joining the continental drilling community will open up new opportunities to tackle ICDP’s key science themes that focus on deciphering geohazards and Earth evolution as well as

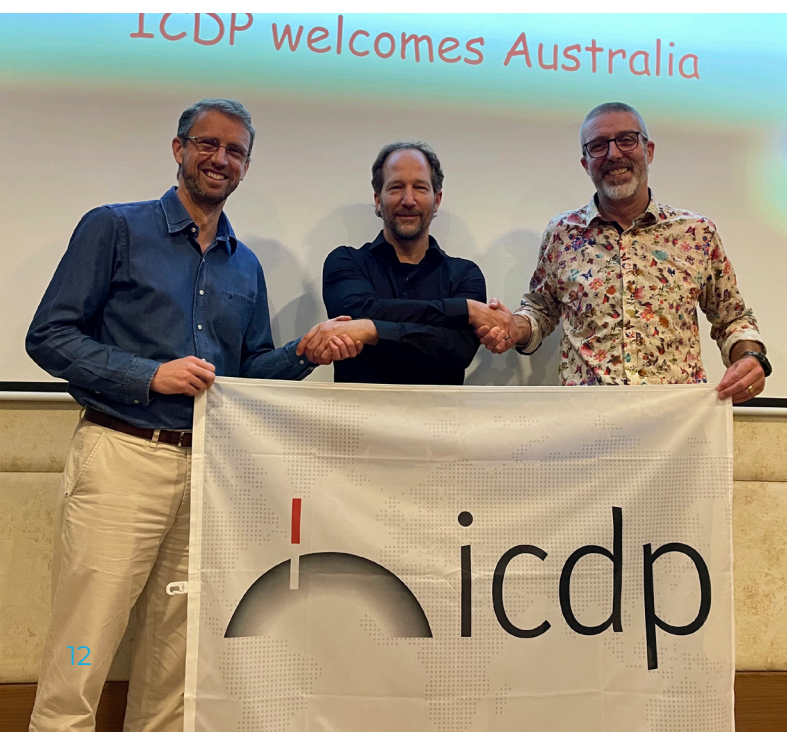
mitigating global warming and contributing to the energy transition.”

Ron added: “Together, this gives us new opportunities to examine our coastal zones, to better understand the interplay between freshwater and saltwater, patterns of drought and increased bushfire risk, and safeguard our coastal communities and infrastructure.”

“It’s an important opportunity for our scientists to participate in world-class projects around the globe and bring the knowledge and expertise home.”

To kickstart Australia’s participation, ANZIC coordinated the ICDP Australia Workshop in June – see page 60 for more.

NZ has been a member of ICDP since 2009. The Deep Fault Drilling Project probed nearly 1.5 km into the Alpine Fault.



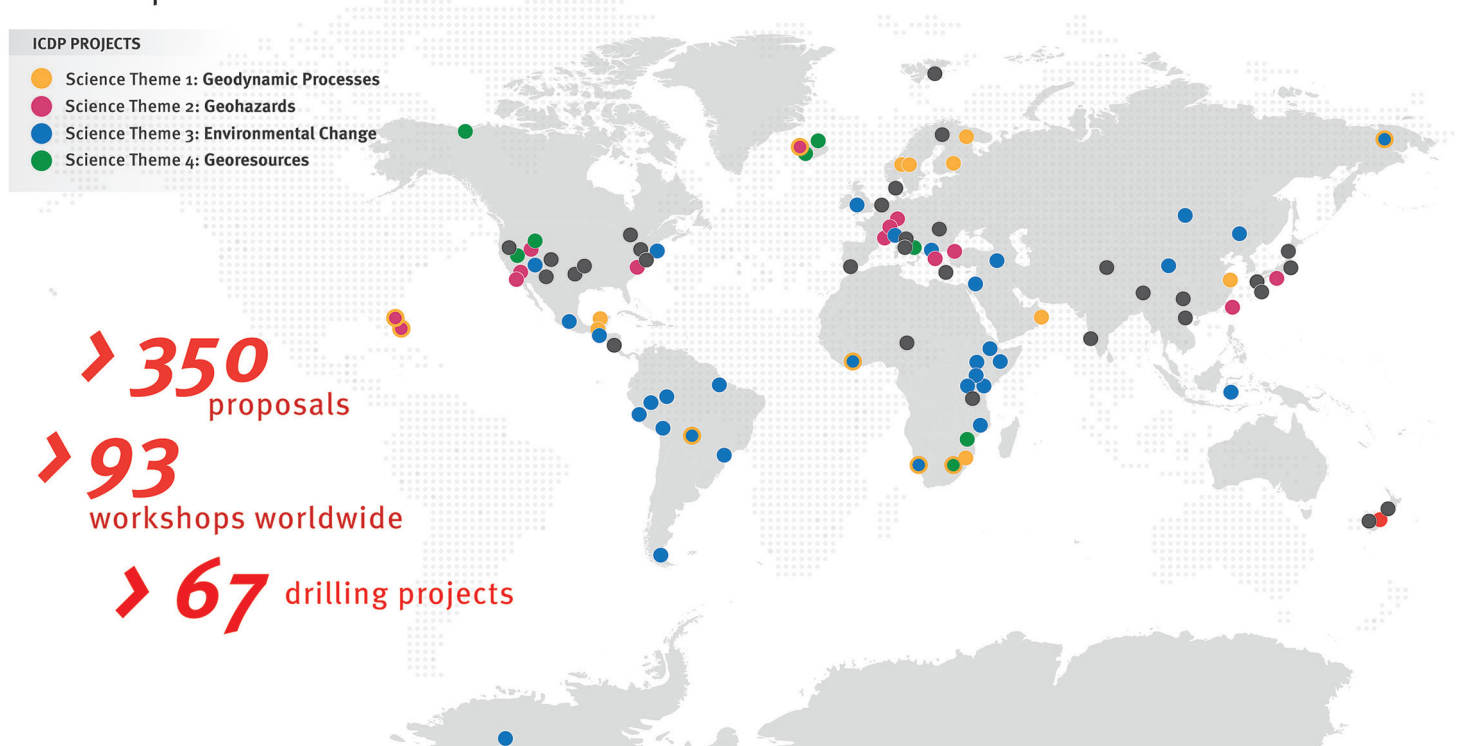
## ICDP PROJECTS

- Science Theme 1: Geodynamic Processes
- Science Theme 2: Geohazards
- Science Theme 3: Environmental Change
- Science Theme 4: Georesources

> 350 proposals

> 93 workshops worldwide

> 67 drilling projects





# EXPLORE

Beneath the Earth's surface lie records of 200 million years of Earth's climatic, biological, chemical, and geological history – just waiting to be explored!

International scientific drilling programs give scientists access to these deep Earth records via sub-surface data and core samples of sediment, rock, fluids and living organisms.

Using these, we can transform our understanding of Earth's dynamic history, processes and structure to inform our future.

For scientists in Australia and New Zealand, ANZIC facilitates this deep Earth discovery by funding and supporting:

- development of proposals for drilling new sites that address globally significant scientific questions
- active participation in international scientific drilling expeditions and projects, ensuring strong representation from our region
- post-drilling research and collaborative analysis of new and legacy samples and data, fostering integration of results into broader Earth science outcomes and global impacts.

Photo credits:  
Thomas Ronge, IODP, JRSO (left)  
IODP, JRSO (centre)  
Ana Tovey, SWAIS (right)





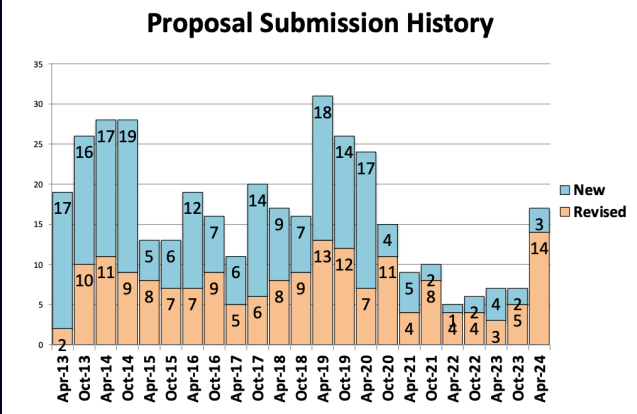
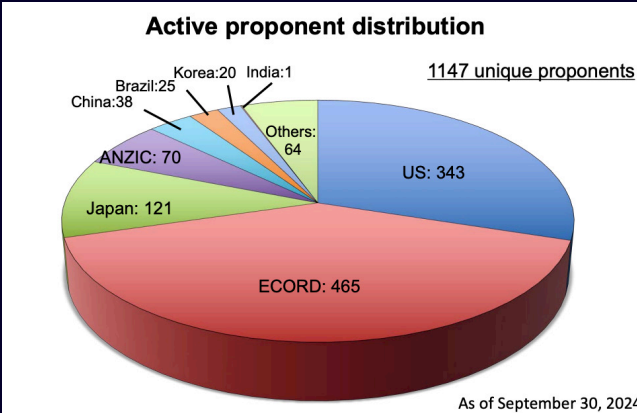
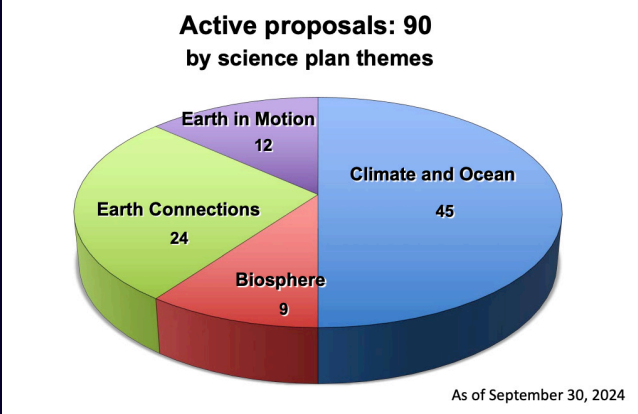
# Ocean Drilling Proposals

2024 was a pivotal year for ocean discovery, with the International Ocean Discovery Program (IODP) reaching its formal conclusion on September 30 after 11 years of operations. This marked the end of a transformative era in Earth science, where IODP facilitated groundbreaking research into climate history, plate tectonics, and deep biosphere dynamics through global drilling expeditions. The program's closure paves the way for the successor initiatives, including the International Ocean Drilling Programme (IODP<sup>3</sup>), set to launch on January 1, 2025, ensuring continuity in international collaboration.

At the program's end, the IODP system housed 90 active drilling proposals, representing a robust pipeline of scientific inquiries poised for future exploration. These proposals underscore the program's enduring impact, with diverse topics ranging from geohazards and paleoceanography

to microbial life in extreme environments. Notably, ANZIC demonstrated strong leadership and participation: six proposals were led directly by ANZIC scientists, while 70 involved researchers from ANZIC-affiliated institutions.

Looking ahead, many of these active proposals will transition into the new framework, promising continued innovation. ANZIC's contributions not only enriched IODP's final phase but also positioned the consortium as a key player in the evolving landscape of ocean drilling science.



# Continental Drilling Proposals

There are currently two active International Continental Drilling Program (ICDP) proposals in New Zealand.

## Connections Among Life, geo-Dynamics and Eruptions in a Rifting Arc caldera (CALDERA)

The CALDERA initiative seeks to uncover how magmatism, rifting, hydrothermal systems, and the deep biosphere interact within the Okataina Volcanic Centre. This ICDP-supported project proposes scientific drilling and long-term monitoring to close global knowledge gaps, improve volcanic and seismic hazard assessments, and guide sustainable management of geothermal resources. "A key feature of the project will be to co-design with mana whenua, interweaving mātauranga Māori and Western science," notes lead proponent, Dr Cécile Massiot (GNS Science).

To support CALDERA site surveys, GNS researchers deployed a dense nodal seismic array (borrowed from the AuScope National Research Facility for Earth Imaging) across the Paeroa Fault, one of the Taupō

Rift's most active structures. This work provides critical insights into subsurface velocity, fault geometry, and fluid pathways, informing the next stage of drilling design. The project is supported by a grant from the National Hazard Commission Toka Tū Ake.

## Fiordland Assessment of Climate, Environment and Tectonics (FACET)

Fiordland's fjords are global carbon cycle hotspots, storing more organic carbon per unit area than any other ecosystem. This 'blue carbon' is vital for climate regulation, yet its capacity is increasingly threatened by climate change and catchment management. FACET, led by Dr Chris Moy (University of Otago) in collaboration with GNS Science, Ngāi Tahu, Fiordland Marine Guardians, and international partners, aims to quantify Fiordland's carbon sink and assess its sensitivity to freshwater inputs and climate variability.

Building on an ICDP workshop held in August–September 2023, the project focuses on recovering long sedimentary archives to reconstruct climate, tectonic activity, and carbon burial over tens of thousands of years. Recent high-resolution seismic surveys in Doubtful Sound have mapped basin geometry and sedimentary architecture, critical for estimating carbon storage and guiding future drilling.

Recovered cores may also hold untapped records of past earthquakes, offering insights into seismic hazard. FACET will help shape strategies to protect Fiordland's carbon reservoir and advocate for the inclusion of fjords in carbon accounting schemes.



