

# Challenger Wave



Monthly newsletter of the Challenger Society for Marine Science (CSMS)

## NEWS

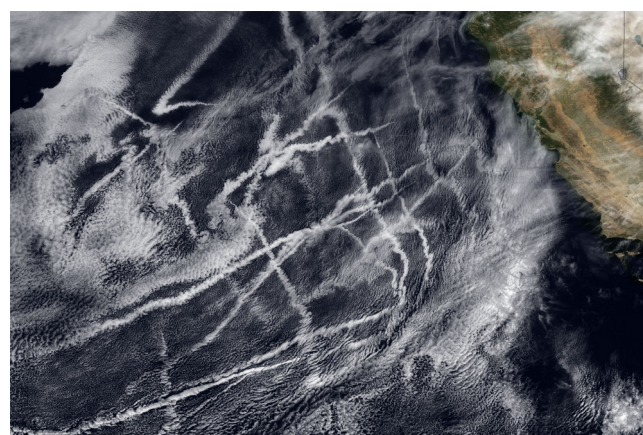
### Has reducing ship exhaust pollution accelerated global warming ?

A new study explored the climate effect of the mandated reduction of sulphur in ship exhaust emissions globally since 2020. Highly relevant to international policy, the study suggests that the shipping regulation has reduced how much light is being reflected back into space, which has likely contributed towards the record warming over the last few years.

International shipping, while invisible to most of us, has a large impact on climate and air quality. There are nearly 100,000 large ships within the global commercial fleet, accounting for over 90% of international trade. Traditionally, ships have burned dirty, high sulphur fuel that emitted large quantities of sulphur gas and aerosol. Particulate matter or droplets suspended in air are called aerosol. Aerosol includes airborne dust, mists, fumes and smoke and can be of primary origin (e.g. dust) or secondary origin (e.g. transformed from gases, including sulphur). 'Dirty' ship emissions increase the background sulphur aerosol levels over the ocean. The sulphur-containing aerosol act as cloud 'seeds', and condensation of water vapour onto these seeds lead to cloud formation. Not only do sulphur aerosol increase cloudiness but these polluted clouds are also generally brighter, due to the small droplet size of the water vapour, which results in more light being reflected back to space. Consequentially, ship emissions have likely had an unintended cooling effect on the planet, offsetting some of the warming due to greenhouse gases. However, the magnitude of this cooling effect is poorly known.

Aerosol, especially those containing sulphur, are a principal component of air pollution and can adversely affect respiratory and cardiovascular

health. Due to air quality concerns, the International Maritime Organization mandated an 80% reduction in the maximum allowed sulphur emission from global shipping in 2020 (IMO2020) so what is the climate impact of this drastic, large scale policy change ?



Ship tracks. Image courtesy of the National Oceanic and Atmospheric Administration (NOAA)

By using several models, this latest study estimates the change in aerosol induced-cooling as a result of the IMO2020 regulation. The study showed that the spatial patterns in the modelled reduction in cooling strongly correlated with the observed changes in clouds from satellite, with less light reflected back to space. This further correlated with the increased Northern Hemisphere surface temperatures during 2022–2023.

These findings suggest that the reduced sulphur emission since IMO2020, while improving coastal air quality, has accelerated global warming. However, the modelled reduction in cooling due to the regulation can only account for a fraction of the observed cloud changes in recent years, implying that although the shipping regulation contributed, it does not completely explain the record breaking temperatures over the last few years.

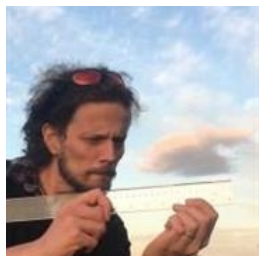
Dr Mingxi Yang, an author on the study, Chemical Oceanographer at Plymouth Marine Laboratory and lead investigator on the ACRUISE project that helped support this study, said: "This study represents our current best estimate of the impact of ship emission changes on climate, which still may be on the conservative side.

Aircraft sampling of ships emissions before and after IMO2020, as part of the ACRUISE project, showed that the shipping regulation not only changed the amount of sulphur gas being emitted but probably also made the ship-emitted aerosol less efficient at seeding clouds. However, this aspect is not yet accurately represented in models and thus, the full impact of the ship sulphur regulation on clouds still needs to be refined, which is on-going work. Understanding the impact of IMO2020 on climate is not just relevant for the current decade, but for several decades to come as the world aims to rapidly decarbonize and further reduce aerosol emissions."



