

Challenger Wave



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

NEWS

Ocean Action at COP26: opportunity to participate virtually if you can't access in-person

No doubt you will not have escaped hearing that this year the 26th annual summit of the United Nations Framework Convention on Climate Change (UNFCCC) Conference of Parties (COP) known as "COP26" will be hosted by the UK, in partnership with Italy, in Glasgow from 31st October to 12th November 2021. COP26 will be delivered across two sites, the Scottish Events Campus (SEC) (referred to as the Blue Zone) and the Glasgow Science Centre (known as the Green Zone) with an aim to bring 197 Parties together to negotiate accelerated actions towards the goals of the Paris Agreement and the UNFCCC.

This is a really important COP as it will be the first time since the Paris Agreement (COP21) in 2015 that countries update their national plans setting out how much they would reduce their emissions (known as Nationally Determined Contributions, or 'NDCs') reflecting their highest possible ambition at this specific time. High ambition is sought after to keep any hope of holding temperature rises to 1.5 degrees centigrade alive as agreed under the Paris Agreement as current NDCs do not even bring the world close to achieving under 2°C global warming.

Whilst progressing the negotiations will be at the heart of the summit the presidency programme for COP26 will showcase momentum from the whole of society and focus on key issues to drive ambition and action. To find out more about the COP26 Presidency goals around mitigation, adaptation, finance and collaboration visit: <https://ukcop26.org/cop26-goals/>.

To help bring evidence of the latest ocean climate science to key stakeholders, Plymouth Marine Laboratory has attended every COP since 2009, participating in, organizing and facilitating numerous ocean events. We also develop briefing papers, for example those developed through the COP26 Universities Network for which we led on: 'Why the ocean matters in climate negotiations', https://www.gla.ac.uk/media/Media_795093_smxx.pdf, and were a co-author on 'Nature-based Solutions for people climate change and biodiversity', https://www.gla.ac.uk/media/Media_790171_smxx.pdf.

What are the Blue and Green zones at the COP ?

The Blue Zone is a UN-managed space which hosts the negotiations and brings together delegations of Parties, the UN and related organizations and agencies, media as well as organizations with observer status. All attendees within the Blue Zone must be accredited accordingly. The official UN COP26 schedule is here: https://unfccc.int/sites/default/files/resource/Overview_schedule_COP26.pdf. Within the Blue Zone many nations and observer organisations host side events, panel discussions, cultural events and receptions to share stories, provide the latest updates, share forecasts and hold discussions.

The Green Zone at COP26 is managed by the UK Government, and is a platform for the general public, youth groups, civil society, academia, artists, businesses and others to have their voices heard through events, exhibitions, workshops and talks that promote dialogue, awareness, education and commitments. When a Green Zone is close to the Blue Zone then you may also see official delegates there. You can find out more about the programme in the green zone here: <https://ukcop26.org/the-conference/green-zone-programme-of-events/>.

The Virtual Ocean Pavilion. Whilst there will be in-person ocean related events at COP26 we recognised that Covid-19 may prevent many people, from many nations, travelling to Glasgow. For this reason, this year Plymouth Marine Laboratory (PML) is a founder and co-organizer of the COP26 virtual Ocean Pavilion <https://cop26oceanpavilion.vfairs.com/> which has over 20 international partners involved and is an example of a mechanism through which organizations and policymakers from across our blue planet are converging to increase knowledge, commitment and action for the ocean-climate nexus at COP26.

Registration to this pavilion is free and open and gives you access to live and on-demand COP26 ocean events, explore virtual exhibition booths and discover the treasure trove to learn more about the ocean and climate connection. All you will need is a Wi-Fi connection and a smart phone, tablet, or computer. This pavilion will aim to give you a real flavour of the ocean events and discussions at COP26:

- Highlight important ocean events such as planned by the UNFCCC Secretariat under the Subsidiary Body for Scientific and Technological Advice (SBSTA), the Marrakech Partnership for Global Climate Action (MP-GCA), and collaborating partners of this virtual pavilion;
- Host panel sessions linking the ocean with the themes of the MP-GCA events and SBSTA Ocean and Climate Change Dialogue themes to provide input to these discussions;
- Feature interviews with Party negotiators to gain insights on the status of discussions;
- Provide a gateway to ocean and climate stories from around the world through virtual exhibits, on-demand videos, reports and other online resources.