Sampling in Doubtful Sound  
Photo provided by: Christina Riesselman

# Expeditions

By participating in international scientific drilling expeditions, scientists from Australia and New Zealand gain unparalleled opportunities to advance their research as part of an integrated science party. ANZIC selects scientists with critical expertise and pertinent research focus to ensure the success of each expedition, and maximise the return on investment for our region.

## ANZIC Expeditioners

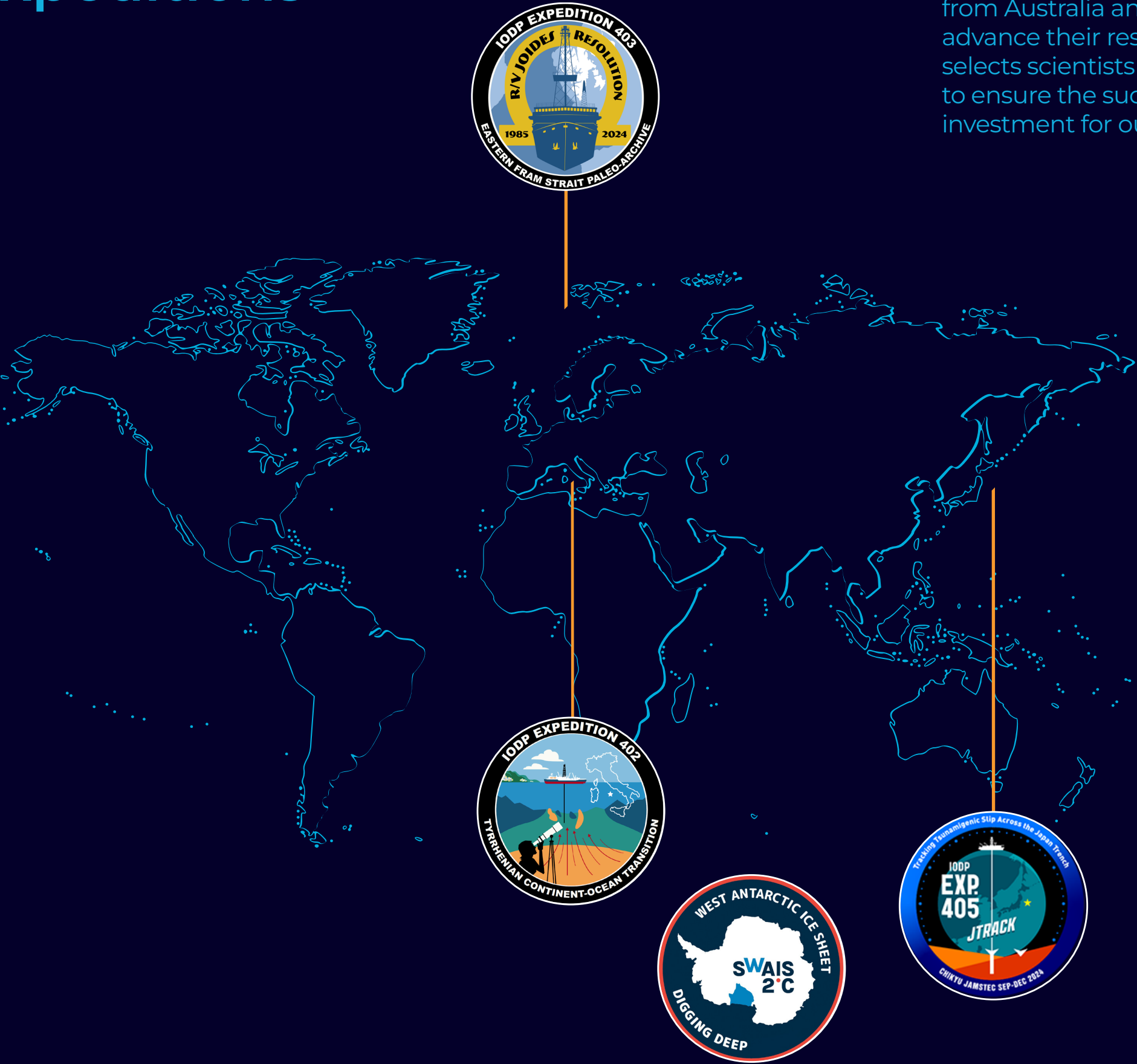
From the Arctic circle to beneath the Antarctic’s Ross Ice Sheet; from the depths of Japan’s Hadal trench to the Mediterranean Sea, ANZIC-supported expeditioners retrieved and analysed critical core samples from some of the world's most important and challenging environments.

In 2024, ANZIC-sponsored specialists participated in four expeditions:

- IODP Expedition 402: Tyrrhenian Continent-Ocean Transition
- IODP Expedition 403: Eastern Fram Strait Paleo-Archive
- IODP Expedition 405: Japan Trench Tsunamigenic Slip
- ICDP Project SWAIS2C: Sensitivity of the West Antarctic Ice Sheet to 2°C.

These expeditions recovered more than 9100m of core, including the plate boundary of a fault zone, and secured precious samples in carefully controlled environments to allow the reconstruction of ancient DNA.

Read the expedition reports on the following pages to learn more.





# IODP Expedition 402

## Tyrrhenian Continent-Ocean Transition

### Understanding plate dynamics

Luca Magri  
University of Tasmania

A collection of cores sampled off the coast of Italy aims to improve our understanding and current models of how continents break apart, and help settle a debate in plate tectonics that's been running for over 30 years.

Cores from beneath the Tyrrhenian Sea in the Western Mediterranean will help build a three-dimensional understanding of the nature of the basement rocks, exhumed magma, and quantify extension rates in both dimensions.

Luca Magri, PhD candidate at the University of Tasmania, and ANZIC Expeditioner explained:

“Our theories say that when the continents break up, you’ve got continental crust at the edges, then a segment of exhumed mantle and then at the centre of the deformation there’s new seafloor forming part of the oceanic crust. That’s the typical standard progression. But over 30 years ago we discovered that in the Tyrrhenian Basin it’s quite anomalous, not fitting with the current model.”

“So we need to understand, by seeing the composition of the rocks within this basin, what is going on here? Perhaps the model is lacking and this isn’t as unusual as it first looks.”

“We’re hoping to pinpoint the timing and dynamics of mantle exhumation and the extension of the new seafloor, and how that’s related to the geometry here. I want to reconstruct a detailed plate tectonic history of the Tyrrhenian Basin, but the results could shed light on what’s happening beneath our oceans elsewhere in the world too.”

Luca found the expedition incredibly enriching.

“Being able to sail on the legendary *JOIDES Resolution* has been a longstanding intention since I was an undergraduate student in Italy. Besides, sailing onto Mediterranean waters has been a very evocative experience, bringing my memories back to all the summer days I spent swimming in it. Back then I knew little about what was hiding below this sea, and thanks to this voyage I am now able to understand more about its formation and evolution.”

“Expedition 402 has been a steep learning curve both personally and professionally, and it has certainly improved the scientist I am and how I will conduct science in the future.”

“The constant action on the JR was thrilling, with new sediment and rock cores constantly arriving on deck. The significance and diversity of the

material recovered will be key to better defining how continents break apart, understanding the effect that volcanic activity has on the ocean and the organisms that live in it, and investigating the causes and consequences of the Messinian salinity crisis.”

It has been a pleasure to share the first sights of newly collected sediments and rocks with my international colleagues of the science team. I was impressed by how efficiently science can be conducted with the complementary work of people from different labs, discussing intensively about how to integrate the new evidence and discoveries into the current understanding.”



Luca enjoying the view on deck.  
Photo credit: Tomoaki Morishita, IODP



Cores collected on Expedition 402  
Photo credit: Tiffany Liao, IODP, JRSO

Luca working with samples on board the  
*JOIDES Resolution*.  
Photo credit: Tomoaki Morishita, IODP



Luca describing cores.  
Photo credit: IODP





# IODP Expedition 403

## Eastern Fram Strait

### Paleo-Archive

Lucinda Duxbury  
University of Tasmania

Last June, I traded the Tasmanian winter for an Arctic summer in the eastern Fram Strait, just west of Svalbard. It was my first time trying my hand at science at sea and as it so happened it was the last time the Research Vessel *JOIDES Resolution* would facilitate such an endeavour.

After countless journeys like this one the ship is a well-oiled machine. On board I found quiet joy in all the ultra-specific solutions to ultra-specific problems. Things like how to have a science library in high seas. Everything optimised to do something no other vessel does.

It's hard to prepare for an experience like this. Hard to prepare for science at this scale and intensity. On land I feel lonely in my little research bubble. But at sea, constant proximity bursts any solo pursuit. Webs are woven out here – between both people and ideas. I sail with colleagues of colleagues – which out here quickly progresses to friends of friends. As much as it is about the science, it is also about our relationships with each other.

My main responsibility onboard the collection of uncontaminated sediment samples for ancient DNA analysis. When we sequence the genetic code of the DNA fragments in our samples, we

can start to reconstruct the marine ecosystems that flourished in the Arctic Ocean at the time that layer was deposited on the seafloor.

We can't risk letting the sediments sit before taking our samples – there's too much opportunity for further degradation of the ancient DNA and contamination from modern DNA. This means we have to take our samples fresh, as soon as we pull the sediment core out of the sea.

As for our sampling plan, we're shooting for a needle in a haystack. We're looking for sediments deposited during periods in Earth's history with warmer-than-present conditions – as a way to glean a glance into our near future. Sometimes these periods are represented only by less than a metre of mud in a core that spans half a kilometre. To pinpoint this section, we rely heavily on the rest of the team who are analysing the core material in real time.

At up around 78° N, the perpetual midnight sun adds another dimension to things. A manic energy radiates from the boat as we work around the clock, taking turns on 12-hour shifts. What my job looks like a lot of the time is me running up and down the stairs between the lab – cross-checking the different lines of evidence coming in from

“Looking at that tiny volume in my pipette, it's hard to believe that there in that liquid are tiny traces of ancient organisms that I travelled to the other side of the world to exhume from their final resting place.”

– Lucinda Duxbury

the palaeomagnetists, physical properties experts, correlators and biostratigraphers – all to get the best guess of where to focus our sampling effort. The process was collaborative, iterative and exhausting.

But that was June and July. Now it's February. I'm waiting for results that will give me the first look into the composition of Arctic marine ecosystems in the eastern Fram Strait from up to about half a million years ago.

I've spent the last six months taking my first batch of samples through a rigorous protocol in our ultra clean labs here in Hobart. During this process, I work on such a small scale. I isolate and purify DNA from less than a gram of sediment – eventually pipetting less than a microlitre of sample into the final product we send off to Sydney where the genetic code will be sequenced or 'read' by a fancy machine.



Lucinda and the microbiology team work in protective gear to collect uncontaminated samples from the cores for DNA analysis. Photo credit: Chris Lyons, IODP

Looking at that tiny volume in my pipette – squinting at it – I feel my tummy squirm like with seasickness – bringing me back to my time on the boat. It's hard to believe that there in that liquid are tiny traces of ancient organisms that I travelled to the other side of the world to exhume from their final resting place.

When I think about my samples like this, I feel as small as them.



# IODP Expedition 405

## Tracking tsunamigenic slip across the Japan Trench

Assoc Prof Ron Hackney  
Australian National University

Three ANZIC expeditioners were onboard IODP Expedition 405 *JTRACK* as it drilled deep into the fault zone responsible for Japan's devastating 2011 earthquake and tsunami.

Expedition 405 drilled directly into the slip zone of the 2011 magnitude nine Tōhoku-oki earthquake. Drilling up to a kilometre below the seafloor, in ocean depths as much as seven kilometres, more than 700 m of core was extracted from eight boreholes on both sides of the fault line. The cores were complemented by 'logging while drilling' data in two boreholes and a borehole temperature observatory installed in two of the holes.

Ron Hackney, ANZIC Director, was part of the onboard science party for seven weeks, working as part of the physical properties team. Ron spent his midday-to-midnight shifts measuring samples taken from the core for thermal conductivity, electrical resistivity, seismic velocity, and mass and volume for porosity. His science goal is to utilise this data in combination with the observations and interpretations of others in the science team to explore whether subduction zone bathymetry and gravity data can be combined to provide a proxy for maximum likely slip extent during giant earthquakes.

"Expedition 405 is bold, ambitious, collaborative and multinational – everything that characterises IODP!", said Ron ahead of joining the expedition in late October.

At the first site the team drilled through the overriding plate and into the subducting oceanic plate below, successfully accessing the fault zone in the region that generated the large, shallow slip in 2011.

"This site was previously drilled – a year after the quake," explains Ron. "The aim was to see how the rocks have changed since then – have they cooled following frictional heating during the earthquake slip? Has the fault healed? How much has the stress built up in that area since the earthquake?"

The second site – on the other side of the fault – sampled the Pacific tectonic plate so that the team can study the rock and sediment being brought into the subduction zone. This will help to work out whether the incoming materials also influence earthquake slip.