The IMO2020 regulations can be seen as an inadvertent experiment in solar geoengineering, but in reverse as it caused warming. Ship sulphur reductions may have contributed a significant amount to the 2023 extreme temperatures in the Northern Hemisphere, but the estimated magnitude appears to be too small to be the only cause. Events like the significant El Niño-Southern Oscillation (ENSO) warming episode from mid-2023 would have played a role as well.

Dr Edward Gryspeerdt, author on the study and Royal Society University Research Fellow at Imperial College London, said: "To what extent are we accelerating climate change by cleaning up air quality faster than limiting greenhouse gas emissions? Our inability to provide a robust attribution of global radiative forcing and resulting temperature changes even three years after such a large experiment speaks to the huge challenges in managing any deliberate intervention due to natural variability".



To help refine the estimates of aerosol induced-cooling as a result of the IMO2020 regulation even more in the future, a better comprehension of ship aerosol emissions and access to ship position data is needed. Understanding the risks and benefits of emissions reduction and the difficulty in robust attribution highlights the large uncertainty in attributing proposed deliberate climate intervention. This study was led by Pacific Northwest National Laboratory (USA) in partnership with scientists from Florida State University (USA), Imperial College London (UK), University of Oxford (UK), University of California (USA), Plymouth Marine Laboratory (UK), University of Leeds (UK) and University of Maryland (USA).

### **Marine Technology Society and Society for Underwater Technology announce Martin "Marty" Klein as the recipient of the 2024 Captain Don Walsh Award for Ocean Exploration**



The Marine Technology Society (MTS) and the Society for Underwater Technology (SUT) are thrilled to announce Martin "Marty" Klein as the distinguished recipient of the 2024 Captain Don Walsh Award for Ocean

Exploration. This prestigious award recognizes an individual who has made outstanding, sustained, and international contributions to the development, application, or propagation of marine and underwater technology toward the advancement of ocean exploration.

Martin Klein, a name synonymous with ocean exploration, is a true pioneer in the field of underwater technology. Known as the "father of side-scan sonar," Marty's innovations have revolutionized oceanographic surveys and underwater searches. His ground-breaking work has made significant strides in marine technology, providing critical tools for the discovery and exploration of our oceans while also inspiring generations of ocean engineers.

Justin Manley, President of MTS, shared: "Marty Klein exemplifies the spirit of this prestigious award. His significant and continued innovation in our field, along with his unwavering dedication to mentoring young people, have left an indelible mark on the marine technology community. MTS

is proud to recognize Marty's legacy of growing the next generation of ocean explorers."

Marty has been involved in Ocean Exploration since 1961, when MIT Professor Harold "Doc" Edgerton introduced him to Jacques Cousteau, George Bass, Peter Throckmorton, Ed Link and many pioneers in the field. When Marty introduced his side scan sonar systems in 1967, there were no commercial units on the market. He helped to create an industry. There are now over 30 manufacturers of these systems, which have truly helped open the world of ocean exploration.

Benj Sykes, President of SUT, stated: "On behalf of the SUT, it is my pleasure to congratulate Martin Klein as the chosen nominee for the Don Walsh Award for Ocean Exploration, 2024. Marty's dedication to and support of ocean technology and its applications in ocean exploration, along with his contributions to education, make him a worthy recipient. His work has inspired the next generation of ocean professionals."

Beyond his technical achievements, Marty's commitment to education and giving back is unmatched. He plays an active role in shaping the next generation of ocean engineers across the globe. Marty has been an avid participant in MTS's MATE ROV Competition, inspiring countless young ocean explorers. Jill Zande, Executive Director of MATE, described Marty as "humble and unassuming, cringing at being called one of the 'grandfathers' of side-scan sonar, but his humility and dedication have profoundly impacted future ocean technologists."

Today, Marty supports organizations that parallel the pioneering spirit of his earliest work in ocean exploration. Katy Croff Bell, President of the Ocean Discovery League, shared: "I met Marty in 1999 when I was an ocean engineering student at MIT. When expanding the Board of Directors at ODL, Marty was at the top of my list. Marty is constantly pushing to take technologies further and figure out how we can improve the status quo; as a result, he has been instrumental in ODL launching a fundamentally new approach to ocean exploration via low-cost, accessible technologies and broadening the deep-sea community."

Marty's influence extends through his numerous publications, patents, and his involvement with various prestigious organizations, including the Explorers Club, the National Academy of Engineering, and the IEEE. His legacy is further cemented through the student scholarship he endowed at Memorial University, honouring his son's memory and supporting future ocean professionals.

