

Challenger Wave



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

NEWS

Underappreciated marine trace gas plays key role in climate cooling but we need to pay it more attention

A new evidence review, published in Nature Reviews Earth & Environment this week, draws attention to the often overlooked marine trace gas dimethylsulfide (DMS) and its importance for climate cooling www.pml.ac.uk/News/The-cool-twin-of-carbon-dioxide-gets-some-worthy-a.

Atmospheric DMS plays a key part in the production and growth of atmospheric sulfate aerosols that influence the radiative properties of clouds, and ultimately affects Earth's climate. The natural climate cooling effect of DMS is estimated to be of a similar magnitude to the warming that has been driven by human CO₂ emissions.

Dr Frances Hopkins, www.pml.ac.uk/People/Dr-Frances-E-Hopkins, lead author on the review paper, doi.org/10.1038/s43017-023-00428-7, and Marine Biogeochemist at Plymouth Marine Laboratory, commented:



"DMS is a fascinating and important marine trace gas, yet we simply do not know enough about it. We need a global long-term sampling programme specifically for DMS to help fill these critical data gaps and help us gain a

better understanding of key processes. This is the first comprehensive review on DMS biogeochemistry research for over 10 years so we hope this will be a valuable resource for anyone doing research on seawater sulfur and/or marine aerosols."

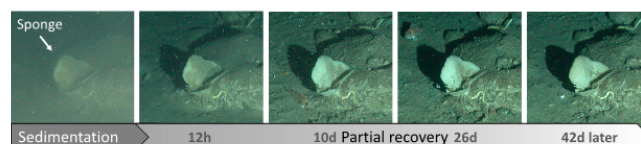
If you have any questions or would like to speak with any of the authors then please do not

www.challenger-society.org

hesitate in contacting me, Kelly Davidson, Senior Communications Officer, kdav@pml.ac.uk.

Scientists observe real-time impacts of industrial activity on deep-sea sponges

Scientists from the National Oceanography Centre (NOC) and the University of Edinburgh have made the first real-time photo observations of the impacts of offshore oil well drilling on deep-sea sponges. The photos show a sponge being covered in sediment over about 5 days, and then appearing to partially recover by removing that sediment over about 40 days.



Sedimentation is an impact of many offshore industries, including oil and gas exploitation, dredging, fishing and seabed mining. Dr Jennifer Durden, NOC Deep Sea Ecologist who led the study, said "Monitoring impacts to remote habitats, such as the deep sea, is difficult, but photography is now making that possible. This research showed how photos could be used for environmental monitoring during industrial activities, and also provides real-world observations that could help in making better environmental impact assessments."



Sponges are an important part of the seabed environment, providing habitat for other organisms and cycling carbon and other nutrients. Dr Johanne Vad, a sponge expert from the University of Edinburgh and a co-author of the study, said "Lab studies have shown that sponges are vulnerable to sedimentation, which can clog them and reduce their feeding,

breathing, and growth. The sponge in this study appeared to recover externally somewhat, by moving either from tides and/or it moving itself. Observing the condition of the sponge during and after a real sedimentation event provides context to lab studies which help us understand marine ecosystems' resilience, and its limits, to human pressures."



The photos were taken with a time-lapse camera placed on the seafloor during the drilling of a Hurricane Energy oil well off the coast of Shetland in autumn 2019. Hurricane Energy supported the project, as part of SERPENT (Scientific and Environmental ROV Partnership using Existing iNdustry Technology), serpentproject.com/about, an international collaboration established by NOC in 2003 between offshore oil and gas companies and ocean researchers.

Dr Andrew Gates, NOC Research Fellow and Head of SERPENT, said, "This project is an important example of how we can understand industrial impacts to the ocean by partnering with industry. Working with industry gives access to sites during real industrial operations that would otherwise be closed to researchers and allows up-close observation of impacts on the surrounding marine environment. This research supports our commitment to pursue a deeper understanding of the ocean and life beneath the waves, aligned to the UN Ocean Decade's goal to secure and protect ocean resources and ecosystems." Read the paper at doi.org/10.1016/j.marpolbul.2023.114870.



Engaging parliament in plastics

NOC (National Oceanography Centre) scientist Dr Alice Horton addressed parliamentarians in Westminster as part of an All-Party Parliamentary Group (APPG) for the Ocean Briefing on Plastic Pollution.



Dr Alice Horton and Sally-Ann Hart MP (Chair of APPG for the Ocean)

Alice, who published the first studies of microplastics in freshwaters in the UK, discussed the challenges of locating where plastics released into the environment eventually end up. Alice also discussed the importance of coming to a better understanding of how degraded plastics in the form of micro and nanoplastics impact our ecosystems and human health.

Announcing the next CIESM Director General

Dr Laura Giuliano, currently Director of Science, has been elected by the CIESM Board, by the widest margin, with only one country abstaining, as the next Director General (DG) of the Mediterranean Science Commission. The CIESM Member States present at the annual Board Meeting held on 24th May at the Oceanographic Institute in Paris had only praise for both the person and the scientist.

Laura Giuliano will assume her new position in September. After the results of the vote, Frédéric Briand, who will remain as DG until the autumn to ensure an optimal transition, declared: "I cannot think of a more qualified successor than Laura Giuliano: she is a brilliant marine researcher, highly respected in our vast scientific family and she knows first-hand the many faces and also the various engines that drive the CIESM ship. Laura is above all a woman of dialogue, with a deep understanding for the



many communities on our diverse Mediterranean and Black Sea shores. As a Sicilian, born on an island lying in the middle of the sea where conditions can be harsh, she is above all a woman of convictions endowed with a strong temperament. Comforted by the trust of both our Board and our Science Council, Laura will keep CIESM on a solid scientific course and will know how to resist undue political pressures. I could not be happier; this augurs a long, bright future for our Commission."

Award for NOC's Into the Blue podcast

NOC's Into the Blue podcast has been awarded the prestigious Babcock First Sea Lord's Award for Best Use of Digital Media at the Maritime Media Awards 2022. Since 1995, the Maritime Media Awards has honoured journalists, authors, filmmakers, digital creators and others whose work in the media has served to create a greater public understanding of maritime issues, and of the UK's dependence upon the sea.

Celebrating the success Peter Ryde NOC's Head of Marketing said: "We are over the moon that our hard work and innovation to make NOC's Science and Technology accessible to be recognised by the industry. This success would not have been possible without the skills of our videographer Dan Bourne, the determination of our host Will Dixon, and all of our guests, who speak passionately about the ocean. I'm looking forward to launching season two of the podcast this summer."



Will Dixon and Peter Ryde picking up the award in London

The first of the Maritime Foundation's own awards, the Babcock International First Sea Lord's Award for Best Use of Digital Media was

awarded to NOC for the 'stimulating and engaging' podcast. Launched in 2022, Into the Blue has just concluded its first season, and has already dived into range of hot ocean topics spanning from the depths of the Twilight Zone all the way through to satellite oceanography in space. Featuring a variety of scientists and experts from the National Oceanography Centre (NOC) and beyond, Into the Blue helps listeners to gain a deeper knowledge of the ocean, the issues it faces, and the current research that is furthering this understanding in a changing climate.