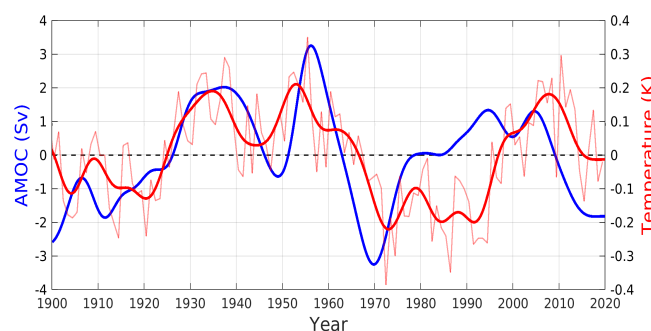
Should you be involved or aware of COP26 ocean events then please do register these on the COP26 Ocean Events tracker run by the Ocean Conservancy: <https://bit.ly/39whoXq>. Entries will be part of an overview of COP26 ocean events and are planned to be promoted through the COP26 Virtual Ocean Pavilion. - **Carol Turley and Thecla Keizer, Plymouth Marine Laboratory**

Data discovery reveals how powerful ocean currents influence climate

Oceanographers studying ocean currents that dictate much of earth's climate have developed a method to unlock data from the past 120 years, improving our ability to predict global temperature changes. The scientists from the Scottish Association for Marine Science (SAMS) in Oban have estimated the strength of these currents, known as the Atlantic Meridional Overturning Circulation (AMOC), going back to the beginning of the 20th century. In doing so, they have reconstructed the longest AMOC time series derived entirely from ocean observations.

The AMOC carries relatively warm surface waters from the tropics northward towards the subpolar and Arctic regions, where the waters cool, become denser and sink before returning southward at depth. In doing so, this vast 'conveyor belt' of water movement is a major factor in dictating global temperature distribution, regional sea level changes, and the ocean's absorption of carbon.

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.



The strength of the AMOC, in blue, was found to correlate closely with the North Atlantic surface temperature, shown here in red, since the beginning of the 20th century.

Despite being so influential in our climate, the AMOC has only been continuously measured for 17 years, limiting our long-term understanding of its relation to climate. Furthermore, the recent IPCC AR6 report highlighted the large uncertainty in 20th century AMOC behaviour based on computer simulations. Using temperature and salinity data from the past 120 years, the SAMS scientists have been able to reveal the strength of

the AMOC during those years and found a very close link between the strength of the AMOC and the North Atlantic sea surface temperature.

The study, agupubs.onlinelibrary.wiley.com/doi/10.1029/2021GL093893, published on the 20th September in Geophysical Research Letters, underlines the dominant role of the AMOC in climate and, since changes in the AMOC precede sea surface temperature change by two to five years, this may provide a means for predicting sea surface temperature in the short-to-medium term. "This is important because devastating European summer heat-waves have been linked to Atlantic surface temperature patterns," explains lead author Dr Neil Fraser. "We want to know how warm the Atlantic is going to be because it has such a great influence on air temperatures, rainfall and storms over the surrounding continents. However, the role of AMOC in governing sea surface temperature is something that has long been debated, with previous studies, usually reliant on ocean simulations, seeing a range of different behaviours. Since our study uses only direct ocean measurements, and finds that the AMOC strength dominates surface temperature change, I think this debate is now effectively over."



*Powerful ocean currents dictate much of our climate.
Credit: Thomas Horig/Ocean Image Bank*

Sea surface temperature is rising because of global warming but also varying on a 70-year timescale in a phenomenon called the Atlantic Multi-decadal Variability (AMV). The SAMS scientists found the strength of the AMOC followed a similar cycle but crucially leads the AMV, showing that the more water moving northward as part of the AMOC, the higher the North Atlantic sea surface temperature. They say

the finding has highlighted the need for continued monitoring of the AMOC to aid climate predictions.

Dr Francisco de Melo Virissimo elected as a councillor and trustee for the IMA

Congratulations to Dr Francisco de Melo Virissimo, Marine Systems Modeller at the NOC, who has recently been elected as a councillor and trustee for the Institute of Mathematics and its Applications (IMA), which is the UK's Professional and Learned Society for Mathematics. Francisco was elected by the corporate members through an election after being endorsed by two other IMA corporate members. He has been elected for a 3-year term, starting in summer 2021.



The IMA exists to support the advancement of mathematical knowledge and its applications and to promote and enhance mathematical culture in the United Kingdom and elsewhere, for the public good.