Ron reflected: "After seven weeks on *Chikyu*, I have first-hand experience of the seamless integration between state-of-the-art research infrastructure (the drilling vessel and the labs), the diverse

Members of the science party gather excitedly as a core containing the plate boundary comes aboard.  
Photo credit: JAMSTEC/IODP

and enthusiastic technical and engineering personnel supporting the acquisition of core, data and samples, the crew that ensures the vessel operations are safe, efficient and comfortable, and the passionate and excitable scientists who have so much to contribute to understanding Earth dynamics. Sure, there were bumps along the way, but the effort that goes into acquiring the priceless core samples is incredible".

"It was great to be part of an amazing team of international experts," said Ron, "all putting their heads together to unpick the details of how earthquakes and tsunamis occur, so we can improve forecasting and reduce their impact."

Ron's highlights from the expedition? Immersion in so many scientific questions, ideas and challenges, being there for the last IODP core (acquired from almost 8000 m below sea level!), and getting involved in the activities of a diverse and motivated outreach team.



Ron with the last core for IODP.  
Photo credit: JAMSTEC/IODP



Deep sea drilling vessel Chikyu off the coast of Japan.  
Photo credit: JAMSTEC



# Beyond the science: Outreach Officers on Expedition 405

Assoc Prof Will Grant, Australian National University  
& Lisa Smith, Curtin University

ANZIC also supported two Outreach Officers to take part in Expedition 405, each for a two-week stint – Lisa Smith, Communications Officer from Curtin University, and Will Grant, Associate Professor in Science Communication at the Australian National University.

## Camera on deck!

Lisa Smith

An amazing body of work was produced by Lisa during her time on board, including a fascinating collection of interviews of the scientists and crew that made Expedition 405 possible. You can enjoy her videos on the [JTRACK website gallery](#).

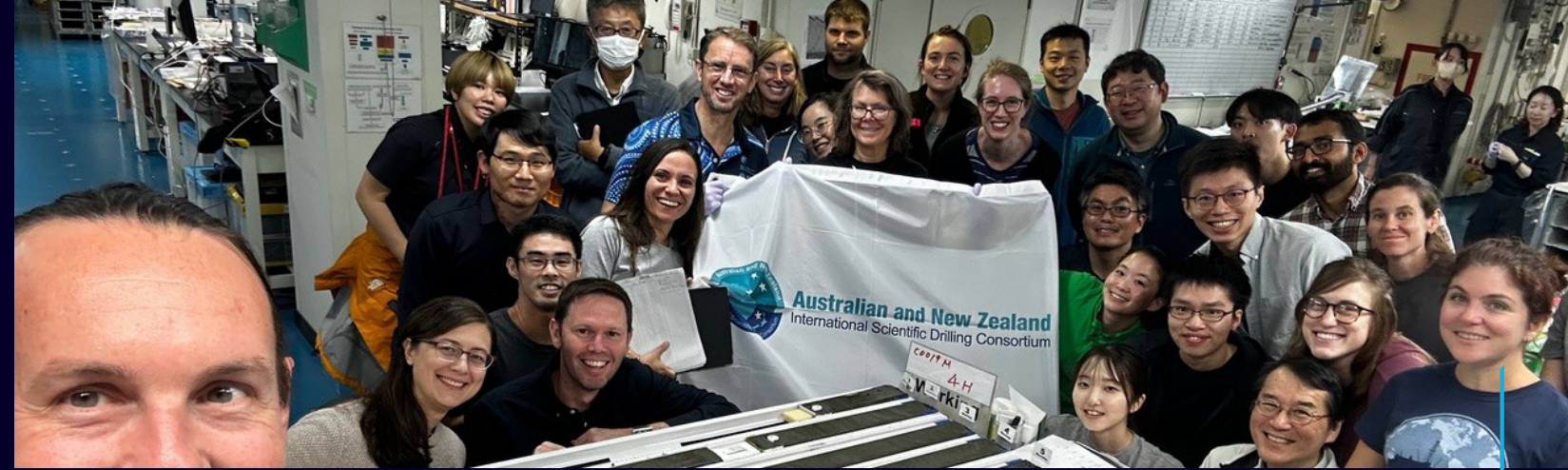
Lisa recalls her experience:

From 20 September to 8 October, I had the extraordinary privilege of joining IODP Expedition 405 *JTRACK* as an outreach officer.

As someone with limited background in geology and sedimentology, but a deep hunger for learning and all things science, this was the most incredible opportunity for me to explore the cutting edge of what is possible in human scientific exploration. Witnessing the *Chikyu* team set a new record with a total drill pipe length of 7,609 meters during the logging-while-drilling phase was nothing short of awe-inspiring.

Alongside being able to observe the logging-while-drilling phase of the expedition, I was able to cheer alongside the scientists as the first core came onboard. Watching the team transform the lab into a nonstop core processing centre – analyzing, describing, and testing core after core – was like witnessing a scientific factory in action.

Whilst aboard I met 31 science party members, six outreach officers and countless crew and lab technicians, all from a diverse range of disciplines and nationalities, working together to make this expedition possible. This on-board mixing pot of brilliant minds ensures that true magic happens onboard these expeditions, and the collaborative nature is something that will always stick with me and inspire my own work moving forward. I'm truly honoured to share the stories of a few of these remarkable individuals and highlight their work which is driving the amazing science from this expedition.



Caption: Will Grant and Expedition 405 scientists on Chikyu  
Photo credit: JAMSTEC/IODP

## A Science Communication Researcher on Board IODP Expedition 405!

Will Grant

My work on board *Chikyu* was a little different to the others on Expedition 405: where some people on board were working on the scientific side, drilling into the Japan Trench and looking in rich detail at the core samples they brought up, and others were working on the outreach side, communicating the work of the scientists to outside audiences, I was half way in between: my job was as a science communication researcher, looking at how the scientists on board thought about and talked about their mission, and how we could articulate the overall mission of scientific ocean drilling.

To do that I interviewed the scientists and co-chiefs in detail, joined in a bunch of conversations all over *Chikyu*, and helped out while they were doing their scientific work. (I became a minor expert in picking tiny bits of plastic off the core samples!)

## Sharing the news

Expedition 405 captured the imagination of a broad audience. The outreach officers on board combined with our office Communications Officer to create over 20 engaging social media posts during the voyage, which were shared across ANZIC's four platforms and amassed 67,000 views. In addition, we partnered with ANU media on a media release which was highly successful. It led to 116 media items across radio, print and online, reaching an estimated audience of 317,173. Highlights included in-depth coverage and extended interviews across ABC's [Radio National](#) The Daily Mail and local TV news.

So, what did I find?

Well, to put it simply, the scientists working on Expedition 405 are a bunch of dedicated and passionate researchers, committed to the work of understanding our tectonically active planet, looking to improve earthquake preparedness, and passionately excited about the crucial work being done by the International Ocean Discovery Program. I was so lucky to be able to join in this excitement!

However, like all scientists, there are ways that we can improve how we articulate the mission of scientific ocean drilling to wider society—including by working with a range of other audiences (including more policymakers), exploring more opportunities for two-way conversation with society, and honing our personal story telling abilities.

*The full findings of Will's research will be captured in a published report.*



# ICDP Project SWAIS2C

## Sensitivity of the West Antarctic Ice Sheet to 2°C

Dr Linda Armbrecht  
University of Tasmania

ANZIC-supported scientists were part of an international team on the ICDP (International Continental Scientific Drilling Program) SWAIS2C project, drilling under the Ross Ice Shelf to better understand how sensitive the West Antarctic Ice Sheet is likely to be in a warming climate.

In December, the team made their second expedition to Antarctica to drill through the ice sheet to recover sediment cores from beneath it.

ANZIC Expeditioner, Dr Linda Armbrecht from the University of Tasmania's Institute for Marine and Antarctic Studies, was one of the on-ice team of 27 specialists. She aims to peer back in time at ancient organisms and ecosystems, hunting for clues in ancient DNA layered in the sediments.

"My goal is to work out what organisms lived here during various phases of the Earth's past, what the ecosystem looked like, and how that changed when the climate was warmer, or cooler, or changing," explained Linda.

"To me, it's a big discovery project – and our collective results will be important for humanity."

Navigating the difficulties of working in the Antarctic, the team successfully assembled at the deep-field drilling site on the Kamb Ice Stream.

The next few weeks were a roller coaster of highs and lows!

In the early hours of the morning on December 18, the team of hot water drillers successfully melted their way through 587.96m of the Ross Ice Shelf to reach the ocean cavity below. Just two days later, the 'open hole' yielded the first set of scientific measurements. Using a gravity corer, the science team obtained a whopping 1.1hm core which was set aside for X-ray and sedimentology analysis. A second core was sliced for microbiological and Linda's ancient DNA analyses.

A custom-built downhole camera was deployed to collect imagery of the ice shelf, ocean cavity and seafloor, and several CTD (Conductivity, Temperature and Depth) casts were taken to collect oceanographic data.

Then it was time to move the 'big rig' into place – the Antarctic Intermediate Depth Drill, a custom-designed drill rig with the capacity for both piston and rotary coring and a mast that extends up to 8.2 m through a flap in the drill tent.

The team was then able to deploy the sea riser through the 588 m ice shelf, and the ocean cavity,



Linda at the microscope.  
Photo credit: Ana Tovey

to the sea floor (a total 632 m distance). This was an amazing achievement—a critical and challenging step never previously accomplished through a thick ice shelf, so far from a base or logistical centre.

The drilling team was more than halfway through lowering the drill string in preparation for coring, when operations were halted due to a serious technical challenge. Unfortunately, it could not be resolved in the field, bringing drilling operations for the season to an end.

It's a reminder that we work at the frontier of logistics and scientific discovery. The team is proud of their amazing effort and now look ahead to next season.

"It was definitely an unforgettable experience," reflected Linda. "I'm so glad I could be part of the team. I got some very precious ancient DNA samples from the gravity core."

"I'm now working on analysing the samples together with IMAS Masters Student Jakob Radford."



The International SWAIS 2C team in front of the drill tent.  
Photo credit: Anthony Powell, AntarcticaNZ

**"To me, it's a big discovery project – and our collective results will be important for humanity."**

– Linda Armbrecht



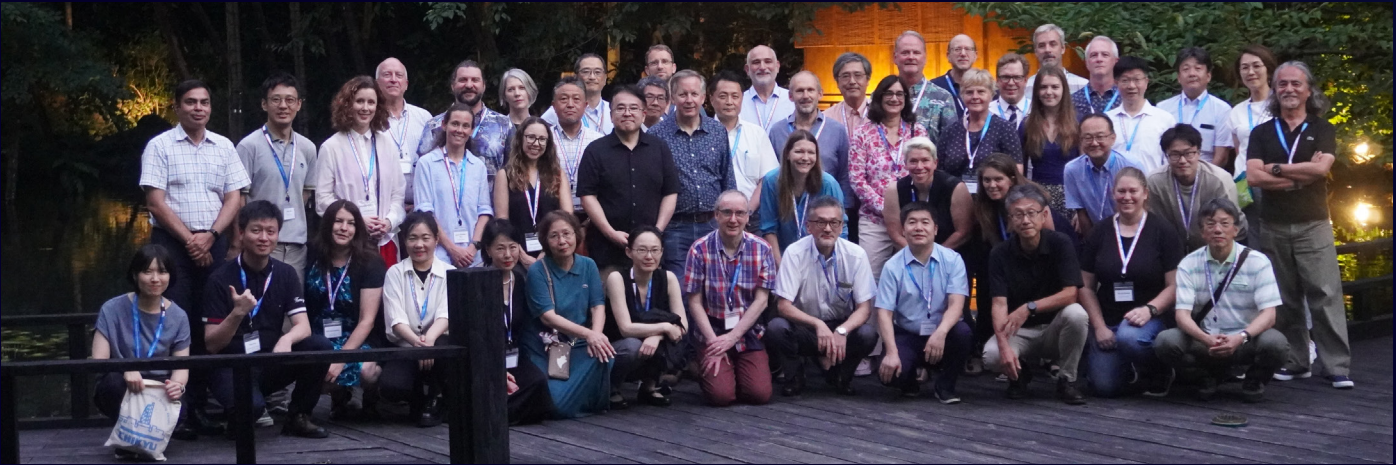
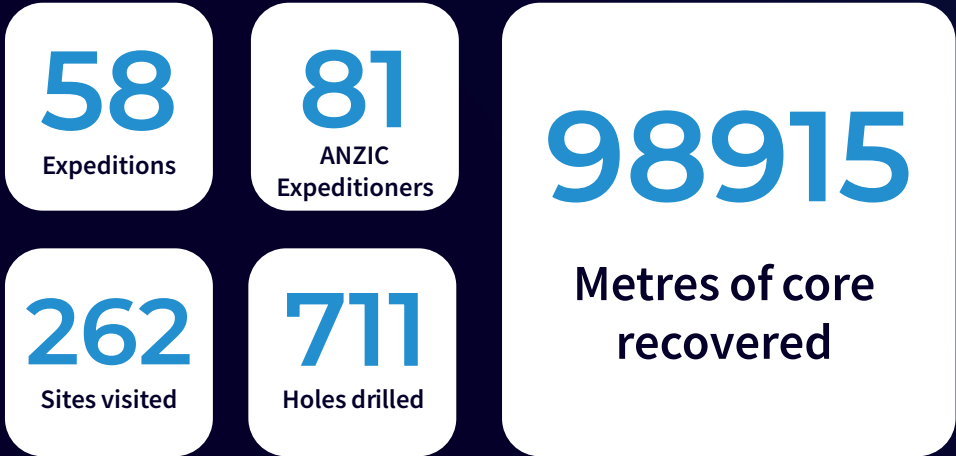
# International Ocean Discovery Program 2013-2024

September 2024 marked an emotional end to the 11-year long International Ocean Discovery Program (IODP), a truly remarkable program in size, scope, and intellectual and international reach. It has transformed our understanding of the planet, international science networks, and countless careers.