Upon receiving the news of the award, Marty said: "I am humbled and honoured. When I was a student at MIT, I read with fascination the Life Magazine cover story about the historic deep dive to 35,813 feet in the Challenger Deep/Mariana Trench by Jacques Piccard and Don Walsh in the Bathyscaph Trieste. Little could I know that three years later, just as I was beginning my career, the nuclear submarine USS Thresher would sink, the Trieste would be called from San Diego to assist the project, and I would become intimately involved in the first ever deep water search. During that search the great Don Walsh became a hero of mine and an invaluable friend and mentor.", The Captain Don Walsh Award for Ocean Exploration will be presented to Marty Klein at the 2024 OCEANS Conference in Halifax, Nova Scotia this month September 2024.

### **The European Marine Board (EMB) Working Group on Marine CDR kicks-off**

On 29th-30th August 2024, the new EMB Working Group on Marine Carbon Dioxide Removal met for the first time during the kick-off meeting held at the InnovOcean site in Ostend (Belgium) and online. The meeting was chaired by Helene Muri from the Norwegian University of Science and Technology and Olivier Sulpis, CEREGE, Aix-Marseille University, CNRS, IRD (France).



You can find out more about the working group members and their aims [here](#)

Carbon Dioxide Removal (CDR) involves capturing CO<sub>2</sub> from the atmosphere and storing it long-term, i.e. for decades to millennia. This storage can be on land, in the Ocean, in geological formations or in products. To achieve the agreed climate targets, novel CDR methods are required including those linked to the Ocean. However, for marine CDR to be deployed responsibly more research is needed. The EMB Working Group on Marine Carbon Dioxide Removal will focus on monitoring, reporting and verification (MRV) of Marine Carbon Dioxide Removal activities. Being able to accurately monitor, report, and verify the amount of carbon durably removed over time, and to measure the environmental effects of the marine CDR technology, is essential to evaluate the efficacy and effects of technologies being tested in controlled field trials and to assess if they are viable for future deployment at scale.

The Future Science Brief will provide a state-of-the-art overview on the topic and conclude with relevant recommendations for policy and research funding. The document will be primarily written from a European perspective, but due to the global nature of marine CDR, it will have global relevance. The working group will develop a Future Science Brief, expected to be published in 2025.

### **Do you have a project that might be suitable for a masters student ?**

The Marine Alliance for Science and Technology for Scotland (MASTS) and the Making the Most Of Masters (MMM) aims to improve collaboration between work places and our partner universities by providing opportunities for marine focussed MSc students to undertake work based projects. These are adaptable across disciplines and key economic areas in Scotland, the format is a flexible one and projects can be desk, field or laboratory based.

The benefits of such a scheme include:

- Those choosing to host projects can utilise expertise from Scotland's leading universities in marine science and can access a pool of highly motivated and talented masters students.
- Students can undertake a real world project with real impact for the organisation, whilst improving their employability.

- Universities can develop and build upon links with industry, policy and NGOs, whilst raising the profile of their masters programmes.
- Masters Programme Coordinators can add value to masters programmes by embedding work based projects as an optional alternative to a more traditional dissertation.

If you would be interested in having a masters student complete their dissertation project with your organisation during spring/summer 2025, please complete the short [proposal form](#) and return to us at [masts@st-andrews.ac.uk](mailto:masts@st-andrews.ac.uk) before **16:00 on the 25th October 2024**. To find out more, please [visit](#) or don't hesitate to drop us an email.

## **IEWS**

### **National Subsea Centre and NOC Innovations partner to shape a stronger marine future**

The [National Subsea Centre](#) (NSC), a centre of excellence for subsea research and technology development, announced in August its newly formed partnership with [NOC Innovations](#), a Southampton-based facility making cutting-edge marine research and tailor-made autonomous technology available to organisations around the globe. The two centres will bring together specialist researchers, engineers and scientists to form a community dedicated to addressing marine-related issues that no single entity could tackle alone. Uniquely positioned both geographically and technologically, the NSC and NOC Innovations will draw on shared resources, insights and skills to help organisations make better decisions in the environments in which they operate.

With expertise spanning the fields of marine science, robotics, sensors and instrumentation, data science, artificial intelligence, imaging, object detection and classification, digital twins, simulation and remote sensing, the teams will work in unison to share research findings and deliver joint solutions that will help achieve sustainability and energy transition targets. The commonalities between the two centres will help generate stronger funding proposals, research agendas aligned with industry needs and societal challenges and structured programmes for

knowledge exchange such as seminars, workshops and training sessions.