Open call for applications for 1 Chair or 2 Co-Chairs of the IMBeR Scientific Steering Committee

The Integrated Marine Biosphere Research project (IMBeR, www.imber.info) welcomes applications either from one person for the role of Chair or from two people willing to act as Co-Chairs of its international Scientific Steering Committee (SSC) for a term of three years beginning on 1st January 2022.

The Chair or Co-Chairs of the SSC will be responsible for the overarching leadership and future scientific direction of IMBeR including the successful completion of the scientific and capacity building objectives in the IMBeR Science Plan and Implementation Strategy 2016-2025, imber.info/news/the-2016-2025-imber-science-

[plan-and-implementation-strategy-has-been-ratified/](#), and the appropriate positioning of the IMBeR community to take advantage of future funding and scientific opportunities after 2025. Considering the current funding landscape, we envisage that a new IMBeR Chair would have expertise in natural sciences such as marine ecology or biogeochemistry, whereas the joint expertise of two Co-Chairs could span these natural sciences and a social / interdisciplinary science.

IMBeR is looking for scientific excellence, and a high level of commitment to IMBeR's goals, but also seeks to achieve a balance of expertise, nationality, gender, and career stage across its SSC. Applications should include a brief curriculum vitae and personal statement and be sent to the IMBeR Director, Dr. John Claydon, john.claydon@dal.ca, by 1st December 2021. To be considered for a Co-Chair, applications can be submitted by separate potential Co-Chairs, or as joint applications by the potential Co-Chair team. Informal enquiries can be directed to the current SSC Chair and Chair of the Appointments Committee, Prof. Carol Robinson, carol.robinson@uea.ac.uk.

Call for nominations for new members of the IMBeR Scientific Steering Committee

Integrated Marine Biosphere Research (IMBeR, <https://imber.info/>) invites nominations for new members of its Scientific Steering Committee (SSC) for a term beginning on 1 January 2022. The SSC is responsible for the development, planning and implementation of IMBeR science. The current IMBeR science plan (2016-2025) is available at: [imber.info/news/the-2016-2025-imber-science-plan-and-implementation-strategy-has-been-ratified/](#). Nine potential future science objectives were identified through assessment of the scientific achievements of IMBeR's regional programmes, working groups and associated IMBeR activities organised since 2015.

SSC members serve for a period of three years, with the potential of renewing for an additional 3-year term. The IMBeR SSC and sponsors, the Scientific Committee on Oceanic Research (SCOR) and Future Earth, will select the new SSC members based on expertise, and contribution to the geographic and gender balance of the SSC. Nominations from Africa and Central America, which are currently underrepresented, are especially welcome. More

information about the SSC is available at: imber.info/about/who-we-are/ssc-2020/.

Please send nominations to the IMBeR International Project Office-Canada (imber@dal.ca) by **Monday 1 November 2021**.

We envisage that applicants who are not selected for the SSC would automatically have the option to remain involved in IMBeR as a National Contact. The IMBeR National Contacts Network aims to broaden the international reach of IMBeR-related research. National Contacts form a network linking relevant research undertaken in their respective countries to the international IMBeR community. National Contacts are appointed for a 3-year term that can be renewed for a further three years.

NOC puts marine robots at the heart of future ocean observations in developing nations

A community engagement programme in East Africa led by the NOC has demonstrated how marine robots have the potential to transform ocean research for developing nations, offering a viable alternative to expensive research infrastructure, such as ships.



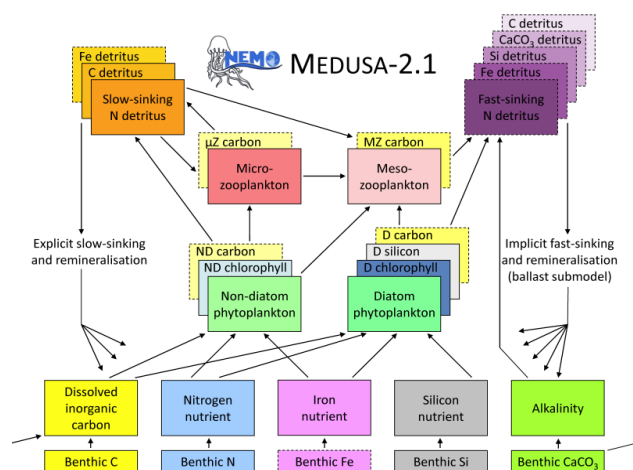
The SOLSTICE-WIO, <https://solstice-wio.org/>, programme involved multiple partners in the Western Indian Ocean (WIO) and East Africa and engaged with regional researchers as well as six Tanzanian coastal communities. The programme tested and assessed the potential and readiness of WIO nations to adopt autonomous

technologies to meet its marine research priorities and ultimately increase capacity to help meet food security and ocean sustainability challenges. For more information visit noc.ac.uk/news/national-oceanography-centre-puts-marine-robots-heart-future-ocean-observations-developing.