The samples of sediment, rock, fluids, and living organisms retrieved by scientific ocean drilling have made tremendous achievements in understanding climate and ocean change,

biosphere frontiers, planetary dynamics and geohazards. The IODP scientific achievement report, due to be published in 2026, evaluates the program's success against the IODP Science Plan (2013-2023), while highlighting the science outcomes.

The legacy built by this epic program will live on through carefully curated samples still available for study, and new ocean drilling programs that owe their genesis to IODP.



Attendees at the last IODP Forum



Last scientific expedition of the *JOIDES Resolution*  
Photo credit: Chris Lyons, IODP



Last JR call of “Core on Deck”  
Photo credit: Thomas Ronge, IODP JRSO



JR's last Science Party  
Photo credit: Chris Lyons, IODP



Last IODP core  
Photo credit: JAMSTEC/IODP

## Reflecting on the achievements of the International Ocean Discovery Program

Over 29,000 scientists attended the AGU in December 2024, the largest ever AGU. In the vast exhibition hall, seeing the former IODP relegated to a small stand with the banner ‘Scientific Ocean and Continental Drilling’ was a stark reminder of reality. During the week, at the last IODP Town Hall meeting, there was a nearly 10-minute standing ovation by hundreds of IODP-related scientists, for all of the staff at the Gulf Coast Repository (the IODP

‘mothership’ at College Station) and all others that had kept the program running so smoothly.

The sadness, tears and gratitude in that packed room brought home the unfathomable impact of the program ending, and its amazing legacy.

The ripples will be felt for many years to come.

**Prof Myra Keep**  
ANZIC Science Committee Chair



# Post-Cruise Progress

In the years following expeditions, ANZIC continues to support expeditioners to collaborate on the outcomes of the drilling project and analyse the precious samples and data collected.

## Expedition 389 Onshore Science Party

### Hawaiian Drowned Reefs

February saw 31 scientists from 12 different countries gather at MARUM in Bremen, Germany, for the Onshore Science Party for Expedition 389.

There was excitement and anticipation at what the 425 meters of cores, collected off the coast of Hawai'i's Big Island last year, would contain.

By the end of the three weeks, it was clear that the team had succeeded in obtaining a high-resolution continuous record of environmental data from shallow-water corals for the first time.

"We were able to recover a spectacular sequence of fossil coral reef deposits that will enable us to decipher in unprecedented detail how sea level, paleoclimate and the reef ecosystem has changed over the past 500,000 years, particularly during periods of rapid global change," said Prof Jody Webster, Expedition Co-Chief and ANZIC Expeditioner.

"The differences in lithologies, framework types, and reef biota are really spectacular, including numerous intervals dominated by well-preserved massive corals well suited for high resolution geochemical proxy work by the expedition paleoclimate team."

One of the most unique and innovative aspects of the Expedition 389 was the collection of extremely old corals – spanning the last half million years. The Science Party worked in two overlapping shifts to ensure the ambitious target of 22 metres of core a day was opened, analysed and sampled.

## Expedition 401

### Mediterranean–Atlantic Gateway Exchange

In 2024, the Expedition 401 team got together for both an editorial meeting and a sample party. ANZIC sponsored Prof Simon George, ANZIC Expeditioner on 401, to attend both, as reported by Simon here.

The editorial meeting for Expedition 401 in April at College Station worked very well. The various components of the reports were in good shape, after several rounds of edits by the Expedition team. I worked on several chapters. The publications staff at IODP are very professional, and they worked with us to make sure there was a good outcome.

Whilst there we saw the XRF scanning of two of the Expedition 401 holes proceeding well, being run by two of the Expedition scientists and Jesse, the XRF Technician. Other scientists rotated in and out so it continued in our time allocation. After some discussion we have



Photo credits: Jody Webster

started doing some high-resolution core scans at 4mm resolution, and maybe will try 2mm resolution for some sections. The XRF has already helped define the splice and precessional cycles ready for sampling in Bremen in July for U1385 and U1609. I was also able to talk about sampling plans and collaboration with others at the meeting, including organic geochemist Sarah Feakins.

We had various social events and I was able to connect with colleagues.

The sample party occurred in Bremen from 1-7 July. This was attended by 30 scientists who worked in two shifts, and who were helped by the excellent BCR staff, including Holger, Nina, and paid student helpers. We sampled cores from all four sites, but only two of the sites were ready for high resolution sampling at specific dated intervals. The other two sites will be sampled at high resolution at specific dated intervals at a later time, most likely by scientists based in Europe.

All together we took about 16,000 samples. Of these, five samples from U1611A came with me to Macquarie University for organic geochemistry slice experiments, and three samples taken under

my sample code allocation were given to new collaborator Lars Wörmer (MARUM), who will do lipid analysis in single submillimeter-sized spots on sediment sections, typically 5 cm by 0.7 cm, using the laser desorption ionization (LDI) coupled to Fourier transform ion cyclotron resonance mass spectrometry (FTICR-MS) instrument at MARUM.

I am part of high-resolution sampling chains for U1611 and U1385, in collaboration with Melissa Berke, and we will receive 104 samples from U1611 and 234 samples from U1385 of extractable organic matter aliquots for analysis at Macquarie University at various times in 2025 and 2026. I am also collaborating with Sarah Feakins on 24 samples from near the base of U1610 and in U1611, and we will receive total hydrocarbon aliquots from 54 samples for analysis at Macquarie University from her later in 2024.

The sample party was regarded by everyone as a great success. It was characterised by very collaborative sampling, thus minimising duplication of samples and preserving core for future research work.

Many thanks to ANZIC for funding my travel.



# Legacy Funding

ANZIC continues to provide funding for projects which advance scientific drilling.

In 2024 we expanded our long running ANZIC IODP Legacy Analytical Funding (AILAF) program to reflect ANZIC's enlarged scope.

The expanded scheme has been rebranded as Continent and Ocean Research and Education (CORE) Funding and now funds research projects using legacy materials from both IODP and ICDP drilling, as well as educational initiatives and pilot projects that may lead to future drilling proposals.

Our first round of CORE funding was met with an enthusiastic response, with twenty-one applications from across our member institutions requesting a total of over \$414,000 in support. The proponents represented a pleasing balance across career stage and gender.

We were thrilled to be able to fund 15 projects – a wonderful investment of nearly \$300,000 to advance the field of scientific drilling and further ANZIC's research priorities.



ICDP's core repository at Spandau, Berlin – a vast collection of samples ready for further study.  
Photo credit: C Heubeck, ICDP

## Successful funding recipients and projects for 2024:

### **Yuhao Dai, Australian National University**

Ancient CO<sub>2</sub> levels in a modern world – How will the Southern Ocean respond?

### **William Defliese, University of Queensland**

Characterising the F and Cl content of terrigenous oceanic sediments.

### **Alexander Francke, University of Adelaide**

Reconstructing groundwater, surface runoff and rainfall recharge of Lake Ohrid (North Macedonia, Albania) during the current and last interglacial period using Sr isotopes.

### **Greer Gilmer, GNS Science**

Do Fiordland (NZ) sediment cores contain an untapped record of past earthquakes?

### **Catherine Ginnane, GNS Science**

Exploring the long-term fate of organic carbon exported from New Zealand fjords.

### **Simon Haberle, Australian National University**

Geophysical survey of Lake Kutubu, Papua New Guinea: a potential ICDP coring site

### **Jess Hillman, NIWA**

Unboxing the Ocean: a hands-on bathymetry exploration kit.

### **Katharina Hochmuth, University of Tasmania**

Middle to late Miocene development of the East Antarctic Ice Sheet offshore the Knox Coast.

### **Mark Kendrick, University of Queensland**

Does the Hawaiian Arch have an anomalous alteration history?

### **Stefan Loehr, University of Adelaide**

Testing the impact of early diagenesis on Si isotope fractionation in marine authigenic clays.

### **Gideon Rosenbaum, University of Queensland**

Can soft collision lead to plate tectonic reorganisation? Revisiting the Ontong Java Plateau collision paradox.

### **George Rowland, University of Tasmania**

Tracing dust sources to the southern Indian Ocean during the last glacial cycle.

### **Lorna Strachan, University of Auckland**

Has the Hikurangi Subduction Margin undergone profound changes in accelerated Pacific Plate subduction during the last 1 Myrs?

### **Chutian Shu, Curtin University**

Temporal dynamics of mantle heterogeneity: Geochemical insights from equatorial Pacific MORB samples.

### **Ita Wulandari, Macquarie University**

A Miocene-Pliocene perspective on the Messinian Salinity Crisis: Organic geochemical evidence from the Alborán Sea Basin.



# Marine Geoscience Postgraduate Project Grants

To further enable research related to scientific ocean drilling, ANZIC initiated one-off top-up funding to support Honours and Postgraduate students with their geoscientific inquiries.

Our 2024 Marine Geoscience Postgraduate Project Grants were an extra boost to Honours and Postgraduate marine geoscience students, assisting research, skills and career progress. While modest (up to \$10,000) the grants were designed to cover expenses directly related to the thesis project, such as fieldwork, laboratory analyses and equipment, or to support travel and participation in conferences and workshops.

The grants responded to a significant need in the research community and we received applications requesting more than \$110,000. We were able to fund eight students, with a total of nearly \$50,000.

## Successful recipients and projects:

### **Mahsa Alidoostsalimi, University of Melbourne**

Deciphering seasonal variations in climate and Indigenous foraging practices linked to paleo-ENSO in the Great Barrier Reef using paleo-archives, supervised by Dr Amy Prendergast.

### **Joseph Cresswell, University of Tasmania**

Investigating temporal and spatial variability of the biological pump within the Indian sector of the Southern Ocean across the last glaciation, supervised by Prof Zanna Chase.

"With these funds I am able to learn a completely new laboratory method while working with colleagues in the USA toward a collaborative research effort. This work will hopefully provide new insights towards nutrient utilisation and factors limiting productivity in the glacial Southern Ocean. From a personal perspective,

through learning new laboratory techniques and expanding my research network, I believe this will help with future post doctorate applications."

### **Jeremy Asimus, University of Tasmania**

Microcontinents in the Kerguelen Plateau: remnants from the breakup of East Gondwana, supervised by A/Prof Jacqueline Halpin.

### **Molly Husdell, University of Queensland**

Reconstructing past environmental changes in the Cape Darnley, East Antarctica, region using microfossils, supervised by Dr Helen Bostock.

"As a recipient of this grant, I was enabled to attend the International Diatom Symposium in South Africa where I met with diatomists from all over the world. They generously

shared their expertise with me, and I learned about taxonomy, genomics, biostratigraphy, integrating AI into diatom-based studies and lots more! I'm very grateful for this opportunity as the microfossil community in Australia is sparse, so connecting with the international community is a must for my professional development as a micropalaeontologist."

### **Vishwadeep Rout, University of Tasmania**

Probing ancient Antarctic krill populations, supervised by Dr Linda Armbricht.

### **Zsanett Szilagyi, Queensland University of Technology**

Unveiling the enigmatic world of Halimeda Bioherms: A comprehensive study of geomorphology, sedimentology, and evolution in the Great Barrier Reef, supervised by Dr Luke Nothdurft.

"Thanks to this support, I was fortunate to visit my collaborator, Prof Juan-Carlos Braga at the University of Granada, and attend the European Geosciences Union conference. My time in Granada involved hands-on lab work, collaboration, and a field trip. Prof Braga is a world-wide known expert on coralline red algae (CCA) and I

had the unique opportunity to learn the basics of CCA identification and sample description directly from him. I also collected samples that will be further analysed."

### **Sebastian Bland, Australian National University**

Investigating atmospheric and oceanographic changes in the Western Pacific and Indonesian Throughflow during the Mid-Pleistocene transition, supervised by Dr Bradley Opdyke.

### **Moss Thompson, Australian National University**

Coral-ation or Cores-ation: A trace element analysis of oil pollution in porites corals from the Persian Gulf by laser ablation ICP-MS, supervised by Prof Stewart Fallon.

"ANZIC's financial support was essential for conducting laboratory work during my project. Using Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) allowed me to analyse low-concentration trace elements in Porites coral cores from the Persian Gulf. This method provided fortnightly resolution geochemical data that revealed a long history of pollution (most likely from the oil industry) recorded in coral skeletons."