In addition, the organisations will be better equipped to support new and existing industry partners through each centre's state-of-the-art offering, including the use of the NOC 'Innovation Centre', a world-class facility boasting specialist engineering and testing facilities and the NSC's warehouse, home to a Flowloop, Hyperspectral Imaging Lab, robotics area, Materials Lab, large workshop, yard space and Innovation Hub which can accommodate up to 75 people for a range of events. Mark Hamson, NOC Innovation Centre Manager, adds: "On behalf of NOC Innovations, I am thrilled to partner with the National Subsea Centre (NSC). This collaboration promises to unify our expertise and resources, fostering a powerful synergy in subsea research and technology. This agreement will also support our members by granting access to our respective centres."

Professor John McCall, NSC Director, said: "With a mission and values strongly aligned to our own, this partnership could not be a better fit for what we strive to achieve here at the NSC. The collaboration exemplifies our commitment to driving innovation and excellence in marine technology by leveraging our combined expertise and capabilities across a range of projects in the marine domain."

## SALTS

**Ocean Census Science Network collaborated with the Schmidt Ocean Institute (SOI) team to identify 20 potentially new marine species**

This expedition focused on [the Nazca Ridge](#), an underwater mountain range located 900 miles off the coast of Chile. This voyage marks the third expedition this year to explore the Salas y Gómez and Nazca Ridges for the [Schmidt Ocean Institute](#), a member of the [Ocean Decade Alliance](#), and its state-of-the-art research vessel, *R.V. Falkor (too)*. Earlier SOI expeditions in January and February revealed over [150 species previously unknown](#) to science, along with many instances of animals being observed in new areas.

Before these SOI expeditions, only 1,019 species had been documented in this part of the Pacific

Ocean. Thanks to these efforts, that number has now surpassed 1,300 and continues to grow. The new findings will be submitted to [the Ocean Census](#), an initiative [endorsed by the Ocean Decade](#) that aims to boost ocean exploration by 2030. The team on board SOI's *Falkor (too)* successfully captured the first-ever footage of a live [Promachoteuthis squid](#), a genus so elusive that only three species have been identified, with most specimens collected dating back to the late 1800s. Previously, the genus was known only from dead specimens retrieved from nets.



*Casper octopus* © Ocean Schmidt Institute

Additionally, the expedition documented a Casper octopus, marking the first time this species has been observed in the Southern Pacific. The team also encountered two rare *Bathyphasa* siphonophores, commonly referred to as flying spaghetti monsters. "The work our taxonomists have conducted aboard *Falkor (too)*, supported by the Schmidt Ocean Institute team, will significantly enhance our understanding of the distribution of remarkable life forms on these underwater mountains, including several that have never before been mapped or seen by human eyes," said Prof. Alex David Rogers, Science Director of The Ocean Census. This article was originally published on the Ocean Census website.

**Ambitious six-month study exploring how marine life helps the ocean store carbon**

An international team of scientists and engineers led by researchers at the National Oceanography

Centre (NOC), [University of Southampton](#) and [Heriot-Watt University](#) are in the midst of an intense six months of study to gain a better understanding of the role marine organisms play in storing carbon in the ocean. An exciting combination of field research and cutting-edge autonomous tech will provide rare in situ observations across a whole seasonal cycle with intense sampling across the most biologically active seasons.

Scientists have already completed the first of two ambitious expeditions, this time on NOC's world-leading research vessel RRS *Discovery*, kicking off months of fieldwork in the North Atlantic, south of Iceland. Scientists spent 37 days at sea to collect novel datasets and deploy robotic platforms to inform the next generation of climate modelling. One NOC's autonomous vehicles, ALR 4, has also completed its first ever country to country mission after being recovered by NOC engineers earlier in mid-August, crossing the Iceland Basin from Vestmannaeyjar to Harris, in the Scottish Outer Hebrides. ALR 4 travelled for over two months, equipped with cutting-edge sensors, many developed by NOC, gathering critical data for BIO-Carbon research and beyond.

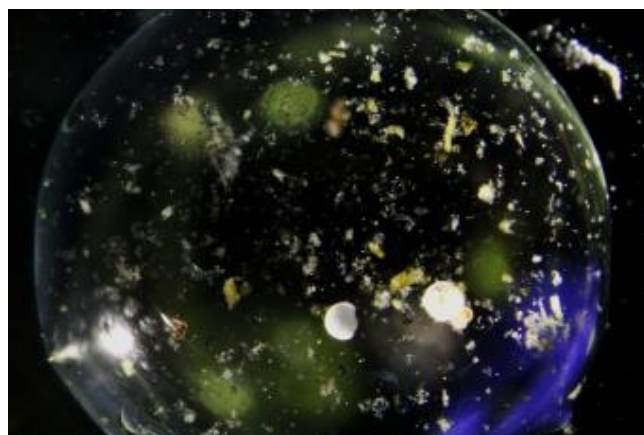


*Scientists on board RRS Discovery.*

Scientists know that marine organisms play a critical role in storing carbon in the ocean that might otherwise remain in the atmosphere. However, recent evidence suggests that climate models are not fully accounting for the impact of potential changes in biological processes. This could hinder predictions of the ocean's role in future carbon storage at a critical time. The ambitious [BIO-Carbon](#) programme, funded by the [Natural Environment Research Council](#) (NERC), will help deliver the new understanding necessary to make robust predictions for how oceanic carbon storage may alter under climate change.