VIEWS

Biogeochemical modelling in CLASS

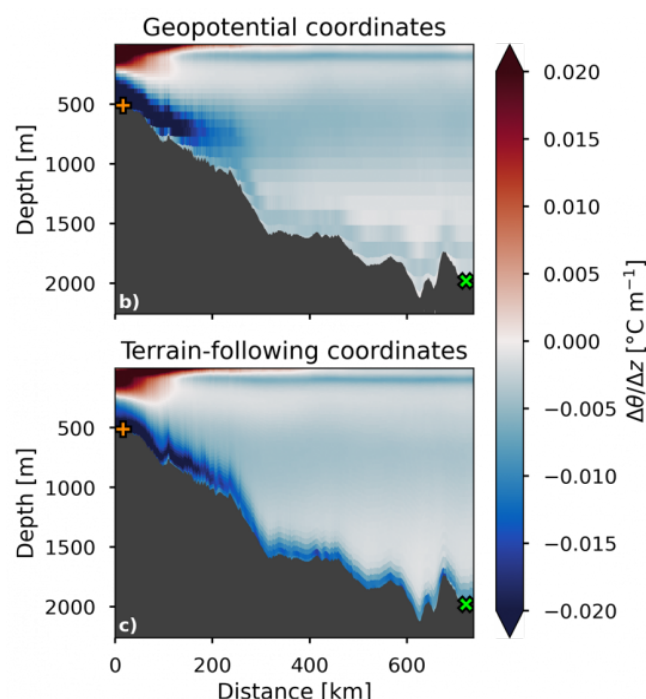
Alongside the programme of fieldwork being undertaken as part of the Climate Linked Atlantic Sector Science (CLASS) project, projects.noc.ac.uk/class-project/, modelling scientists at the NOC are also using supercomputers to make “virtual reality” versions of the World Ocean and its ecosystems.



These computer models bring together our physical understanding of the ocean's circulation with our knowledge of the major biological processes that take place within it. These processes include the production of organic carbon by tiny plant-like organisms, phytoplankton, in the sunlit surface waters of the ocean, and the consumption of this by the animals, zooplankton, that make up the lower tiers of its food web. Combined with the physical ocean circulation, these processes result in the ocean storing more carbon than simple chemical dissolution would suggest it should. Interactions between ocean physics and this marine biogeochemistry are therefore key to understanding the wider climate system.

Global ocean model development under CLASS

For about ten years NOC has collaborated closely with the Met Office under the Joint Marine Modelling programme (JMMP), which forms part of the Joint Weather and Climate Research Programme (JWCRP). Under JMMP and related programmes, NERC funds researchers to support the UK's national capability in observing, understanding, modelling and predicting weather and climate, and this work is currently being funded through the CLASS project.



NOC's role under JMMP has been to work, along with the Met Office, on creating and assessing a succession of global and regional ocean configurations: the former constitute the ocean component both of coupled models for climate research (notably participating in the IPCC Assessment Reports and CMIP), and of operational systems such as GloSea and DePreSys that are used for weather prediction on time scales from hours to decades.

The stand-alone ocean and sea ice models, as well as the coupled climate models they form part of, have also been made available to the UK science community as research tools, and have made essential contributions to NERC-funded programmes such as ACSIS and SMURPHS. For more information see the blog, projects.noc.ac.uk/class-project/blog/global-ocean-model-development-under-class.

Seatronics first to order Sonardyne's new SPRINT-Nav Navigator for VALOR ROV

Subsea technology specialist Seatronics has been announced as the first customer for Sonardyne's new SPRINT-Nav Mini Navigator, launched just one week ago. Seatronics has purchased the technology, the world's smallest hybrid acoustic-inertial navigation instrument, for its VALOR remotely operated vehicle (ROV), itself designed to be the smallest, most powerful and capable inspection class ROV in its category.