The second season of Into the Blue will launch on World Ocean Day (8th June), kicking off with Dr Helen Czerski, discussing her journey to write her brand-new book, 'Blue Machine: How the Ocean Shapes our World'. We'll then be boarding RRS Discovery to catch-up with Captain Antonio Gatti for a unique insight into the responsibilities and duties of being the captain of a Royal Research Ship. There are many ways to listen and watch Into the Blue; whatever your preference is, we've got it covered. View all platforms and catch up on season one, noc.ac.uk/education/educational-resources/into-the-blue-podcast.

Two vacancies on Challenger Society for Marine Science Council

The Challenger Society Council currently has 2 vacancies to be filled by September 2023. Please see below or our website, www.challenger-society.org.uk/Current_vacancies, for further information. The roles are undertaken remotely and Challenger Council meetings are hybrid. If you are interested in applying for a council role please email kathen@bas.ac.uk with a short statement of interest (1 page of A4 maximum) by June 15th 2023. We are looking to fill the role of Honorary Treasurer and a new position for the Publications and Website Portfolio. The roles and responsibilities of each portfolio are detailed below.

The Challenger Society is working towards being a fully equitable and inclusive organisation, www.challenger-society.org.uk/EDI_Statement, The Society encourages applications from individuals from underrepresented and/or diverse backgrounds. Those in the early stages of their career are encouraged to apply for the roles,

www.challenger-society.org.uk/ecr_definition, and please note that those in non-research focused roles are also encouraged to apply.

Honorary Treasurer

The Challenger Society is looking for its next Honorary treasurer, to take up the post by September 2023. The treasurer normally serves a 4-year term on the council. If you have any questions about the role please contact Ed Mawji (ezm@noc.ac.uk). The Treasurer's tasks include, but are not necessarily limited to:

- Organising the annual audit of the CSMS accounts which are then submitted to Companies House and the charity commission.
- Invoice the CSMS sponsors
- Liaise with SCOR to organise the payment of the UK annual SCOR fees.
- Act as one of the Officers of the Society and ensure the Society's records with the Charity Commission and Companies House are up to date
- Arrange payment of all awards (Travel awards/Stepping stones etc)
- Report financial updates to the Challengers Council at the meeting. Present the accounts at AGMs.
- Arrange the CSMS yearly insurance and make payments associated with Ocean Challenge.
- Handle the UK Polar Network account, including reimbursements and invoices

Publications and Website Portfolio

The Challenger Society for Marine Science Council is searching for a new Publications and Website Portfolio Officer. This is an exciting opportunity to join the Challenger Society council, which is a great way to expand your network and raise your profile within the Challenger marine science community. The responsibilities within the role are as follows:

- Update webpages and liaise with co-opted Website Development Lead
- Upload and circulate Challenger Society publications and news items (Ocean Challenge and Challenger Wave)
- Upload travel and stepping stones reports
- Circulate communications to members via our mailing lists

The role will require approximately 1 hour during

an average week. Full training will be provided and no specialist knowledge is required for the website or mailing list. If you have any questions regarding the role, please email chelsey.baker@noc.ac.uk. - **Chelsey Baker, Membership Portfolio Officer**

ASSW 2024 Science Day

The Arctic Science Summit Week (ASSW) 2024 Science Day will be held at the Dynamic Earth, www.dynamicearth.co.uk/, on 26 March 2024. The day's theme of "Arctic Coasts" encompasses all International Arctic Science Committee (IASC) Working Group areas, iasc.info/our-work/working-groups. There will be a mixture of invited talks on the day's theme from each working group, panel discussions on net zero arctic research aspirations and on effects of arctic environmental change on coastal communities, and a public facing Keynote presentation. Abstract submission for poster presentations will be open to all ASSW attendees.



"Our Dynamic Earth" is a public facing science centre focussed on the natural history of planet Earth. Alongside the IASC working group talks and panel discussions, there will be public displays related to scientific community research activities in the Arctic. We invite ASSW participants to get in touch with the local organising committee about bringing their displays to this space, assw.info/program/science-day-2024.

Forthcoming Challenger Special Interest Group meetings

The Ocean Modelling Special Interest Group (SIG), www.challenger-society.org.uk/Ocean_Modelling, and the Advances in Marine Biogeochemistry (AMBIO) SIG, www.challenger-society.org.uk/Advances_in_Marine_Biogeoche

mistry, are hosting meetings in September 2023. The Ocean Modelling SIG meeting is being held on the 5th and 6th of September at the National Oceanography Centre in Southampton. Registration is now open. The AMBIO SIG meeting is being held on the 6th-8th of September at the Plymouth Marine Laboratory. Registration will open very soon. See the Calendar section below.

Three IMBeR online Earth Observation Training Sessions

Two more in July and September and you can catch up on the first session by registering at imber.ceotr.ca/machform/view.php?id=157808.



IMBeR
Expanding EO data usage to address climatic changes in the marine biosphere of the northwest Pacific and Indo-Pacific regional seas (EO-WPI)

EO-WPI Online Training: Session #1
Date & Time : 16:00-17:30 (UTC+8), 25 May 2023

Mati Kahru
Scripps Institution of Oceanography, UCSD
Creating and analyzing time series from satellite data

Yan Bai
Second Institute of Oceanography, MNR
Satellite-based ocean carbon fluxes estimation

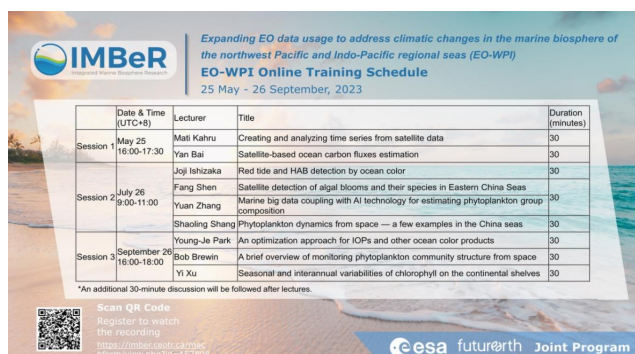
Scan QR Code
Register to watch the recording
<https://imber.ceotr.ca/machform/view.php?id=157808>

esa futur@rth Joint Program

EO-WPI Online Training: Session #1

Expanding EO data usage to address climatic changes in the marine biosphere of the northwest Pacific and Indo-Pacific regional seas (EO-WPI)
16:00-17:30 UTC+8, 25 May

Full schedule for three sessions



IMBeR
Expanding EO data usage to address climatic changes in the marine biosphere of the northwest Pacific and Indo-Pacific regional seas (EO-WPI)

EO-WPI Online Training Schedule
25 May - 26 September, 2023

Session	Date & Time (UTC+8)	Lecturer	Title	Duration (minutes)
Session 1	May 25 16:00-17:30	Mati Kahru	Creating and analyzing time series from satellite data	30
		Yan Bai	Satellite-based ocean carbon fluxes estimation	30
		Joji Ishizaka	Red tide and HAB detection by ocean color	30
Session 2	July 26 9:00-11:00	Fang Shen	Satellite detection of algal blooms and their species in Eastern China Seas	30
		Yuan Zhang	Marine big data coupling with AI technology for estimating phytoplankton group composition	30
		Shaoling Shang	Phytoplankton dynamics from space — a few examples in the China seas	30
		Young-Je Park	An optimization approach for IOPs and other ocean color products	30
Session 3	September 26 16:00-18:00	Bob Brewin	A brief overview of monitoring phytoplankton community structure from space	30
		Yi Xu	Seasonal and interannual variabilities of chlorophyll on the continental shelves	30

*An additional 30-minute discussion will be followed after lectures.