Speaking about the BIO-Carbon Programme expeditions, Programme Champion, Dr Adrian Martin, said: "Scientists, business leaders and politicians are asking whether we can manipulate the ocean to remove carbon dioxide from the atmosphere to reduce the effect of climate change. We clearly need to understand the side effects first, yet we still lack basic knowledge of how marine life will respond to climate change even before we perturb it further. These expeditions and the wider BIO-Carbon programme will deliver fundamental insights that will allow us to make robust predictions and informed decisions." The fieldwork and programme seek to address three critical climate relevant challenges.

The project of Professor Stephanie Henson from NOC is gaining a better understanding of how climate change will affect the rate at which the marine ecosystem releases carbon dioxide by using organic carbon as a source of energy, in a process called respiration. In addition to using advanced cameras and robots to examine how carbon in dead organisms is consumed as it sinks, Stephanie and her team have deployed a new piece of equipment that acts like a freely drifting mini laboratory, which is quantifying the rate at which organic material is being respired in situ.



*A drop of water containing sinking material which was collected at 120 m depth with a drifting collector during a BIO-Carbon experiment.*

Led by Professor Mark Moore from the University of Southampton, another project is exploring primary production, the process by which carbon is removed from the surface of the ocean and transformed into organic matter. Primary production supports virtually all life in the sea. By combining elegant experiments that were

conducted on board RRS *Discovery* with observations made by a fleet of robots and drifting floats throughout the year, Mark and his team are examining the relative importance of the availability of light and nutrients, as well as consumption by larger organisms, in controlling this key process.

Fieldwork led by Professor Alex Poulton from The Lyell Centre at Heriot-Watt University is gaining a better understanding of how specific organisms, called coccolithophores, which build intricate "shells" through a process called calcification, can affect the ability of seawater to absorb carbon dioxide from the atmosphere. To do this, Alex and the team have undertaken novel measurements and experiments at sea, using an innovative suite of new sensors on the ship, on ocean robots and on satellites to look at how viral infection and consumption by small animals influence coccolithophore "blooms", often referred to as "white waters" or "white tides" by sailors. During the Spring expedition, the team encountered a massive bloom of coccolithophores in the far northeast of the Atlantic. The current bloom in the Iceland Basin to the South of Iceland is roughly the size of Scotland.



The ALR team just after recovery at Leverburgh, Isle of Harris. Photo taken by: Donald MacLennan (Sound of Harris Shellfish)

Additionally, a joint BIO-Carbon and FMRI mission has seen the use of two autonomous vehicles, ALR 4 and ALR 6, both equipped with a suite of cutting-edge sensors to analyse the biology and chemistry of the ocean. The sensors, have provided the scientists with unprecedented amounts of information on the changing conditions in the ocean in near-real-time. This is the first time NOC engineers have deployed two

ALRs simultaneously for one mission, pushing the boundaries of robotic ocean exploration.

The forthcoming autumn BIO-Carbon expedition onboard the NOC-operated RRS *James Cook* will see the retrieval of the robotic platforms deployed on the spring expedition and a continuation of groundbreaking BIO-Carbon fieldwork. Find out more about the [BIO-Carbon programme and the fieldwork](#) that is being undertaken.

## CALENDAR

**23th-26th September 2024: IMBIZO7, Transitioning towards Sustainable Ocean Governance by 2030, Commitments and Challenges**

*Rabat, Morocco*

IMBeR will hold its seventh IMBIZO (the Zulu word for 'a gathering') at the Institut Agronomique et Vétérinaire Hassan II (IAV) in Rabat, Morocco. IMBeR aims to promote and enable transdisciplinary marine research towards ocean sustainability and its governance. Topics addressed during IMBIZO7 will showcase current and emerging research, and explore potential solutions towards sustainable ocean governance by 2030, the target of multiple global sustainability initiatives.



We will follow the usual IMBIZO format of three distinct but interacting workshops. To optimise discussions, the number of IMBIZO7 participants will be limited to about 120 people (around 40 per workshop). The workshop topics are:

1. Science based adaptive management and policy responses to the causes and consequences of eutrophication.
2. A framework for development of social-ecological models of transformative change for sustainable ocean management.