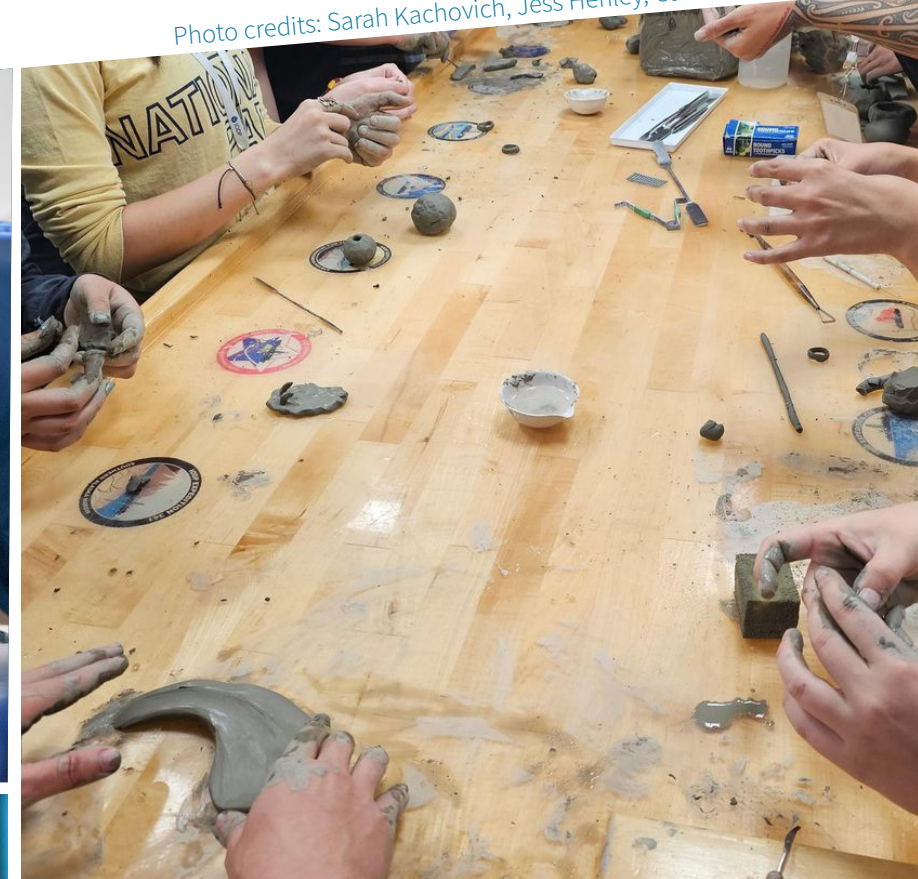




# EDUCATE

Every year, ANZIC provides specialist training opportunities for students and ECRs from our Australia and New Zealand member institutions, ensuring that our researchers have the skills necessary to fully participate in scientific drilling now and into the future.

Photo credits: Sarah Kachovich, Jess Henley, Carol Cotterill, IODP





# ANZIC Marine Geoscience Masterclass

## Convenors' Report

Hosted by:



In January and again in December, ANZIC's Masterclass was held in subtropical Southeast Queensland. The participants? Fifty talented undergraduate and higher degree students from across Australia and New Zealand along with graduate students studying in the US, Europe, Japan, China and young professionals from Papua New Guinea and Geoscience Australia.

In December, participants were welcomed by the very proud Badjala, Woopaburra and Torres Strait Islander Ann-Maree Long, who recently participated on the JR Academy Fire to Water expedition earlier this year as a mentor. The students then spent four days participating in a series of workshops covering a range of traditional marine geoscience techniques such as seismic interpretation, core processing (splitting, logging, scanning XRF, Magnetic Susceptibility and Spectrophotometry) and sampling, grainsize analyses, processing and smear slides and looking at microfossils, petrology of volcanic rocks, and sedimentology of tsunami deposits for simulation of ship-based activities. Some more futuristic approaches included using a Virtual Microscope and machine learning to automate the identification of microfossils, Virtual Reality to experience marine ecosystems, and the similarities between technologies used to study the planet

Mars with the 2020 Perseverance Rover Mission and those used in marine geoscience.

Interspersed with the workshops were a series of keynote lectures to showcase the amazing science from IODP samples and data ranging from earthquake hazards, volcanic eruptions, tropical reefs, and deep-sea life highlighting recent expeditions (Expeditions 375 & 399). The January Masterclass included a ship-to-shore tour of the *JOIDES Resolution* with Prof Simon George, and Dr Udara Amarathunga on Expedition 401, while the December class toured D/V *Chikyu* with Dr Ron Hackney, Lisa Smith and Dr Derya Guerer on Expedition 405. The students also had the opportunity to visit the RV *Investigator* INVESTIGATE exhibit at QUT and the Queensland Museum.

Part two of the Masterclass was a five-day field trip. Unfortunately, in January, Cyclone Kirrily was forecast to impact Heron Island, so we rapidly developed Plan B: a field trip to the UQ Moreton Bay Research Station on Minjerribah. The students got to snorkel over the coral reefs in Moreton Bay and learn about the formation of the large sand islands along the coast and offshore Southeast Queensland and some of their cultural heritage, and marine and terrestrial ecosystems of the region.



January and December Masterclass students.

In December the weather was more cooperative, allowing a road trip to Gladstone via short stops at the Glasshouse Mountains and Point Vernon (to look across to K'gari), before boarding the ferry to Heron Island in the Southern Great Barrier Reef. We were honoured with a welcome to country from Uncle Mick Egglemose from Byellee, the Traditional Owners of the seacountry and Heron Island (part of the Port Curtis Coral Coast TUMRA - Traditional Users of Marine Resources Agreement). At Heron Island Research Station, participants undertook reef walks, snorkels, talks and hands-on workshops looking at carbonate sediments and reef cores to learn more about the geological evolution of reefs, and the enigmatic beach rock from Prof Gregg Webb. There was an online keynote talk by Prof Jody Webster on the IODP Mission Specific Platform expeditions to access reef sequences in Tahiti, the Great Barrier Reef and Hawaii (Expeditions 310, 325 & 389).

Prof Helen Bostock & Dr Luke Nothdurft  
Masterclass convenors

ANZIC is grateful to everyone that contributed to the success of the Masterclass by running workshops, giving inspiring talks and organising the fieldtrips. It really was a massive team effort.

- Dr Michele Elmes, University of Queensland
- Prof Gregg Webb, University of Queensland
- A/Prof Teresa Ubide, University of Queensland
- Dr Will Defliese, University of Queensland
- Dr Jennifer Cooling, University of Queensland
- Dr Gang Xia, University of Queensland
- Prof Anthony Rathburn, California State University
- Samadhi Gunathunga, University of Queensland
- Prof Gordon Southam, University of Queensland
- Daniela Encalada, University of Queensland
- Martin Koehler, University of Queensland
- Molly Husdell, University of Queensland
- Dr Annie Lau, University of Queensland
- Dr Nick Dyriw, Queensland University of Technology
- Dr Sarah Kachovich, ANZIC
- Dr Lorna Strachan, University of Auckland
- Dr Stuart Henrys, GNS Science
- A/Prof Craig O'Neill, Queensland University of Technology
- Prof David Flannery, Queensland University of Technology
- A/Prof Selen Turkey, Queensland University of Technology
- Prof Balz Kamber, Queensland University of Technology
- Dr David Conroy, Queensland University of Technology
- Dr Joel Harman, Queensland University of Technology
- Cael Gallagher, Queensland University of Technology
- Dr Marco A. Acevedo Zamora, Queensland University of Technology
- Dr Christoph Schrank, Queensland University of Technology
- Fiona Kallus, Queensland University of Technology
- Rhianon Dodd, Queensland University of Technology
- Tarrah Burke, Queensland University of Technology
- Peter Nemere, Queensland University of Technology
- Jayden Fryer, Queensland University of Technology
- Aisha Darmansjah, Queensland University of Technology
- Zsanett Szilagyi, Queensland University of Technology
- Prof. Jody Webster, University of Sydney
- Dr Catherine Kim, Queensland University of Technology
- Dr Ao Chang, Queensland University of Technology
- Staff at the Heron Island Research station
- ANZIC Science Committee
- Staff in the ANZIC office – especially Kelly Kenny and Kelly-Ann Lawler



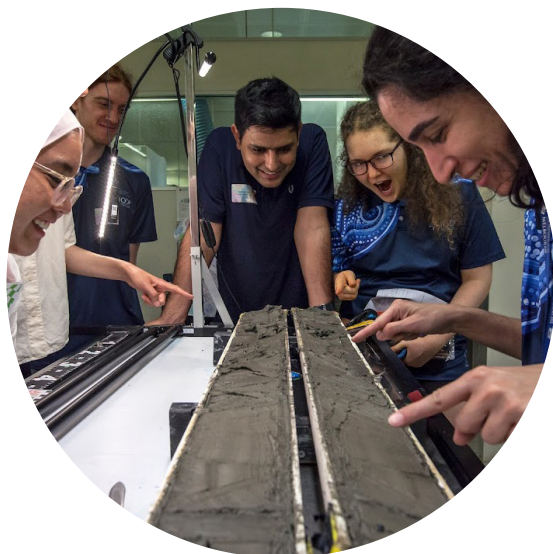
# ANZIC Marine Geoscience Masterclass

## Student Reports

In December 2024, I was lucky enough to travel to Queensland, Australia, to participate in the ANZIC Masterclass – an incredible opportunity to deep-dive into modern reef systems and ocean drilling.

During the first week, we were based in Brisbane and attended lectures, tutorials, and workshops at both UQ and QUT, looking at everything from deep ocean sediment cores and micropaleontology to volcanic rocks and tectonic plate reconstructions. One of the standout hands-on experiences for me was getting to see how sediment cores are first cut open and then prepared for analysis and logging.

For the second week, we traveled north to The University of Queensland's research station on beautiful Heron Island. Here, we took part in reef walks looking at diverse coral ecosystems, snorkeling with turtles, rays, and reef sharks, and further expanded our understanding of the geology, evolution, and biology of the Great



Barrier Reef through engaging lab work. To be able to relate our knowledge to the real world and experience it first hand was invaluable.

Throughout the trip, I thoroughly enjoyed being fully immersed in the scientific environment whilst spending time with like-minded individuals. One of the most impactful aspects of this experience was getting to meet so many amazing and knowledgeable people, from international researchers and lecturers, to new friends and future colleagues. I am incredibly grateful to have had this unique opportunity and look forward to continuing to be a part of the geoscience community.

Jack Crichton  
University of Auckland



Stunning weather for a reef walk to look at coral ecosystems on the southern side of Heron Island.



As a participant in the 2024 ANZIC Geoscience masterclass, I was incredibly grateful for all the exposure to new ideas and methods over the two weeks of lectures, hands-on labs and field experience.

The first week taught me how much information we can extract from marine sediment cores and its applications to paleoclimate reconstruction, oceanography, understanding reef building and reef recovery from climate change, geohazards and plate tectonics, and understanding ecosystems new to science like the halimeda bioherms. I gained new exposure to innovative methods like using AI learning to classify microfossils on smear slides, virtual reality as a science communication tool and using programs to model tectonic movement and seismic cross sections.

The second week, at the Heron Island Research Station, learnt about reef-building microbialites, features of current and wind direction and how they change sediment deposition and reef shape, and saw foraminifera and halimeda algae in the field. More lectures on sediments and tropical carbonate ecosystems past and present made me look at the reef with new hope for its resilience and recovery but also highlighted the importance of research in conservation.

I am excited to see where this takes me in the future and will follow ANZIC to see what new research and opportunities appear. Thank you so much to all the people I met, both mentors and participants, you really opened my eyes to how many passionate and brilliant people are working in this space.

Eleanor Shuetrim  
Australian National University

A Tēnei te mihi ki a ANZIC mō te tiripi nei. “Ki uta, ki tai” he whakataukī matua o tēnei kaupapa māku. E ai ki ngā kōrero nō ngā tangata whenua, ka ora te wai, ka ora te whenua. Ka ora te whenua, ka ora te tangata. Rite tonu rātou ki te iwi Māori.

As someone passionate about marine science and the future of our planet, particularly from an indigenous lens, I was stoked to be accepted into the ANZIC Marine Geoscience Masterclass.

The first week was based in Brisbane with a series of lectures and workshops which delved into geochemistry, geophysical modelling, micropaleontology and more. The second week was a field trip to Heron Island Research Station where we did reef walks, snorkeling, surveys, explored a range of tropical carbonate ecosystems, unraveled geomicrobiology secrets and had enlightening talks linking the modern reef system to recent IODP expeditions.

We learned so much in such a short amount of time, and I am really grateful to have been selected to represent Ōtākou Whakaihu Waka (University of Otago) for this experience. My key highlights were how AI is being trained to help with the identification of microfossils under the microscope, the welcome to country by tangata whenua, mana whenua, video-calling the *Chikyu* and exploring organisms living in extreme environments.

Overall, it was great to get a taste of working alongside multiple disciplines. It is important to have diverse perspectives and to work with different groups to understand the whole picture.

Rāwinia Wikaira  
Ōtākou Whakaihu Waka (University of Otago)



# ANZIC Masterclass impact

## Student Feedback

A survey of students showed the impact of the Masterclass, greatly increasing interest in marine geoscience careers. We were also pleased to see very high satisfaction levels for everything from pre-class communication, to catering and of course the class content.