Scan QR Code
Register to watch the recording
<https://imber.ceotr.ca/machform/view.php?id=157808>

esa futur@rth Joint Program

Royal Society Special Issue

Royal Society Publishing has recently published a special issue of Philosophical Transactions A entitled Heat and carbon uptake in the Southern Ocean: the state of the art and future priorities organised, edited by Andrew J S Meijers, Corinne Le Quéré CBE FRS, Pedro M S Monteiro, Jean-Baptiste Sallée, and the articles can be accessed directly at www.bit.ly/TransA2249.

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY A

MATHEMATICAL, PHYSICAL AND ENGINEERING SCIENCES

Heat and carbon uptake in the Southern Ocean: the state of the art and future priorities

Discussion meeting issue organised and edited by Andrew J.S. Meijers, Corinne Le Quéré CBE FRS, Pedro M.S. Monteiro and Jean-Baptiste Sallée

Published 08 May 2023. Available online and in print.



The print issue can be purchased at the reduced price of £40 per issue by contacting sales@royalsociety.org.

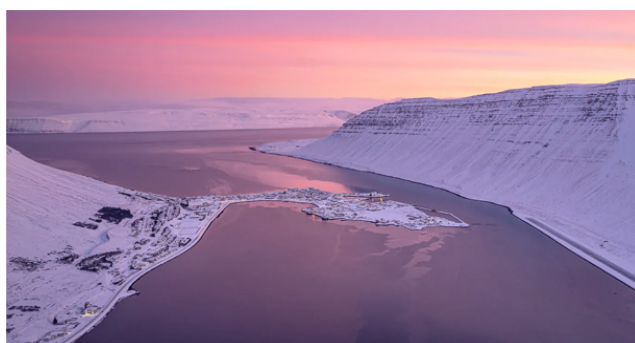
Call for Grímsson Fellows now open

Grímsson Fellowships are open to scientists, researchers, experts, scholars and writers of any nationality. The fellows are invited to stay in the House of Grímur in the historic town of Ísafjörður, the capital of the beautiful Westfjords region in Iceland. In addition to the free stay, the Fellowship includes travel to and from Iceland, as well as a stipend contribution towards living cost.

The Grímsson Fellowship program will appoint annually 2-4 fellows in order to encourage research and writing in an idyllic space close to the Arctic. The aim is to promote cooperation and knowledge as well as relations between international and Icelandic communities. The Fellowship will be open to candidates in the fields of Climate Change, Environment, Social Sciences, Natural Sciences, Health Sciences, Oceans, Sustainability, Clean Energy, the Arctic, History, as well as Literature.

The program offers a 2-6 weeks stay in Grímshús, the House of Grímur, where President

Ólafur Ragnar Grímsson was born and his family lived. President Grímsson now owns the apartment which will house the fellows and has made it available for the program. In addition to living in this splendid old house which offers excellent working space, the fellows can have access to the Town Library in the magnificent old hospital, a one-minute walk from the House of Grímur, or in the facilities of the University Centre of the Westfjords, located further downtown. Air fare for the fellow from Icelandair's European and American destinations will be covered as well as 500 US dollars per week stipend as a contribution towards living expenses.



No obligations are attached to the Fellowship other than participating in a seminar or a dialogue or giving a lecture either at the University Center of the Westfjords or with one of the main universities in Iceland. The Fellowship was launched in November 2022 at a conference in Ísafjörður opened by Katrín Jakobsdóttir, the Prime Minister of Iceland. Among other speakers were Ólafur Ragnar Grímsson, former President of Iceland, Jón Atli Benediktsson, Rector of the University of Iceland; Ragnhildur Helgadóttir, Rector of Reykjavík University; Eyjólfur Guðmundsson, Rector of the University of Akureyri; Peter Weiss, Director at the University Center of the Westfjords along with a number of scholars and scientists from the Westfjords region.

The international program is initiated by and within the auspices of the new Ólafur Ragnar Grímsson Centre, founded in late 2021 at the instigation of the Government of Iceland to honour the international legacy of President Grímsson who is the founding father of Arctic Circle. He remains the longest-serving President of Iceland; from 1996-2016. The fellowships are based on participation by the University of Iceland, University of Akureyri, Reykjavík University, the University Centre of the

Westfjords and the biotechnology company Kerecis, which originates in Ísafjörður. The office of the Fellowship is in the Arctic Circle Secretariat.

Applications for the Fellowship are now open for the period August 2023 to July 2025. In the years that follow, the Fellowship will be advertised annually. A selection committee consists of representatives of the main universities in Iceland as well as from the Ólafur Ragnar Grímsson Centre and Arctic Circle. General management of the program is in the hands of the Arctic Circle Secretariat. The deadline for the first round of applications is July 1st. Apply here, forms.monday.com/forms/7c07481f20f955d16516c52db8f6df7f?r=use1, or for further information contact secretariat@arcticcircle.org.

VIEWS

Measuring Ocean Currents to Better Understand Climate

Marine scientists have deployed two hi-tech bottom pressure recorders (BPRs) on either side of the Atlantic Ocean in an effort to measure the strength of global ocean currents that drive much of the Earth's climate. The Atlantic Meridional Overturning Circulation (AMOC) is a large system of ocean currents that transports warm surface waters from the tropics northward towards the sub-polar and Arctic regions. There, the waters cool, become denser and sink before returning southward at depth. In doing so, this vast 'conveyor belt' movement of water is a major factor in controlling global heat distribution, regional sea level changes, the ocean's absorption of carbon and European weather.

To measure the AMOC's impact on our changing climate, scientists from the Scottish Association for Marine Science (SAMS) in Oban have deployed two deep-sea Bottom Pressure Recorders (BPRs), one in the north-east Atlantic and one in the Labrador Sea, to record regular changes in sea surface height. The two Fetch AZA BPRs, developed and built by UK marine technology firm Sonardyne, have been placed thousands of metres below the sea surface where they will record sea surface height to the nearest centimetre, giving the researchers a detailed comparison between the two locations. Deployed for up to 10 years, this will allow them to measure changes in the speed and strength of

the AMOC, which will provide crucial data to inform climate predictions.