3. Governance transformations for resilient fisheries and aquaculture: Progressions, challenges and opportunities, [imber.info/imbizo7-workshop-3/](http://imber.info/imbizo7-workshop-3/).

Plenary keynote presentations and poster sessions will enable you to learn about the work of participants in other two workshops.

**14th-18th October 2024: 43<sup>rd</sup> CIESM Congress: Marine and Cultural Heritage in the Heart of the Mediterranean**

*Palermo, Italy*

Join us after a 2-year hiatus imposed by the global pandemic and subsequent issues, we are excited to resume our traditional marine research showcase. This event will foster scientific excellence and promotes peaceful dialogue across the Mediterranean and Black Sea basins. Sicily, the chosen location for our next congress, offers a stunning backdrop, combining marine science with rich coastal heritage in a region steeped in cultural and historical significance.

Dive deep into the realm of open science with our first morning plenary panel. This strategic discussion will explore the benefits and challenges of open science practices, towards more sustainable and reliable scientific publication policies. Join leading experts debating on popular science, unbalancing and distorting science, incentives versus regulations, science marketing and non commercial licences, and ethical use of AI.



You can now register [online](#). Please, do not hesitate to contact us if you need any additional information, but be sure to check first our [Congress webpages](#).

Our 2024 CIESM (The Mediterranean Science Commission, headquartered in Monaco) Congress will explore a wide range of marine disciplines, featuring multidisciplinary scientific sessions and contextual side events that will immerse you in the unique Sicilian atmosphere. Save the date and stay tuned for regular updates on the rich scientific and cultural programme throughout 2024.

**17th-19th October 2024: Arctic Circle 2024 Assembly**

*Reykjavik, Iceland*

For more information, <http://www.articcircle.org>.



A new initiative, the [Business Forum](#) will be announced at this assembly. Participants will benefit from a wide range of connections, opportunities and networking events, along with discussions on future trends, entrepreneurship and finance. [Registration](#) is open, and for special hotel rates visit [the assembly rates](#). The draft programme is available [here](#).

**18th-20th October 2024: 'Archwiliwch ein planed - Explore our planet' public event**

*Cardiff, UK*





In partnership with the Natural Environment Research Council (NERC) and Techniquet, Cardiff, we are excited to announce a free public event 'Archwiliwch ein planed - Explore our planet'. The event will offer a blend of hands-on attractions and in-person talks led by the UK's leading environmental scientists, and we're even bringing one of our world-leading research vessels RRS *James Cook*.

'Archwiliwch ein planed - Explore our planet' will include free, ticketed access to Techniquet, the Cardiff based science discovery centre: focused on exploring the world of science, technology, engineering and mathematics for schools, families and adult visitors. Dr John Siddorn, NOC CEO, said: "This is a unique opportunity for the public to visit a working research ship and understand what life on the ocean is like for our researchers and crew. Our scientists and technologists can be at sea for weeks at a time, carrying out critical research under difficult conditions. It takes great skill across a range of disciplines to understand the ocean. Adults and children can see first-hand what it's like on the ship, and we may even inspire some to become the oceanographers of the future".

### **5th-7th November 2024: Marine Alliance for Science and Technology, Scotland (MASTS), annual science meeting**

*Glasgow, Scotland*

The MASTS ASM will take place at the Technology & Innovation Centre, and we have officially opened the call for special session and workshop ideas. Stay up to date with all the latest news on our [ASM webpage](#). The release of early bird tickets for the 14th Annual Science Meeting (ASM) 2024 are officially open; secure your spot today with early bird pricing. Limited online attendance options are also available. Go straight to our [events page](#) to get your early bird ticket.

**Special sessions** (focussing on a specific topic or area of science) can take place on either Tue 5th or Wed 6th November. They would be in plenary in one of the large lecture theatres, may have the option of remote viewing and are generally 2 hours long. Special session organisers can have a call for abstracts or devise a programme of invited talks.

We are pleased to confirm our first special session for the 2024 MASTS ASM. Pitcairn's

MPA (Marine Protected Area) is the 3rd largest in the world, is a platinum level Blue Park Award winner, and its purity as a fully intact marine ecosystem provides an important scientific reference point in measuring the impact of climate change. The session will cover the ambition of the new Marine Science Base on Pitcairn, scientific evidence on the health of marine biodiversity through recent science expeditions and the efforts of the Pitcairn Islands Government in protecting such a large MPA, with the support of the Blue Belt Programme.