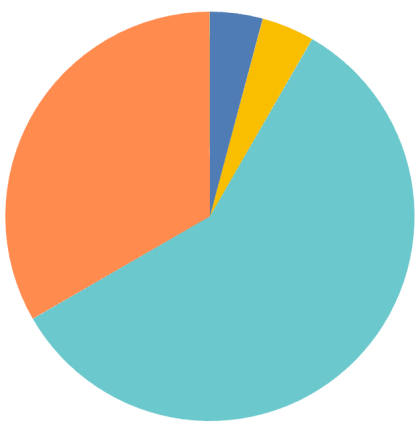
The Masterclass was well structured and logically presented



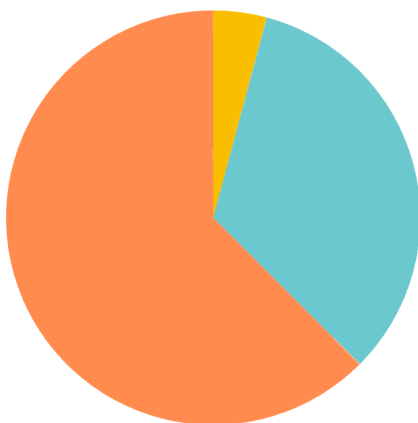
Before this course I was interested in future studies and a career in marine geology



The information covered was presented in sufficient detail



After this course I would be interested in pursuing studies and a career in marine geology



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

“I really enjoyed being so immersed in being with so many incredible people. Curiosity and interest are infectious, and being with people with the same mindset is incredibly inspiring.”

- January Masterclass participant.

“I loved being exposed to many new areas of marine geosciences that I had never previously encountered. It was eye opening, and it’s so exciting to consider how much there is to discover.”

- January Masterclass participant.

“Splitting the cores on the first day was truly special. To be one of the first people to see this segment of the Earth's history was humbling. Sampling the core in the ground truthing future climate workshop and having the opportunity to explain the process to my peers was my highlight”

- Kimberley, January Masterclass participant.



“Having a chance to work together as a team and create a voyage proposal which hopefully will be something I will be able to do in the future for real.”

- Naomi, January Masterclass participant.

“The instructors did an amazing job showing us what field research looks like and I thoroughly enjoyed every moment!”

- Edoardo, January Masterclass participant.

“This masterclass gave me the opportunity to try a range of fields my university doesn't offer, whilst meeting a group of people that I hope will become lifelong friends and colleagues. An absolutely amazing experience that I would recommend most highly to all.”

- January Masterclass participant.





# JR Academy

## Cross-Cultural Geoscience

Madison Anders, University of Tasmania  
Pianina Kahui-McConnell, NIWA  
Nicole Cloutier, University of Queensland  
Rawinia Wikaira, University of Otago  
& Alana Dooley, Curtin University

ANZIC was proud to support five First Nations geoscience undergraduate students and three mentors (academics and professionals) on a transformative voyage with the JR Academy – a two-week ‘science at sea’ experience on board the *JOIDES Resolution* from Naples to Amsterdam in April.

The Academy was a unique opportunity to live and work aboard the drilling ship, while learning about scientific ocean drilling, the exciting geoscience careers that surround it, and exploring ways to bridge Indigenous and Western sciences.

“I was pinching myself,” said lead ANZIC mentor and Kamilaroi water scientist, Associate Professor Bradley Moggridge. “Having already witnessed the recovered city of Pompeii covered by pyroclastic flows in 79AD, and climbing to the top of Mt Vesuvius that caused it all. Then waking up and experiencing the ship sailing through the Strait of Gibraltar, seeing the Rock of Gibraltar and understanding that you are between Morocco on your left and Spain on your right.”

“And then there's the amazing geoscience students and mentors we have on board from Australia, New Zealand and America. Some of the discussions have woken up the geoscientist in me from many years ago. Such a privilege.”

### With Mentors:

Assoc. Prof. Brad Moggridge  
Ann-Maree June Long  
& Jesse-James Rehu Pickery

ANZIC's mentor from Aotearoa, Jesse-James Pickery also felt incredibly fortunate to be involved.

“It's a bittersweet experience, there's a world on this waka (boat), it feels like a nexus. To meet scientists with such passion for knowledge and exploration, having the privilege to grow, know and form a network with young indigenous scientists, seeing that fire in their eyes... I've been spoiled. The things these rangatahi (youth), these rangatira (leaders) will do...”

Curtin University student, Alana Dooley, reflected on the experience after returning from what she described as a “life changing trip”.

“For me, the journey began in Boorloo (Perth), and it wasn't until I was on the other side of the world, arriving in Naples, that I met my fellow travelers from Australia, Aotearoa New Zealand and the US.”

“After a couple of days in Naples and months of eager anticipation, the time had finally come to board the JR!”

“Spending time aboard the JR was unbelievable. I will never forget watching us pull out of port in Naples, travelling through the Strait of Gibraltar, seeing whales, dolphins, a Northern Hemisphere



Eating together on deck.  
Image credit: Carol Cotterill, IODP

view of the stars, the wide blue ocean stretching out as far as the eye can see, sunrises and sunsets. The list goes on!”

“Our days onboard were action-packed, including tours, lectures, hands-on activities, creative projects and discussions.”

“The JR Academy facilitators and mentors had such diversity and depth of knowledge which we were all so lucky to learn from. Some of the highlights include activities and sessions on Indigenous Astronomy, weaving, Earth Law, sharing our own stories, looking at samples in the lab, science communication, history of the JR, and filmmaking.”

“I was also fortunate to get to know such an amazing cohort of students. Having all come from such a diversity of backgrounds, each person had their own experiences, knowledges, and stories. Together, we shared and learned deeply from one another, in a very special and heartwarming experience. I believe the friendships made on this journey will last forever.”

“The JR Academy was truly life changing and I am so fortunate to have had the opportunity to participate in an experience which will stay with me forever.”



ANZIC-supported students and mentors.



Learning together on board.  
Image credit: Carol Cotterill, IODP



# GLASS Summer School

## GLacial Sedimentation

**ANZIC sponsored four students to participate:**

James Trihey, Alexandra Parrott, Linda Balfoort & Mardi McNeil.

Supported by ANZIC and GeoDiscoveryNZ, I was able to attend the GLacial Sediment School (GLASS) in College Station, USA, in July to upskill myself and learn about glacial sedimentation processes.

A range of different researchers, lab technicians and tutors provided us with lectures about their respective fields before we were all assigned a sediment core from a polar region. The goal was to understand the core and its significance as best we could by the end of the week. This dual approach of learning ended up being incredibly valuable and allowed me to connect with the vast majority of people that attended the school and gave me insight into other people's research, methods and systems.

There was enough space in the program to allow for conversations about people's research, and I caught myself being incredibly motivated at the end of every day. As someone who has, thus far, only worked on short and soft sediment cores from underneath the Ross Ice Shelf, learning about deep-sea sediment cores and circum-Antarctic and Arctic sedimentation processes has put my research into context and has really kick-started my PhD.

**Linda Balfoort**  
Victoria University of Wellington

I was lucky enough to travel to College Station to attend a Summer School on Glacial Sedimentation. But, I hear you ask, why travel to inland Texas in the middle of summer to learn about the Earth's polar regions? Because it is where one of the three core repositories for the International Ocean Discovery Program is based, and all the cores from the Southern Ocean (plus parts of the Pacific and the Gulf of Mexico) are stored here. So, it is really the perfect place to learn about all aspects of glacial sedimentation.

I've recently commenced a PhD at the University of Tasmania and will spend the next three and a half years looking at marine sediment from the coast of East Antarctica. I hope to be able to use this sediment to infer changes in the region's glaciers and ice sheet going back in time through recent glacial and interglacial periods. Therefore, a well-rounded understanding of the underlying sedimentology of glacial regions is essential to the research I'll be conducting. This summer school was the perfect opportunity.

GLASS was one week long, and attracted 30 early career researchers from all corners of the globe. It started with some icebreaker activities on the Sunday afternoon, as we got to know the other attendees (who will likely be our colleagues for the next few decades!).

Linda says she was like a kid in a candy shop here in the IODP Core Repository.



Then the week settled into a rhythm of lectures and practical activities in the mornings, with a focus on all aspects of the sedimentation process. This included: deciding on seafloor sites to drill, what sets of data we can measure both onboard research vessels and back on land, and learning about glacial and oceanographic systems and how they can influence the sediment that is so highly prized by scientists.

In the afternoons, we were split into groups, each assigned a set of cores to study. This was incredibly useful, as we got to know our team members a lot better and were able to put into practice the theory that we spent the mornings learning.

Also in attendance was a set of world experts in the field, who were all incredibly welcoming and friendly, and patient with our endless questions and enthusiasm. In short, GLASS was an excellent week where I learnt content and skills essential to my PhD, and forged new friendships that will be useful going forward in my career.

**James Trihey**  
University of Tasmania



From left: Katharina Hochmuth (University of Tasmania), one of the School convenors, with Australian and New Zealand students - James Trihey, Alexandra Parrott, Linda Balfoort and Mardi McNeil in Texas.



# ECORD Summer School

## Downhole Logging for IODP Science

ANZIC sponsored four students to participate:  
Zsanett Szilagyi, Dina Hanifah & Jess Henley

My sincere thanks to GeoDiscoveryNZ, in association with ANZIC, for the privilege of attending this Summer School at the University of Leicester. This workshop brought together participants from 16 institutions, nine countries and 12 nationalities, and from various geological and geophysical backgrounds, fostering cross-cultural collaboration and exchange of ideas.

The event kicked off with an icebreaker at the Leicester Museum and Art Gallery, followed by a cultural visit to the King Richard III Museum Centre and group dinner, providing opportunities to build connections in a relaxed setting.

The program was well-structured, focusing on downhole logging techniques essential for understanding subsurface conditions in scientific ocean drilling. It covered a comprehensive blend of theoretical lectures (Petrophysics 101), practical training (WellCAD software; geophysical properties tools: MSCL, Rockphysics), and field trips, which provided a deep dive into downhole logging techniques essential for marine geoscience.

One of the most rewarding aspects was the group project, where I had the honour of being awarded the Best Logging Project along with my

teammates. In this project, we collaboratively reviewed an IODP expedition and engaged in critical thinking to navigate a one-day imaginary scenario, overcoming challenges to meet expedition objectives. This exercise was both practical and educational, offering insights into real-world problem-solving.

Overall, the Summer School was an enriching experience that has contributed significantly to my professional growth.

Dina Hanifah  
University of Auckland

This School was a fantastic opportunity for me. It covered a whole range of theoretical lectures, practical times and field trips. They built our knowledge on petrophysics from the basics in the first few days. The enthusiastic lecturers provided a deep insight into downhole logging techniques and walked us through from data collection on the vessel until data processing in the laboratory. Invited guest lecturers widened our knowledge on the new IODP3 program as well as on interesting projects that they participated in. Of course, besides all the learning, we had time for both cultural and professional field trips such as visiting the British Geological Survey and the National Space Centre.

We also had a chance to present our work to our peers, both students and lecturers, as part of a Mini-Conference. It was so great to see all the exciting projects in marine geosciences from all around the world and extend our professional network. I was very delighted when I had the honour of being awarded the 'Popular Vote Poster Award' by my student peers.

Participating in the summer school helped me to improve my core-log-seismic integration skills and to apply it on our dataset. A huge thank you to the organising committee and ANZIC for supporting my participation!

Zsanett Szilagyi  
Queensland University of Technology

For the past year I have been completing my honours project, looking at geochemistry of sediments from the Great Australian Bight. At the end of July, I had the opportunity to attend ECORD's summer school.

My highlights of the week were going to the British Geological Survey and the poster session. At BGS, we toured the core stores and learned how downhole logging data is related to core features such as changes in lithology. Being new to downhole logging, this deepened my understanding of how to interpret logging data and what it can be used for.

Learning about how cores are analysed and stored, how core storage is managed, and the volume of data held in cores was also amazing. At the poster session, I had the opportunity to learn about other work being done with cores, especially in ways which do not use geochemistry (such as seismics). This broadened my understanding about the many ways core data can be used to answer questions about Earth's history and processes.

As an honours student, the poster session was my first time presenting my own work. I loved sharing what I've been working on and why it is important. It was also a great chance to practice and grow communication skills for the future.

Overall, the summer school was an extremely valuable experience. It diversified my understanding of core analysis and use of the resulting data. Now at the end of honours, I look forward to how I might use these skills in the future.

Jess Henley  
University of New South Wales



Zsanett, Dina and Jess.  
Image credit: Colin G.,  
Brooks Photography



# Urbino Summer School Paleoclimatology

ANZIC sponsored two students to participate:  
Ellyse Noy & Julianne Burns

In July two ANZIC-sponsored students, Ellyse Noy (University of Tasmania) and Julianne Burns (Victoria University of Wellington), took a deep dive into the fundamentals of paleoclimate data, modelling and applications at the Urbino Summer School.

It was a learning adventure, stretching over three weeks and including a field trip to the Bottaccione Gorge.