The north-east Atlantic instrument was deployed from the RRS James Cook during the Overturning in the Sub-polar North Atlantic Programme (OSNAP) research cruise, jointly led by SAMS and the National Oceanography Centre (NOC) in August. The western instrument was deployed by SAMS oceanographer Dr Sam Jones during a cruise on board the RV Meteor, led by the German marine institute GEOMAR in September.

SAMS oceanographer Dr Kristin Burmeister, co-chief scientist on the OSNAP cruise said: "This is the first time these Sonardyne pressure sensors have been used in ocean physics, but they could be a game changer in how effectively we can measure the vast AMOC. Once we know the speed of these currents, we can work out the volume of water being moved and then calculate how much heat is being transported. This heat is important to the climate of Europe and gives the continent its relatively mild weather. These currents directly impact our weather, particularly in the UK. The influence of the AMOC on the Earth's climate is so significant that there is an urgent need to better understand its movement, speed and heat transfer. That data will allow us to feed into the various climate models that help governments and society prepare for the changes in our climate in years to come."

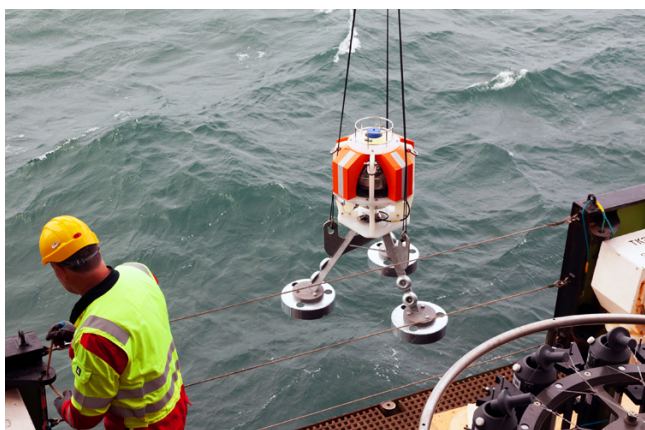


Image Caption: A Fetch AZA BPR being deployed in the North East Atlantic. (Photo credit – Ben Moat: Senior Scientist, NOC)

The east side of the Atlantic Ocean is typically around 20 centimetres higher than the west side but the flow of the water does not go east to west, as the opposing force of the Coriolis effect from the rotating Earth causes a circular flow in a

general south to north movement. The AMOC transports roughly 1.25 Peta (10^{15}) Watts of energy from the Tropics towards the subpolar and Arctic regions, more than 60 times the present rate of world energy consumption. Despite being so influential in our climate, it has only been continuously measured for 19 years, limiting our long-term understanding of its relation to climate.

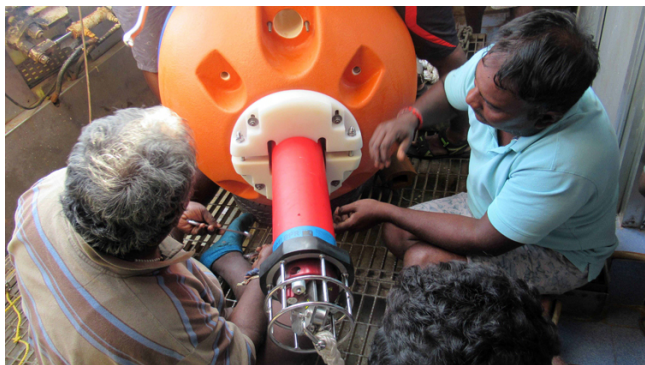
The BPRs will remain on the seabed for up to 10 years and the data they gather can be transmitted wirelessly through the water to a ship or even an uncrewed platform, without the need to recover them. Geraint West, Head of Science at Sonardyne, says, "AZA is a game-changing technology as, previously, the need to calibrate pressure sensors meant that lengthy observations were compromised, limiting their use for long-term studies. The Ambient-Zero-Ambient (AZA) technique used in the Fetch AZA overcomes this by autonomously recalibrating in situ with an internal high accuracy barometer. This allows consistently accurate readings for up to 10 years. Mastering this technique took years of investment by Sonardyne and while it's already been used, at scale, in other sectors, we are hugely excited to see it now being put into use in physical oceanography, not least in a project that will aid our understanding of key climate drivers."

OSNAP is now six months into gathering data from both sides of the Atlantic and to mark this milestone Sonardyne and SAMS have released a video, [Understanding the AMOC](https://www.youtube.com/watch?v=ynUWBNwAIIk) www.youtube.com/watch?v=ynUWBNwAIIk, explaining the effect of ocean currents on climate and the importance of the programme in more detail.

Sonardyne upgrade for India's national tsunami detection network

A network of deep-water acoustic sensors that provides India's coastal communities with an early warning of tsunami waves is being upgraded, by marine technology company Sonardyne, to extend both their endurance and capability. Deployed at key locations in the Bay of Bengal and the Arabian Sea, the network of Sonardyne's Bottom Pressure Recorders (BPRs) is owned and operated by India's National Institute of Ocean Technology (NIOT) as part of the country's Tsunami Early Warning System (TEWS).

The BPRs were first installed in 2007, as part of NIOT's national tsunami detection system, which was conceived following the deadly Boxing Day Tsunami of 2004. The BPRs detect the characteristic changes in water pressure (as little as 1 cm in 4,000 m depth) caused by an earthquake in the deep ocean. If a tsunami wave is detected, an alert message is transmitted up to a satellite buoy on the surface. From there, it is relayed to the national Tsunami Warning Centre onshore for comparison with recent seismic activity. If validated, a widescale alarm is raised to alert vulnerable communities.



A Bottom Pressure Recorder (BPR) being prepared for deployment in the Indian Ocean

Following a 10-year life refurbishment in 2017, the BPRs are now being upgraded to Sonardyne's 6G hardware and Wideband 2 communications standard. The installation of low power electronics, new lower power consumption pressure sensors, and doubled battery capacity of these maxi BPRs will significantly reduce maintenance visits and costs. Additionally, the acoustic telemetry signals used to transmit data to the surface will also now be fully digital, providing greater resilience to noise interference in the water column, as well as increasing bandwidth by ten-fold (from 600 bps to 6000 bps).

The first batch of upgraded BPRs arrived in India in 2022, with further batches planned for shipment in 2023. In addition, Sonardyne are also supplying a large pool of spares to maintain a continuously available TEWS capability. These include floats and fittings for the larger Maxi BPRs being supplied, as well as transceivers for the surface buoys to communicate with the BPRs. NIOT are planning to use the upgraded capability to extend the number of permanently occupied stations.