As part of the MASTS Annual Science Meeting, Prof William Austin (University of St Andrews) and Prof Hilary Kennedy (Bangor University, Emeritus) are hosting a workshop on "Filling knowledge gaps and identifying priorities for Blue Carbon". This workshop will take place in-person in Glasgow on Thursday 7th November (1030-1600). Part of the workshop will be dedicated to talks on blue carbon, and abstracts are now invited for short talks (10-15mins) that illustrate the growing power or constraints of current data sets, modelling or mapping that can advance or limit the evidence base, conceal or reveal the priorities needed to support Blue Carbon (BC) Ecosystems inclusion in national and international policy as well as carbon accounting.

A current grouping of BC ecosystems (BCE), based on the evidence available to support climate mitigation, are termed "actionable" and include seagrass, tidal marsh, and mangrove. Another group of BCEs, termed "emerging" include macroalgae, tidal flats and subsurface sediments, while a third grouping are termed "non-actionable" (sometimes also referred to as "supporting" BCEs) and include corals, shellfish and maerl. If you would like to submit an abstract for this workshop, please submit your abstract using [this form](#) before close on Tuesday 1st October.

We are pleased to announce that MEDIN Marine Data will be running a workshop at this year's Annual Science Meeting on "Marine Data Management, Governance, and the MEDIN Toolset". With data management being such a critical skill, underpinning the integrity, efficiency, and impact of research, this workshop will enhance attendees' knowledge and skills in marine data management as well as introducing MEDIN's catalogue of useful resources. This is an open workshop, but particularly aimed at

PGRs. Find out more below and check MEDIN's website for more workshops; [find out more here](#).

“Linking conservation/restoration projects with community empowerment”. The purpose of this workshop is to start a discussion regarding how to transition existing marine conservation/restoration research projects into ongoing community-led environmental projects through community empowerment. It will include short presentations by those working with communities on conservation/restoration projects, detailing lessons learned and best practice. This will be followed by a facilitated session to identify a generic theory of change.

“Tracking top predators in marine renewable energy development areas”. An opportunity for the marine wildlife tracking community (i.e., academia and industry) to come together to identify key knowledge gaps and provide “best practice” guidance on the advantages and limitations of tracking data in the context of assessing effects of marine renewables on wildlife.

“Innovations in sea lice monitoring”. Scotland is undergoing a new approach to sea lice management through the new sea lice risk assessment framework. The framework calls for improved sea lice monitoring methods, both targeting the in-water larval stages as well as automation of sea lice counting on farms. This workshop will look at innovations in methods for monitoring sea lice.

Abstracts are invited for 12-minute presentations or 5-minute speed talks, for a special session that will explore the theme: ‘Marine mammals in an Ocean of Change’. Contributions are welcomed from all career stages, from anyone working on this topic that would like to present (e.g. academia, consultancy, industry). We would encourage talks on topics related to marine mammals and changing oceans (for example, related to climate change, anthropogenic impacts (e.g. fishing activity, vessels, renewable developments)). Projects do not need to be complete or have results to be considered for inclusion, we would welcome early-stage PhD students or similar to consider submitting abstracts.

“Designing multiple driver experiments”. This workshop is aimed at students and ECRs new to

multiple driver experiments. It is focused on the design of manipulation (laboratory or field) experiments, though many of the concepts are applicable to observational data.

### **5th-7th November 2024: Marine Autonomy and Technology Showcase**

*Southampton, UK*

MATS [registration](#) is now open. MATS has proudly grown over the last decade to become one of the foremost events in the marine technology calendar, attracting presenters and delegates from around the world. Huw Gullick, Managing Director of NOC Innovations, said: "This will be our 10th MATS and whether you are joining us for the first time or are an event regular, we are looking forward to celebrating the occasion with you."

### **25th-28th November 2024: The 4th Mediterranean Geosciences Union Annual Meeting.**

*Barcelona, Spain*

The 4th MedGU Annual Meeting will be held this year in-person and online. Visit our website ([www.medgu.org](http://www.medgu.org)) to learn more about the event. On this occasion, we are pleased to invite you to attend the conference and share/discuss your latest research findings. Your participation in-person or virtually will support MedGU's mission of ensuring a sustainable future for humanity in the region and for the planet.

### **11th-13th March 2025: The 4th Ocean Visions Biennial Summit.**

*Vancouver, Canada*

We're thrilled to announce that the 4th [Ocean Visions Biennial Summit 2025](#) will be held in March in Vancouver, Canada. This action-oriented event will bring together scientists, policymakers, innovators, funders, students, and others to explore solutions and strengthen partnerships to help restore our ocean and stabilize the climate. We invite you to [be part of the movement](#). Join a multidisciplinary community focused on advancing solutions to the ocean's most pressing challenge, climate disruption.