## Julianne reports on the experience:

I had the privilege of attending the Urbino Summer School for Paleoclimatology in Urbino, Italy. The course combined lectures, practical sessions, and a field day covering all aspects of paleoclimatology, with this year's focus specifically on modelling. I presented a poster on the research I have been doing since the start of my PhD, titled *Investigating the Role of Orbital Forcing on Antarctic Ice Sheet-Ocean Dynamics during the Miocene*.

The course provided me with a strong foundation in various palaeoclimatological methods, giving me a better understanding of how the data I use is acquired. This summer school was an excellent opportunity to meet researchers whose papers I have frequently read and to learn about who specialises in what. My background is primarily in geology and geophysics, so to meet and discuss with researchers from different backgrounds than me was invaluable. I am very grateful to GeoDiscoveryNZ for enabling me to go on this trip!



Julianne very happy to be touching the K-T boundary on the field work day.

# Grant Writing Workshop CORE Funding

We are committed to building skills to support Early Career Researchers.

This year, in response to need in the ANZIC community, we ran a fabulous Grant Writing Workshop, focusing on the intricacies of crafting compelling proposals for our CORE Funding. The aim was to upskill Early Career Researchers in writing grant applications and navigating IODP and ICDP data relevant to their research ideas.

During the one-day virtual workshop in July, participants heard top tips on writing proposals from previous awardees, learnt what reviewers look for, and got a tour of the application process. A highlight was a chance to 'assess' some 'applications' themselves!

The Workshop also included a detailed guide to accessing data and samples from IODP provided by Laurel Childress (JRSO), while Yusuke Kubo showed how to request samples from the Kochi Core Centre in Japan. Participants were also introduced to the LILY database which contains lithological information of 89 km of core recovered on 42 expeditions conducted from 2009–2019.

The information and resources shared during the workshop were deemed so useful, that they are now permanently available on our [website](#)

Our thanks to Laurel, Yusuke, and Jo Wittaker, Katharina Hochmuth, Myra Keep, Linda Ambrecht, Zanna Chase, Martin Jutzeler, Jacqueline Halpin and Tarin Noble for this educational event!

"This was my first time applying for a research grant during my first year PhD, and I'm thrilled to share that I didn't just submit it – I actually secured the grant! The workshop was truly an ultimate guide, helping me write the CORE application, and even future grant applications, with confidence."

- Ita Wulandari,  
Macquarie University



GRANT WRITING  
WORKSHOP

July 1





# ANZIC Outreach

To make sure great minds continue to focus on Scientific Drilling, ANZIC highlights the wonders of its science to a broad audience.

## Science Olympiad & National Youth Science Forum

In January, ANZIC Program Manager Sarah Kachovich wowed – and was wowed by – some of Australia's brightest secondary science students. She presented fascinating and fun sessions to participants in the Science Olympiad and the National Youth Science Forum in Canberra and Brisbane, opening up a new world for them! A



ship-to-shore from Simon George on Expedition 401 on board the *JOIDES Resolution* was an absolute highlight!

## Replica cores visit Tasmania

The ANZIC replica cores depicting the Cretaceous/Tertiary boundary and the Paleocene/Eocene Thermal Maximum, visited the University of Tasmania in September, hosted by Katharina Hochmuth. They were showcased at three different events: the University's Open Day at the Institute for Marine and Antarctic Studies; the Australian Marine Science Association and New Zealand Marine Science Society (AMSA-NZMSS) conference; and as part of a week focused on scientific ocean drilling in the Advanced Oceanography unit within the University's bachelor program.

The cores were a tremendous hit and talking point for prospective students and their parents, undergraduates, and attendees at the conference, with many now excited to further explore the history of our oceans and planet, or borrow the replica cores themselves! We reached a variety of groups who are working and studying in adjacent disciplines but never had the chance to see ocean drill cores and the stories they can tell in person. It is said that a picture can say more than a thousand words, and surely a sediment core can say even more!

## Inspiring primary students

In September, Kelly Lawler – ANZIC's Acting Program Manager – had a lot of fun telling Queensland school students about her past adventures with science and at sea, plus all about scientific ocean drilling!

The kids were in awe, and asked a series of brilliant – and amusing – questions!

## Celebrating microfossils

For International Fossil Day in October we encouraged people to zoom in on microfossils in a variety of crafty ways!

From artworks to colour, to diatoms to knit, there was plenty of fun on offer, along with some footage of microfossils being used on the *JOIDES Resolution* to date core sediment.

International days like these, celebrated by a growing social media audience, are an opportunity to bring the relevance of our science to new audiences.

## Diatoms

Silica skeletons, storytellers of ice sheet history and ocean currents. Currently responsible for 1 in 5 breaths we take.



Fabulous colouring fun by Dr. Deborah Tangunan, Artist and Research Fellow at Cardiff University

We also helped create a buzz around Earth Science Week and World Tsunami Awareness Day (November).

## In the media

ANZIC's communications efforts resulted in significant media coverage over 2025 which highlighted the importance and excitement of scientific drilling. Media stories highlighted Linda Duxbury's adventure on Expedition 403 and Ron Hackney and Will Grant's participation in Expedition 405. By working with the media teams at the University of Tasmania and the Australian National University, we counted over 100 media items across radio, print and online, including the ABC, Daily Mail and WIN News, with an estimated total audience of over 300,000.

## New ANZIC Video

With both ANZIC Director, Ron Hackney, and talented videographer and science communicator on board *Chikyu* for Expedition 405, we took the opportunity to shoot an updated video introducing ANZIC – and the spectacular infrastructure we give scientists access to – from the deck of the drill ship itself. It's now a highlight on our website.





# ENGAGE

We are proud to host and foster ways for scientists to deepen their engagement with the ANZIC community and international scientific drilling science.



Image credit: Carol Cotterill, IODP



# ANZIC CORE Legacy Forum

Celebrating Oceanic Rediscoveries & Exploration of legacy scientific ocean drilling collections

At the end of May, the ANZIC CORE Legacy Forum gathered an enthusiastic group of researchers to celebrate 12 years of ANZIC IODP Legacy Analytical Funding (AILAF). Having provided nearly \$2 million in grants over that time, the Scheme has enabled impressive advancements in scientific ocean drilling research. The Forum served as a pivotal gathering for the ANZIC community, embodying the theme ‘Learn, Celebrate and Collaborate’ and underscored the value of sub-seafloor core samples and data as rich resources for groundbreaking research.

The Forum aimed to share and celebrate some of this amazing research and to ensure continuous improvement and greater accessibility of

scientific drilling core and data. The insights gathered will help refine the delivery of future funding schemes, making IODP and ICDP resources and involvement even more accessible to students, Early Career Researchers and for those who cannot commit to the extended periods at sea or on site typically required by IODP or ICDP expeditions.

The Forum highlighted the impactful outcomes of over 100 AILAF-funded projects since 2012. The presentations spanned a diverse array of disciplines, from using cryptic crystal archives to track the growth and evolution of the oceanic crust, to charting the recovery of microbial life after the end-Cretaceous extinction.

# CORE Legacy Report

The 12th year anniversary of our legacy funding (formerly AILAF grants, now CORE funding) was also cause to reflect on and evaluate these long-running grants. A careful audit was carried out, along with a survey of past awardees.

The comprehensive [CORE Legacy Report](#) provides a detailed evaluation of the significant contributions and impacts these awards have made since the program's inception.

ANZIC-funded projects have yielded groundbreaking research and valuable insights into various aspects of the Earth sciences and beyond. Awardees consistently emphasised how ANZIC legacy grants provided essential funding in a competitive landscape, enabling high-risk, high-reward projects that might otherwise remain unfunded.

By connecting with fellow scientists through pilot projects, new exchanges of ideas, and developing new partnerships, the scheme encourages a collaborative research environment.

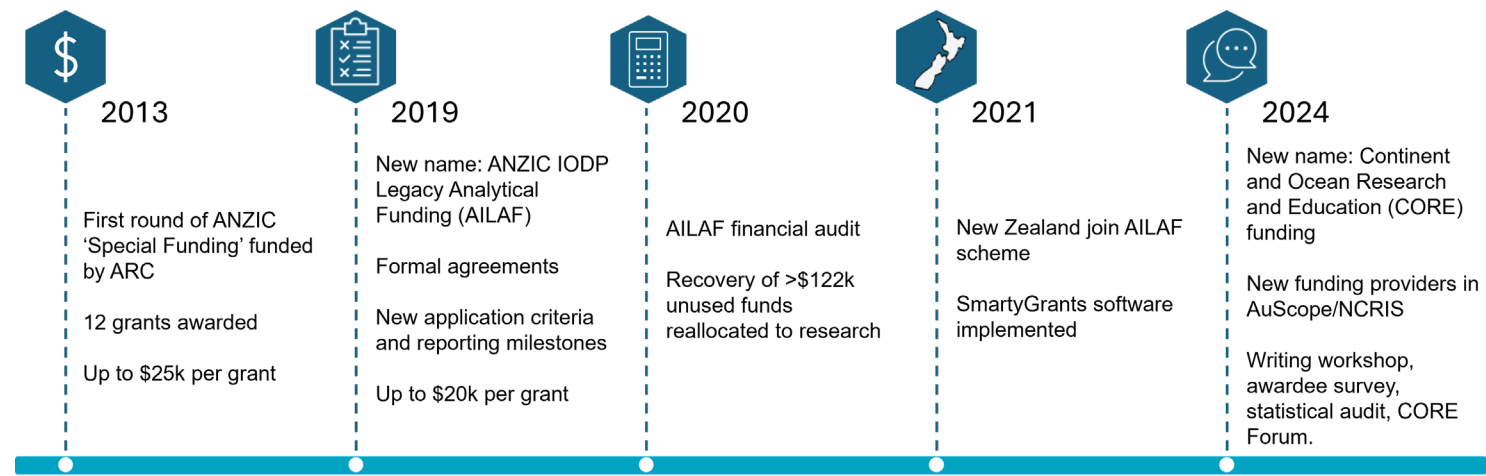
**"It helped carry out important research that otherwise would not have happened which established links with other organisations."**

The survey also revealed how valued ANZIC legacy grants are for their effect on career trajectories and student support. The grants facilitated skill development, international exposure and publication opportunities.

**"Without AILAF funding the students would not have been able to complete their PhDs"**

At the same time, the audit revealed the breadth, range and reach of the grants across research areas, Australian and New Zealand institutes, and global drilling sites. A record of strong gender balance and spread of awards across career stages was also revealed.

The impact of ANZIC legacy funding is clear. It has played a vital role in promoting and sustaining scientific excellence and innovation within the ANZIC community and beyond.





# ICDP Australia Workshop

With Australia as the newest member of the International Continental Scientific Drilling Program (ICDP), ANZIC was thrilled to convene this workshop to kick-start Australia’s participation.

Over a hundred participants joined us for our inaugural ICDP Australia Workshop in Adelaide in June. The two-day hybrid workshop brought together a diverse community with interest in ICDP, including those from industry, government, academia, state and territory geological surveys, and incorporating a strong focus on engagement with Australia's First Nations peoples.

We heard science talks covering a broad range of topics from paleoclimate records in Australian lakes to sampling the Neoproterozoic.

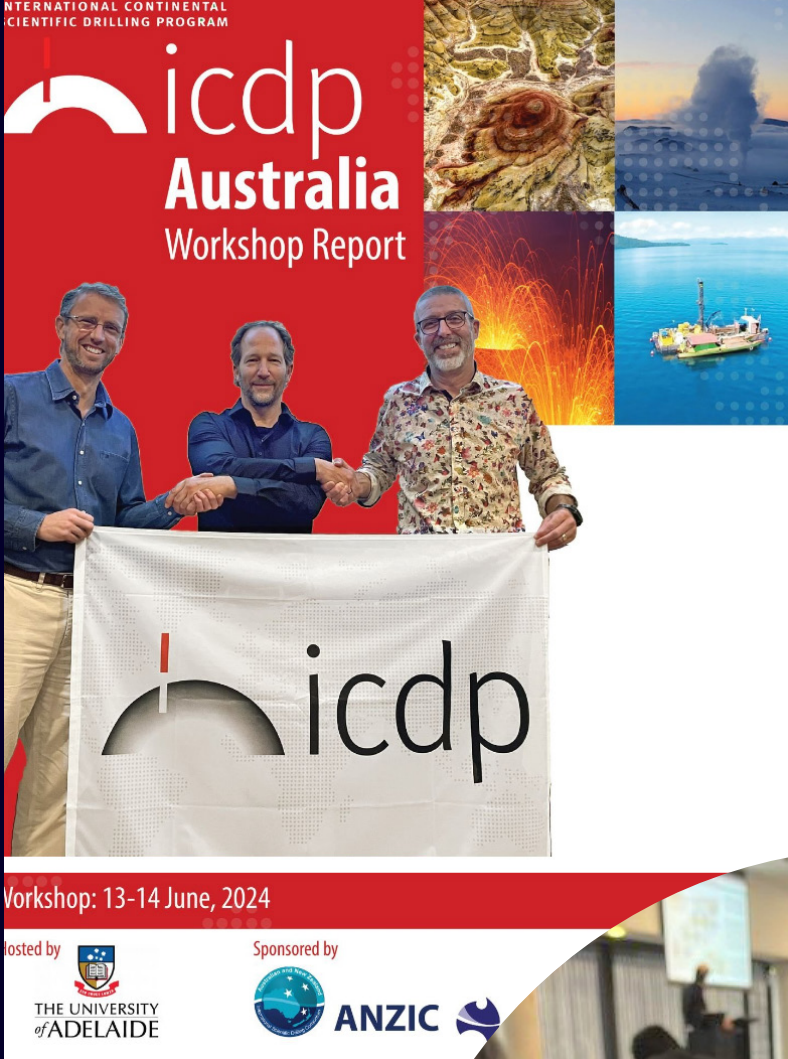
We learnt more about New Zealand's 15 years of experience of ICDP, explored synergies with existing programs (e.g. those of MinEx CRC and Geoscience Australia) and turned our attention to planning for future engagement with ICDP, considering key science questions that require subsurface sampling via drilling in Australia.