NIOT staff on a recent training visit to Sonardyne Headquarters as part of their ongoing support package

Each BPR is a customised version of Sonardyne's Compatt transponder, a versatile subsea instrument that has a wide range of autonomous monitoring and measuring applications within offshore energy, survey and ocean science. Sonardyne's BPRs benefit from being small and self-contained, with no cables, exterior sensors or batteries to interface, making them easy to deploy and more reliable. These features, alongside long battery life, reliable through-water communications and Sonardyne's expertise in long-endurance underwater monitoring applications, are the reasons why they were chosen for the Indian Ocean Tsunami Detection System back in 2007 and continue to protect their coastal communities 16 years later.

AquaTitans selects Sonardyne tracking for submersibles package

Newly formed specialist manned submersible services provider AquaTitans has chosen underwater tracking systems from marine technology company Sonardyne to support underwater vehicles used by scientists, researchers and filmmakers. The Glasgow-based company, formed by submersibles specialists Alan Green and William Arthur in 2022, will use Sonardyne's Mini-Ranger 2 Ultra-Short BaseLine (USBL) positioning system as part of its new containerised submersible support system.

For use from small expedition vessels to large, open-decked offshore support ships, vessels of opportunity or even quaysides, the AquaTitans container concept comes with everything needed to operate submersibles. The package includes dedicated support equipment for underwater

communications, re-charging batteries, oxygen and air re-supply, together with accurate and reliable underwater tracking. The company's first two 20 ft containerised systems will be used with Triton 3300/3 submersibles; three-man vehicles built by Triton Submarines that are able to carry science and research specialists to depths of 1,000 m. The first delivery was made in the first three months of 2023.



Underwater communications and subsea tracking from the AquaTitans Submersible Support Container

For work with underwater platforms like submersibles, Mini-Ranger 2 offers a portable and quick to mobilise, versatile tracking and communications system. It provides submersible pilots with the confidence, accuracy and safety assurance they need on critical tasks during dives, saving valuable operational time. It is ideal for use on vessels of opportunity and even from the quayside, offering performance, without cost and complexity of a permanently installed USBL system. It is able to track up to 10 underwater targets out to 995m operating range, as standard, using Sonardyne's market-leading 6G hardware and Wideband 2 digital acoustic technology. The operating range is extendable to 4,000 m and, with an optional robotics pack, Mini-Ranger 2 can also provide underwater vehicle command and control.

Alan Green, who has been working with submersibles since his first job working with submarine rescue company Rumic in 2002, says Mini-Ranger 2 was an obvious choice for their containerised solution for submersible operators. "Sonardyne's deep water USBL systems are deployed on a number of projects and when we spoke with the submersible pilots and operators, this was the preferred system" he says. "We didn't need to look elsewhere. The Mini-Ranger 2 has been proven to be reliable, accurate and

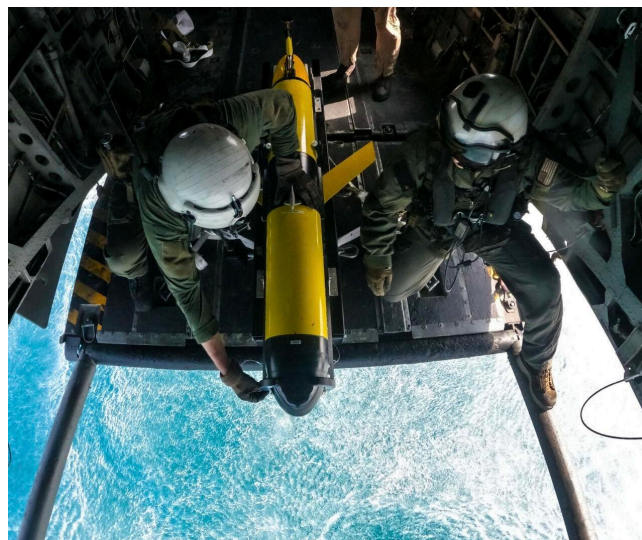
easy to use; all critical factors when selecting subsea equipment. With confidence in the tracking data, the pilot can quickly locate targets subsea and avoid losing valuable dive time transiting to the wrong location. It is all part of ensuring that the scientists and researchers are able to maximise their time underwater and receive the best experience possible."

"We're pleased to be supporting AquaTitans in their new venture," says Alan MacDonald, Sales Manager at Sonardyne. "Both Alan and William are highly experienced operators and their containerised solution will make submersible operation from vessels or even waterside locations far easier, reducing equipment set-up and integration complexities. Mini-Ranger 2 fits perfectly into that ethos."

SALTS

Teledyne Slocum Glider successfully deployed from a U.S. Navy helicopter

Teledyne Marine and the U.S. Navy successfully executed the first-ever undersea glider launch from a helicopter, and in doing so, the first-ever successful deployment from an aircraft. The Teledyne-owned Slocum glider, configured with Littoral Battlespace Sensing, Glider (LBS-G) mine countermeasures (MCM) sensors, was launched from the ramp of a U.S. Navy helicopter flying "low and slow" over shallow waters.



Teledyne Marine provided Slocum glider piloting and technical support. "Teledyne Marine takes

pride in our continued innovation and support of the U.S. Navy as it expands the operational envelope of underwater gliders.” said Dr. Thomas Altshuler, Senior Vice President, Global Maritime Defense Strategy and Business Development at Teledyne Technologies.

The Mine Countermeasure (MCM) Commander now has the capability for rapid and widespread glider deployment by Task Force elements under direct, tactical control, eliminating the dependency on strategically tasked oceanographic ships. The gliders provide critical environmental information to optimize acoustic and optical MCM sensor performance. This constitutes a revolution in MCM decision support.

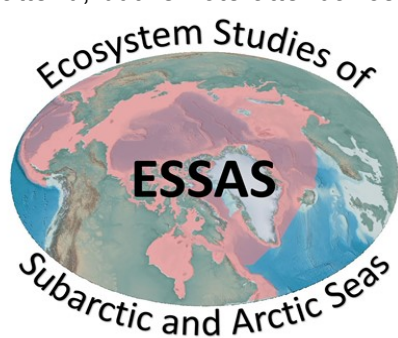
The Slocum glider is the backbone of the US Navy LBS-G program, with over 210 delivered since 2009. The Naval Oceanographic Office (NAVOCEANO) pilots the LBS gliders and includes collected data supporting Navy operations. For more information see the full article in Oceanbuzz issue 706, from which it was derived, www.oceanbusiness.com/general-ocean-news/teledyne-slocum-glider-successfully-deployed-from-a-u-s-navy-helicopter/.

CALENDAR

19th–22nd June 2023: Ecosystem Studies of the Subarctic and Arctic Seas (ESSAS) 2023 Annual Science Meeting

Bergen, Norway

This meeting, entitled Ecological, social and economic dynamics of high-latitude coastal systems, will be a Hybrid in-person / online meeting. Arrangements have been made for an in-person meeting for those who are able to attend, but remote attendance and presentations



from anyone interested in participating are also catered for. We hope to make the hybrid conference format work as effectively as possible.

There will be a workshop on 19th June, AnalogueART, using natural analogues to

investigate the effects of climate change on northern ecosystems; moving from gradient to mosaic approaches.