Programming will be highly interactive and include ample opportunities for collaboration. Participants can look forward to:

- **Sharing & Learning:** Gain insights from inspiring keynote speakers and panel

discussions on the forefront of ocean-climate research and innovation.

- **Workshops:** Dive deeper with fellow attendees on challenges and issues of mutual concern.
- **Networking:** Connect with leading experts, industry pioneers, and decision-makers shaping the future of ocean-climate health through time devoted to building and strengthening relationships.
- **Collaborating:** Forge partnerships and collaborations to accelerate the impact of

your work in ocean-based climate solutions through interactive, action-oriented sessions and activities.

Registration information coming soon; we look forward to hosting this special convening of the ocean-climate community, our fourth biennial summit, and hope to see both new and familiar faces.

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The CSMS email address is [challenger.society@gmail.com](mailto:challenger.society@gmail.com). Contributions for next month's edition of Challenger Wave should be sent to: [john@myocean.co.uk](mailto:john@myocean.co.uk) by the 30th September.

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## ***JOBS and OPPORTUNITIES***

### **Senior Research Associate in Shelf Sea Oceanography**

An exciting opportunity has arisen for a senior researcher in shelf sea oceanography to join the Centre for Ocean and Atmospheric Sciences in the School of Environmental Sciences in order to undertake research into physical and biogeochemical processes around offshore wind turbines. Dr Hall's research (<https://research-portal.uea.ac.uk/en/persons/rob-hall>) is on ocean dynamics in regions of complex topography using both autonomous vehicles and conventional at-sea observations.

The post is linked to the research project eSWEETS3 (Enabling sustainable wind energy expansion in seasonally stratified seas), which will investigate the possibility of enhanced thermocline mixing caused by tidal currents flowing past floating offshore wind turbines, and the effects that the mixing has on biogeochemistry. The post will involve a 6-month autonomous ocean glider campaign and a major research cruise (3 weeks in summer 2025). You will be responsible for processing, calibrating and quality control of physical and biogeochemical ocean glider data (Slocum and Seagliders), then lodging the data with the British Oceanographic Data Centre. Following the glider campaign and cruise, you will analyse and interpret the glider data and take the lead on writing publications. The project is in collaboration with leading marine scientists at multiple UK institutions and offers an excellent opportunity to further develop your career.

You should hold (or have submitted before commencing in role) a PhD in physical or biogeochemical oceanography or have equivalent independent research experience and have led publications in respected international scientific journals. You should be able to demonstrate research experience relevant to the project, have excellent communication skills, and have presented results at scientific conferences.

This full-time post is available from 6 January 2025 on a fixed term basis for 22 months.

For more information and to apply, <https://vacancies.uea.ac.uk/vacancies/1091/senior-research-associate-in-shelf-sea-oceanography-ra2248.html>

**There are jobs in the IMBeR newsletter**

- [Until positions are filled, reviews start on September 22] [Assistant Professors of Marine Science](#), Marine Biology: Nekton Ecology at Coastal Carolina University in Conway, US.
- [September 26] [Assistant Professor Position in Marine Biology](#) at the University of Lisbon
- [October 1st] [Assistant Professor in Ecology](#), Macalester College, Environmental Studies
- [October 1st] [Assistant Professor in Natural Resource Science and Management](#), Macalester College
- [October 15] [Assistant Professor Coastal or Marine Ecology](#), University of California, Santa Cruz
- [No date] [Coastal Fisheries Management and Policy: Tenure-Track Faculty Position](#), University of Hawai'i at Mānoa
- Proficiency in Portuguese language.
- [November 29; Applications review from September 30] [TWO Marine Staff Scientist Positions](#), Smithsonian Tropical Research Institute, Panama.
- [Until positions are filled] [Technician for research support in the Marine Science Section](#) at OIST, Okinawa Institute of Science and Technology, Japan.

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**There are jobs in the MASTS newsletter**

**[New vacancies:](#)**

- Chief Executive Officer – [Scottish Seabird Centre](#) – 26/09/24

**[Still open vacancies:](#)**

- Youth Advocacy Officer – [Sea Changers Scotland](#) – 23/09/24
- Scientific Fisheries Observer – [Falkland Islands Government](#) – 22/09/24
- Postdoctoral scholarship (2 years) within biophysics and photonics – [Umeå University](#) – 30/09/24
- Postdoc in marine climate change and algal biophysics – [Umeå University](#) – 21/09/24
- Future Marine Research Infrastructure (FMRI) Science Advisory Group member vacancies – [NERC](#) – 25/09/24
- Associate Director (Science & Technology) – [National Oceanography Centre](#) – 22/09/24