We learned a lot, forged new connections, and many attendees are now ready to advance with planning for new proposals.

A full report from the Workshop is in preparation, including the detailed work done by breakout groups focused on each of ICDP’s Science Plan Themes: Geodynamic Processes, Geohazards, Georesources, and Environmental Change. A broad range of projects captured participants’ interest, including investigating climate history, meteorite impacts, stress states, carbon capture, and critical minerals.

Many potential drilling targets within Australia were discussed, from the Gulf of Carpentaria to the Pilbara, to the mouth of the Murray River, while regional sites of interest in Antarctica and Papua New Guinea were raised.

We are deeply grateful to the University of Adelaide for hosting the event and to Alexander Francke, Lucy McGee, Jarred Lloyd, Tom Wise, Alan Collins, Kelly Kenney and Sarah Kachovich for their excellent planning and organisation.





# IODP<sup>3</sup> Workshop

Future of Scientific Ocean Drilling: toward submission of drilling proposals for IODP<sup>3</sup>

In March, the Japan Drilling Earth Science Consortium (J-DESC) and the European Consortium for Ocean Research Drilling (ECORD), hosted a proposal planning workshop in the remote (by Japanese standards) town of Nachikatsuura in Wakayama Prefecture.

Six ANZIC representatives (plus one in transition from Australia to Europe) joined more than 100 on-site scientists from around the world for this three-day workshop intended to review existing proposals and identify new proposal ideas in the lead up to commencement of the International Ocean Drilling Programme (IODP<sup>3</sup>) in 2025.

Discussions were centred around themes aligned with the 2050 Science Framework, namely Climate Change and Ocean Health (44 abstracts), Deep Earth (14), Geohazards (29) and Deep Life (21).

Under the Climate Change and Ocean Health theme, nine proposal ideas in the South Pacific and Indian Ocean and 11 in the Southern Ocean and Antarctica were discussed. These covered topics ranging from ocean circulation to terrestrial climate and tectonics, and from ice sheet stability to the effect of solid Earth processes on ice sheet dynamics.

An Australian-led idea in the Deep Earth theme is looking to utilise the new Scientific Projects using Ocean Drilling Archives (SPARC) concept to examine tectonic processes related to the Ontong Java Nui Large Igneous Province.

Discussion of available platforms was common to all themes, with a recognition that infrastructure to acquire sub-seafloor samples extends beyond vessel-based drilling platforms to seabed and ice-shelf drilling systems, and giant piston coring.

A key focus was on identifying opportunities for international workshops targeting clusters of proposals in specific regions. This approach will help to ensure maximum efficiency in implementing expeditions under IODP<sup>3</sup>.



ANZIC's Workshop representatives atop tsunami-emplaced boulders at Hashigui-iwa Rocks on the southern coast of the Kii Peninsula, Japan

# IODP Forum

The final Forum of the International Ocean Discovery Program was held in Shizuoka, Japan, from 2–6 September. Since the 2013 commencement of this most recent iteration of almost six decades of global scientific ocean drilling programs, the Forum has served as a venue for exchanging ideas and views on progress against the IODP Science Plan 2013-2023. The Forum also provided advice to the IODP Facility Boards on Platform Provider activity.

The Forum was open to all countries, consortia, or entities that provided funds to IODP scientific drilling operations and met annually during IODP.

A Consensus Statement agreed by all participants at the final Forum summed up the sentiment at this critical juncture in global scientific drilling efforts:

**“The IODP Forum acknowledges all the entities and individuals who contributed to eleven years of success under the International Ocean Discovery Program. Without the vessel crews, technicians, funding agencies, Facility Boards, Science Operators, Program Member Offices, support offices, members of the Science Evaluation Panel and Environmental Protection and Safety Panel, working groups, outreach teams, enthusiastic community of scientists at all career levels, and the interested public, the legacy of one of the world's longest running and most successful international scientific collaborations would be far less profound than it is today”.**

Reflecting on the successes of the past decade, the Forum also recommended the establishment of a post-IODP Forum-like body to provide a mechanism for communication that enhances opportunities for future collaboration and coordination. It was agreed that this Forum-like body should also include the International Continental Scientific Drilling Program (ICDP) to ensure that synergies between all scientific drilling programs are considered.



Forum attendees were lucky enough to tour *Chikyu*



# ANZIC Governing Council

The Governing Council is a steering committee for ANZIC, responsible for broad policy and high-level decision making.



Jonathon Law  
Chair



A/Prof Ron Hackney  
ANZIC



Dr David Robinson  
Geoscience Australia



Prof Myra Keep  
Chair/University of WA



Jens Klump  
CSIRO



Dr Stuart Henrys  
GeodiscoveryNZ



Dr Christina Riesselman  
University of Otago



Prof Andrew Roberts  
Australian National University



Prof Kliti Grice  
Curtin University



A/Prof Joanne Wittaker  
University of Tasmania



Dr Tim Rawling  
AuScope



Roger Fairclough  
Neo Leaf Global/  
Independent Member



Prof Dorit Jacobs  
Australian National University/Host



Prof Helen Bostock  
University of Queensland



A/Prof Jon Tyler  
University of Adelaide

# ANZIC Science Committee

The Science Committee has oversight of the scientific program of ANZIC, including setting criteria and assessing applications for expeditions, legacy funding and summer schools.



Prof Myra Keep  
Chair/University of WA



Dr Lorna Strachan  
Vice Chair/University of Auckland



Dr Agathe Lisé-Pronovost  
University of Melbourne



A/Prof Ron Hackney  
ANZIC



Dr Sarah Kachovich  
ANZIC



Dr Georgia Grant  
GNS Science



Dr Sara Moron-Polanco  
University of Sydney



Assoc Prof Marco Coolen  
Curtin Univerity



Dr Verity Normington  
Geoscience Australia



Dr Alexander Franke  
University of Adelaide



Dr Nicky Wright  
University of Sydney



Dr Katharina Hochmuth  
University of Tasmania



Dr Suzanne Bull  
GNS Science



Dr Samuel Boone  
University of Melbourne



Dr Amy Elson  
Curtin University



Dr Matthew Druce  
University of Otago



A/Prof Olivier Alard  
Australian National University



Dr Bella Duncan  
Victoria University of Wellington



Dr William Defliese  
University of Queensland



Dr Indrani Mukherjee  
University of NSW



Mr Yangguang (Light) Han  
University of Wollongong



# ANZIC Representation at IODP and ICDP

IODP and ICDP evaluate proposals for scientific drilling expeditions based on impact, logistical feasibility and cost through a system of committees and advisory panels whose membership is drawn from the international scientific community.

Ocean drilling proposals submitted to IODP are first evaluated by the Science Evaluation Panel, which assesses scientific objectives and technical approach. This Panel then forwards ready-to-drill and top-priority proposals to the appropriate

Facility Board. The Environmental Protection and Safety Panel provides critical support to the review process.

Continental and land-to-sea drilling proposals are similarly assessed by ICDP’s Science Advisory Group and Executive Committee as part of the ICDP proposal pipeline.

ANZIC has participation rights on these evaluation panels and groups, with ANZIC representatives listed below.

## ANZIC Representatives

Committee or Panel	Representatives	Institution
ICDP Science Advisory Group	Graeme Ross Beardsmore Prof John Townend	University of Melbourne Victoria University of Wellington
ICDP Assembly of Governors	Dr Tim Rawling Ms Chelydra Percy	AuScope GNS Science
ICDP Executive Committee	A/Prof Richard Levy A/Prof Ron Hackney	GNS Science ANZIC
IODP Science Evaluation Panel	Science Reps: Dr Hugo Olierook Site Reps: Dr Jess Hillman	Curtin University GNS Science
IODP Environmental Protection and Safety Panel	Dr Simon Holford	University of Adelaide
JR Facility Board	Prof Rob McKay A/Prof Ron Hackney	Victoria University of Wellington ANZIC
ECORD Facility Board	Prof Jody Webster A/Prof Ron Hackney	University of Sydney ANZIC



“The IODP SEP is a wonderful opportunity to be part of one of the largest transnational scientific bodies. I only played a small role, but it's amazing to see your hard work in reviewing and discussing scientific proposals come to fruition when the expedition results roll in.”

– Dr Hugo Olierook

## IODP Forum Attendees

ANZIC representatives also participated in the IODP Forum in 2024 ([see report on page 63](#))

There were four attendees:

- [A/Prof Ron Hackney](#), ANZIC
- [Prof Myra Keep](#), University of WA
- [Dr Stuart Henrys](#), GeoDiscoveryNZ
- [Dr Lorna Strachan](#), University of Auckland





# More opportunities to engage

## Science meets parliament

Lucinda Duxbury and Associate Professor Brad Moggridge were ANZIC representatives at the 2024 Science Meets Parliament event in Australia. Lucinda shares her highlights:

The event was a powerful and privileged view into how science interacts with our political system.

I met with Greens Senator Larissa Waters, one of the five politicians in Canberra with a science background. I told her about my upcoming voyage to the Arctic on IODP Expedition 403 and mentioned how RV Investigator funding cuts are very disappointing for palaeo scientists in Australia. Of course, no chat about money is complete without addressing funding issues for PhD candidates, with stipends currently sitting at \$16/hour, or about two-thirds of minimum wage.

Larissa was engaging and warm to talk to and recognised the importance of scientific research in this field. The Greens have been pushing for increased remuneration of students in higher education and have also advocated for the establishment of a Parliamentary Office of Science. This is encouraging and needs support from the major parties.

## ANU Open Day

ANZIC Program Manager, Sarah Kachovich, wowed prospective students and University Chancellors alike at the Australian National University Open Day in March. She took visitors to the Research School of Earth Sciences' stand back to that dramatic 'day the dinosaurs died'

with the help of the ANZIC Office's replica of a core from ODP Leg 171B showing the K/Pg mass extinction boundary and tektite fallout.

## Microbial Mysteries Seminar

The ANZIC Office organised a cross-disciplinary seminar to showcase the impact of scientific ocean drilling on our understanding of microbes, biology, ecosystems and the origins of life. The event, hosted by ANU's Research School of Biology, brought together four expeditioners from a variety of fields from across three Australian Universities and attracted a pleasing audience in person and online.



Julie Bishop, Chancellor of the Australian National University, is wowed by a replica

## Geoscience Society of New Zealand Conference

In November, GeoscienceNZ spread the word about the joys of IODP and scientific drilling via a booth at the Geoscience Society of New Zealand Conference in Dunedin. Stuart Henrys and Marianna Terezow put together an excellent

display. It was a great opportunity to reach researchers early in their career and network with scientists from across the Geoscience community. The four New Zealand recipients of ANZIC CORE funding this year dropped by too!

## Research infrastructure expo

ANZIC's host institution, The Australian National University, runs an annual Research Infrastructure Expo and the ANZIC office team grabbed the opportunity to showcase scientific drilling infrastructure amongst the other impressive research infrastructure on display.

The replica cores – and the stories they tell – were a hit, but the stage was stolen by a live cross to Ron Hackney onboard IODP Expedition 405 in the Japan Trench. After being wowed by seeing cores retrieved from 500 m below the sea floor, a rush of visitors descended on the ANZIC display!



Stuart Henrys (Left), with Lorna Strachan, Greer Gilmer, Jess Hillman and Cathy Ginnane.

## ANZIC at AGU

We were thrilled to see ANZIC well represented at AGU24 in Washington DC in December. From catching up with international colleagues to learning what's on the horizon at the IODP Townhall, it's always a busy week.

We are very grateful to (outgoing) ANZIC Science Committee Chair, Prof Myra Keep, for presenting on the impact of our legacy grants over the past decade.

NZIC's new Coordinator, Liz Arnold, at the ANZIC booth. Image credit: Jamie Kidston





# 2024 Publications

In 2024, ANZIC members provided remarkable scholarly output, contributing 88 publications stemming from IODP-related research, highlighting the consortium's pivotal role in advancing science.

This effort formed a key part of the broader IODP program's achievements, which saw a total of 2,023 publications during the year. Particularly noteworthy were the 53 publications from the program that appeared in journals with impact factors exceeding 10, reflecting the high calibre of ANZIC-affiliated work and its enduring influence on understanding Earth's systems, from climate dynamics to deep biosphere processes.

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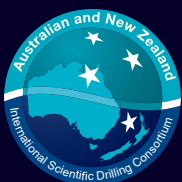
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