Conference sessions include:

1. Cooperative studies of coastal ecosystems engaging local communities in the sub-Arctic and Arctic
2. Natural disasters, multiple stressors and cumulative impacts along sub-arctic and arctic coasts
3. Blue Carbon, mariculture and climate change mitigation and adaptation in the Subarctic and Arctic
4. Cod and climate change at the coastal interface

For more information, please visit the web page at essas.arc.hokudai.ac.jp/what_s_new/2023-essas-annual-science-meeting-in-bergen-norway/.

26th–30th June 2023: MARE Conference People & the Sea XII, Blue Fear, navigating ecological, social and existential anxieties during the Anthropocene

Amsterdam, Netherlands

In addition to regular paper-based panels, we have encouraged panel proposals with innovative formats that stimulate interaction and dynamism. These include formats such as roundtables, workshops, brainstorm sessions, debates, artistic interventions, exhibition (virtual excursion), documentary film (photo essay/story) screenings with discussion, meet the author sessions, book presentations etcetera.

To present a paper in the MARE conference, the participant must be physically present in Amsterdam. Online participants can observe all conference sessions, but will not be able to present themselves. Please, regularly visit this page, <https://marecentre.nl/>, for updates and important information about the 12th MARE People and the Sea conference.

28th June 2023: Structures in the Marine Environment (SIME) 2023 conference

Glasgow, Scotland

MASTS (Marine Alliance for Science and Technology Scotland) is assisting with this year's SIME 2023 conference which will be held in person in Glasgow at the Studio. Academics, stakeholders, industry and government representatives and interested parties are invited

to come together for talks, posters, networking and discussion about the environmental effects of artificial structures already within the marine ecosystem, and the rapid expansion of new infrastructure over the coming decades. To find out more visit our webpage, masts.ac.uk/events/structures-in-the-marine-environment-conference/.

In response to our societal need to generate energy, artificial structures have been placed into our coastal and marine environments. The structures range from oil and gas installations, associated pipelines and seabed infrastructure, as well as offshore wind farms and other renewables that, as part of an energy transition, are rapidly scaling up to meet the needs of the Government's Energy Strategy as well as tackling the world's climate crisis. Inevitably, these structures host communities by providing habitat and shelter, and potentially serve as stepping-stones for the spread of some species. In addition to deliberately placed structures, shipwrecks can also serve a similar function. In turn, the biodiversity that develops on these structures can affect biological, hydrodynamic and biogeochemical processes from the water column to the seafloor, either directly (e.g. food-webs, scouring) or indirectly (e.g. biorefugia, displacement of fisheries) and, hence, ecosystem functioning, ecosystem services and benefits to society are also affected at various spatial and temporal scales.

Science plays a critical part in understanding these effects as well as the role they play in our society and any opportunities they create, for example for environmental restoration, marine net gain and environmental credit trading markets. Ambitions for more integrated decision making across marine planning, fisheries, nature conservation and energy sectors, rely on the scientific evidence base to develop suitable policies and decisions where multi-sectoral considerations are increasingly important. Within an international context, SIME2023 will focus on developing a better understanding of the role artificial marine structures have in a changing seascape, supporting ecological best practice in relation to the energy transition, marine environmental management and a changing climate.

Let's talk about the effects, benefits and implications of structures, and discuss how we

can accelerate our understanding to support decisions for the benefit of the environment and society.

9th-14th July 2023: Goldschmidt Conference Lyon, France

Let's Talk about #DEI @goldschmidt2023. Tell us about obstacles that contribute to the under-representation of marginalized groups in geochemistry, conf.goldschmidt.info/goldschmidt/2023/cfp.cgi.

11th-12th July 2023: Restoring Estuarine and Coastal Habitats

Scarborough, UK

The Environment Agency and Ocean & Coastal Futures have come together to focus on the restoration agenda for a healthy and resilient estuarine and coastal environment. Furthering the REACH (Restoring Estuarine and Coastal Habitats) conferences since 2019, this year's focus is on the ambitions of the Restoring Meadow Marsh and Reef (ReMeMaRe) initiative.



Registration is open for the 2023 programme, site.corsizio.com/c/64397e281af5ec3fd6017903, will include five sessions across two days, highlighting current and future opportunities and challenges, illustrating progress and evolving practice and discussing how we achieve our restoration targets.

1) *How do we deliver the ambitions for coastal restoration?* Leading speakers will illustrate how far we've travelled in the last few years and the need to build on this momentum to set and achieve ambitious restoration targets. They will offer insights into how strategic aims are capable of becoming a reality in this crucial decade.

2) *Do we have the enablers in place to meet our ambitious targets for coastal restoration?* Speakers will share their perspectives from Scotland, Wales, England and Northern Ireland, to present a UK-wide picture of the regulatory, planning and policy landscape influencing restoration. They will highlight the key drivers, the barriers and opportunities that come with this

changing landscape and examples of the progress being made.

3) Showcasing practical action, speakers will demonstrate a wide range of successful restoration initiatives for estuarine and coastal habitats and species, from local to seascape scale. Insights into the journey from vision to reality will provide inspiration to increase the pace and scale of coastal restoration, whilst a series of short talks will provide a horizon scan of the new wave of projects at the start of their journey.

4) Restoration involves many partners from catchment to coast. Connecting people, place and perspectives is essential to achieving better ecological outcomes for people and nature. Speakers will share systems approaches to coastal restoration, examples of coastal coordination and the ambitions of the seascape statement.

5) Interest and appetite for estuarine and coastal restoration is growing, but with this comes complexity. Speakers will suggest how to steer the course for restoration through current and future priorities. This involves harnessing the opportunities associated with local nature recovery and spatial planning, net zero ambitions and transitioning to offshore wind, net gain and embedding natural capital approaches, to achieve outcomes for estuaries and coasts, people and nature.

Speakers in each session will respond to targeted questions and debate through lively panel sessions. The full programme will be published in May.

Download the outline programme at cmscoms.us1.list-manage.com/track/click?u=a477eb8cd0fd95c25563618a1&id=6b893a0d52&e=686d63024a. The full programme will be published soon. For partner and sponsor opportunities, the brochure cmscoms.us1.list-manage.com/track/click?u=a477eb8cd0fd95c25563618a1&id=02d0c511b1&e=686d63024a.

5th-6th September 2023: Challenger Ocean Modelling Special Interest Group (SIG)

Southampton, UK

The Ocean Modelling SIG meeting is being held on the at the National Oceanography Centre in

Southampton. Registration is now open, www.challenger-society.org.uk/Ocean_Modelling

6th-8th September 2023: Advances in Marine Biogeochemistry (AMBIO) SIG

Plymouth, UK

The AMBIO SIG meeting is being held at the Plymouth Marine Laboratory. Registration will open very soon www.challenger-society.org.uk/Advances_in_Marine_Biogeochemistry. We will hold the conference from lunchtime-to-lunchtime, to assist with travel logistics. We will have sessions with talks in addition to networking, a poster session, poster flash talks, and an ECR event. Lastly, we will be holding our annual Town Hall/AGM over the Friday lunchtime.



The Challenger Society for Marine Science

ADVANCES in
MARINE
BIOGEOCHEMISTRY

**Marine Biogeochemistry
for the Future**

The tenth biennial meeting of the Challenger Society for Marine Science's Special Interest Group, AMBIO

September 6th - 8th 2023
Plymouth Marine Laboratory, UK

Future announcements via the web and Twitter:
www.challenger-society.org.uk/Advances_in_Marine_Biogeochemistry
@ChallengerAMBIO
Follow the QR code to join the AMBIO mailing list

Convened by:
Kate Hendry (BAS)
Sarah Reynolds (Portsmouth)
Andy Rees (PML)

Sponsored by:



We now have a full list of sessions:

- Biogeochemistry and Marine Autonomy;
- The Cutting Edge of Biogeochemical Observations and Modelling;
- The Future of GEOTRACES; and
- Marine Biogeochemistry at the Sediment-Water Interface.

For now, keep the date in your diary, and look out for registration and abstract submission, which will open later this month. If you have any

questions or suggestions, please don't hesitate to contact us kathen@bas.ac.uk and sarah.reynolds@port.ac.uk.

13th-20th September 2023: Biodiversity, Ecology, and the Biological Carbon Pump in the Ocean Twilight Zone, a sustainable future in the face of human exploitation and climate change.

Woods Hole, USA

Woods Hole Oceanographic Institution will be hosting this international mesopelagic conference in collaboration with JETZON. There will be two main plenary sessions.

Session 1 will focus on how we determine biomass in the mesopelagic, looking at the architecture of mesopelagic food webs, and understanding diel vertical migration.

1. What is the biomass and distribution of the mesopelagic: how do we know ? Who are the major contributors to biomass ? How is biomass distributed ?
2. Diel vertical migration and biodiversity: who's migrating, how often, how does this change seasonally, annually ?
3. Food web architecture: what fuels the mesopelagic biomass, how are the epipelagic and mesopelagic connected, what are the predator prey relationships ?

Session 2 will focus on the biological carbon pump, seeking to establish a benchmark figure for its magnitude now and to understand how it may change in the future.

4. How large are the fluxes due to gravitational sinking and how well do we understand its drivers to predict their future magnitude ?
5. How significant is the transport of organic carbon to depth due to the physical circulation and how will anticipated changes in properties such as stratification affect this?
6. How significant are the carbon fluxes associated with the vertical migration of organisms and how will these respond to changes in temperature and oxygen ?
7. What biogeochemical constraints are there on the magnitude of the biological carbon pump and what do they tell us about its future strength ?

This conference is possible through the generous support from WHOI's Ocean Twilight Zone project, the NERC CUSTARD project, and the Grantham Foundation. Registration closed on June 1st, but please email kbates@whoi.edu to be added to an email list for virtual participation. For conference details, visit twilightzone.whoi.edu/otz-symposium/.

2nd-5th October 2023: 5th Euro-Mediterranean conference for Environmental Integration

Rende (Cosenza), Italy

The editorial office of the Euro-Mediterranean Journal for Environmental Integration, www.springer.com/journal/41207, in collaboration with the University of Calabria (UNICAL), www.unical.it/?lang=en, organizes this year's the EMCEI. On this occasion, we are pleased to invite you to take part in the conference (in person or virtually) and share/discuss your latest research findings from various fields of environmental sciences. Visit our website, www.emcei.net, to learn more about the event.

The MedGU Annual Meeting is one of the largest international geoscience meetings in the Mediterranean region. It aims to provide a forum where geoscientists, especially early career researchers, can present and discuss their findings with experts in all fields of geosciences. It will feature talks and panels covering a diverse range of geoscience and geoscience-society topics.

The EMCEI series is one of the largest international gatherings of environmental science in the Mediterranean (400-500 participants). The EMCEI aims to provide a forum where scientists, especially early career researchers, can present their findings and discuss their ideas with experts in all fields of environmental sciences. Contact us, if you need more information: contact@emcei.net.

19th-22nd October 2023: Arctic Circle Assembly 2023

Reykjavik, Iceland

Breaking previous records, over 280 session proposals have been received and hundreds of speakers have already confirmed from more than 27 countries. Attended by more than 2000 participants from over 60 countries last time, the Assembly is the largest international gathering on Arctic, Climate, Energy, Oceans, Geopolitics and

more. Registration is now open, www.arcticcircle.org/assemblies/2023-assembly-registration, and help finding hotel accommodation is available, www.arcticcircle.org/hotels. For more information and booking activities, visit www.arcticcircle.org/.

7th-9th November 2023: The Nansen Legacy symposium, Towards a new Arctic Ocean – Past, Present, Future

Tromsø, Norway

During this science conference, www.nansenlegacy-symposium.com, the current understanding of the Arctic Ocean across disciplines and regions will be presented and discussed. In the mornings we will have plenary sessions with invited key-note presentations, dedicated presentations on the use of science for societal needs, and panel discussions to stimulate interdisciplinary discussion and involve user perspectives.

During the afternoons, we welcome the pan-Arctic research community across the natural science disciplines, and stakeholder representatives interested in knowledge status and future perspectives, to contribute to a vibrant symposium to build bridges across disciplines, regions, and from natural sciences to societal needs.

Details about registration are here: <https://www.nansenlegacy-symposium.com/registration/> Feel free to also check out the program overview <https://www.nansenlegacy-symposium.com/program/program-overview/> (more details will be added soon) and our compilation of practical details <https://www.nansenlegacy-symposium.com/practicalities/>.

15th-17th November 2023: The 11th Annual World Congress of Ocean

Sapporo, Hokkaido, Japan

Following the success of the previous events, we are honored to launch The 11th Annual World Congress of Ocean-2023 (WCO-2023). WCO-2023 is intended to provide a platform for professionals around the world to exchange state-of-the-art research and development and identify research needs and opportunities in the field of the Oceans. It covers a wide range of topics related to Ocean Economy, Maritime Law, Ocean Engineering, Ocean Energy, Green Port, Shipping and Modern Shipbuilding, Marine Management and Environment Protection,

Ocean Science, etc. Over the conference period, you will have opportunities to share information and come face to face with business leaders, academic researchers and government agents around the world. It serves as a great opportunity to find global partners and build up research and business relations.

The three-day conference has an effective series of activities such as plenary lectures, parallel symposiums, oral communications and lively poster sessions etc. Currently Programmed activities at a glance include:

- Opening Ceremony and Keynote Forum
- Track 1: Ocean Economy and Finance
- Track 2: Maritime Law
- Track 3: Coastal and Ocean Engineering
- Track 4: Ocean Energy Development and Utilization
- Track 5: Emerging Ocean Science and Technology
- Track 6: Marine Management and Environment Protection
- Track 7: Smart Port, Green Shipping & Shipbuilding
- Track 8: Marine Biotechnology
- Track 9: Aquaculture and Fisheries

Sapporo, the capital of Hokkaido, Japan's northernmost island, draws international visitors for its annual Snow Festival and its world-famous ramen. Those seeking out the full diversity of Japanese cuisine will want to visit: a city with a ramen-inspired theme park is one that embraces and pampers foodies. For more information about the conference, please visit www.bitcongress.com/wco-2023/default.asp.

27th-30th November 2023: 3rd Mediterranean Geosciences Union annual meeting

Istanbul, Turkey

The annual meeting of the Mediterranean Geosciences Union, association.medgu.org/, will be held this year at the Congress Center of Istanbul Technical University. Visit our website, www.medgu.org, to learn more about the event. On this occasion, we are pleased to invite you to take part in the conference either in person or virtually, and share/discuss your latest research findings.

The MedGU Annual Meeting is one of the largest international geoscience meetings in the Mediterranean region. It aims to provide a forum

where geoscientists, especially early career researchers, can present and discuss their findings with experts in all fields of geosciences. It will feature talks and panels covering a diverse range of geoscience and geoscience-society topics.

Abstract submissions (max. 350 words) will be accepted until 10th June 2023. The MedGU-23 encourages submissions of research works not only from the Mediterranean region, but from all regions of the world. Before submission, please read the guidelines, medgu.org/index.php?p=author-guidelines.

The MedGU-23 Proceedings will be published in the Springer/IEREK ASTI Series, www.springer.com/series/15883, (indexed in Scopus & SCImago). Selected papers will be published in some Springer and Elsevier journals Special Issues, medgu.org/index.php?p=special-issue. Contact us, if you need more information, contact@medgu.org.

26th March 2024: ASSW 2024 Science Day Edinburgh, Scotland

The Arctic Science Summit Week (ASSW) 2024 Science Day will be held at the Dynamic Earth, www.dynamicearth.co.uk/. The day's theme of "Arctic Coasts" encompasses all International Arctic Science Committee (IASC) Working Group areas, iasc.info/our-work/working-groups. There will be a mixture of invited talks on the day's theme from each working group, panel discussions on net zero arctic research aspirations and on effects of arctic environmental change on coastal communities, and a public facing Keynote presentation. Abstract submission for poster presentations will be open to all ASSW attendees.



"Our Dynamic Earth" is a public facing science centre focussed on the natural history of planet Earth. Alongside the IASC working group talks and panel discussions, there will be public displays related to scientific community research activities in the Arctic. We invite ASSW participants to get in touch with the local organising committee about bringing their displays to this space, assw.info/program/science-day-2024.

10th-12th April 2024: UN Ocean Decade Conference

Barcelona, Spain

Three years after the start of the UN Decade of Ocean Science for Sustainable Development (2021-2030), oceandecade.org/, a global conference will bring together the Ocean Decade community and partners to celebrate achievements and set joint priorities for the future of the Decade. Hosted by Spain and co-organized with UNESCO's Intergovernmental Oceanographic Commission (IOC/UNESCO), it will be a 3 day, in-person event co-led with a range of partners: Government of Catalonia and the Barcelona City Council through the Barcelona Capital Náutica Foundation, and the Spanish National Ocean Decade Committee, which is led by the Ministry of Science and Innovation through the Spanish Research Council (CSIC).



The conference will be a key moment for governments, leaders, maritime sectors, philanthropy, universities, private sector, NGOs and more, to take stock of the achievements of the first three years of the Ocean Decade and define a collective vision for the coming years. Participants will benefit from concrete examples and best practices in ocean science to deliver "the science we need for the ocean we want". A key outcome of the 2024 UN Ocean Decade Conference will be the publication of a set of white papers related to the 10 Decade

Challenges, oceansdecade.org/challenges/, that will identify future priorities for the Ocean Decade to generate the knowledge needed for science-based solutions related to global challenges, such as climate change, food security, biodiversity conservation, sustainable ocean economy, pollution and natural hazards.



A number of related high-level national and international events will take place before and after the main conference and there will also be scope for partners to propose and lead side events, exhibitions and networking events relevant to the conference themes on the days before the conference and in the sidelines of the conference itself.

Registration for the 2024 Ocean Decade Conference will take place in two steps:

- Pre-registration which will be open from 8 June to 30 September 2023.
- Full registration which will take place from 30 September to 30 October 2023.

To pre-register for the 2024 Ocean Decade Conference, visit oceansdecade-conference.com/registration.php. Deadline for pre-registration is 30th September 2023.

On-site Satellite Events will take place at the Conference venue on 10th-12th April 2024 during the lunch breaks of the Conference, while off-site Satellite Events will be organized in a variety of locations around Barcelona starting from 8th April. To learn more about Satellite Events and to submit your application, please visit oceansdecade-conference.com/satellite-events.php. Deadline for submission is 30th October 2023.

To provide partners with the opportunity to present their activities, foster knowledge-sharing and strengthen collaboration, a small number of booths will also be available at the Conference venue. Stay tuned for information on calls for posters and for presentations during the parallel sessions. If you would like to receive updates, please sign up here, www.surveymonkey.com/r/OceanDecade24_updates. For more information, please contact, the Ocean Decade Team at oceansdecade@unesco.org.

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

JOBS and OPPORTUNITIES

There are jobs on the IMBER web site

<http://www.imber.info>



Integrated Marine Biosphere Research

Jobs and opportunities

New

- Data management experts, affiliated with (inter)national data centres, networks and scientific data programmes, SOOS DMSC. Apply **now**
- ECR funding: Save Our Seas Foundation, for 12-18 month projects. Apply by **16 June**
- Postdoc: Analysis of marine environmental data obtained using models and calculation of hazard indicators. OGS, Trieste, Italy. Apply by **23 June**
- Postdoc: Analysis of marine environmental data in relation to different climatic and socio-economic scenarios. OGS, Trieste, Italy. Apply by **23 June**
- Postdoc: Modelling the bioaccumulation of pollutant compounds in food webs. OGS, Trieste, Italy. Apply by **23 June**
- Postdoc: Data analysis and data assimilation, University of Maryland, Maryland USA,. Apply by **30 June**
- Senior lecturer (track tenure): Marine carbonate chemistry, NIWA and Otago Dunedin, New Zealand. Apply by **2 July**

In case you missed it...

- Global funding opportunities: CO2 removal technology research: Ocean Visions
- Postdoc: Elasmobranch Genetics, Stellenbosch University, Cape, South Africa. Apply now. Open until filled
- Postdoc: Coastal and Marine Spatial Biodiversity Planning, South Africa
- 6 MSCA SEAS postdoc positions. University of Bergen, Bergen, Norway. Apply by **12 June**
- Postdoc: The Ecosystem role of harp seals in Newfoundland & Labrador, Memorial University, NL, Canada. Apply by **1 Aug**

imber@imr.no