SPRINT-Nav Mini offers both the survey positional accuracy and a small form factor, ideal for small ROVs like the VALOR.

SPRINT-Nav Mini Navigator will provide VALOR with accurate, precise and robust navigation and control, supporting Seatronics in its goals to further extend the boundaries of remote operations with tasks ranging from underwater inspection in lieu of dry-docking (UWILD) through to mine identification and destruction. SPRINT-Nav Mini combines an INS, AHRS, pressure sensor and DVL in a single subsea housing depth rated to 300 m or 4,000 m and weighs as little as 3.6 kg in air. The new Navigator variant extends the capability of the Guidance model, introduced in 2020, by calculating and providing the position of a remote, autonomous or piloted underwater vehicle, or un-crewed surface vessel, in addition to its velocity, depth and attitude.

The cost and complexity of integrating third-party sensors is a key consideration for robotic vehicle builders and owners. SPRINT-Nav Mini addresses these needs with a compact, all-in-one design that requires only one cable connection, is supplied with a full integration guide, and is cheaper than the separate sensors it replaces. And unlike other MEMS-based sensors, SPRINT-Nav Mini's performance is not impaired

by magnetic interference when operating close to structures such as an underwater dock.

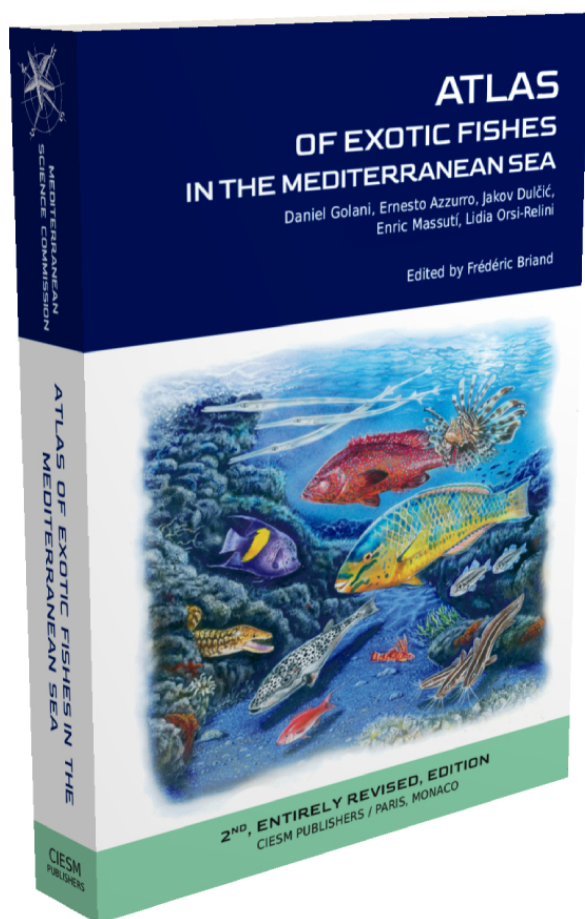
VALOR already offers an advanced capability for its size, with a 40Gbp MUX capacity allowing it to accommodate the most modern, high bandwidth survey sensors. Equipping it with SPRINT-Nav Mini Navigator further differentiates it from similar-sized platforms, providing a significantly more flexible, configurable inspection platform that can undertake a variety of tasks that would typically be associated with much larger ROV systems.

Derek Donaldson, Seatronics' Group Managing Director, says, "Specifying payload sensors for a vehicle like VALOR often requires a trade-off between accuracy, performance, price and ownership. SPRINT-Nav Mini offers both the survey positional accuracy our clients are looking for, and a small form factor that we can fit and put straight to work. Another key reason for investing in SPRINT-Nav Mini is our ongoing relationship with Sonardyne. We knew that we would be fully supported in our concept to push the boundaries of remote operations from a small ROV solution by the Sonardyne team. This is critical when adopting new technology for a new platform."

Jose Puig, Regional Sales Manager, Asia, at Sonardyne, says, "VALOR has been designed to be a versatile platform in terms of its operability, including remote operation, over-the-horizon control combined with supervised autonomy for enhanced inspection experiences. SPRINT-Nav Mini Navigator will support those operations, whether that's from a quayside, vessel or uncrewed surface vessel (USV), providing a flexible solution to Seatronics' customers."

CIESM revised Atlas of Exotic Fish

This richly illustrated 365-page volume, the fruit of many years of work and exchanges by our international team of ichthyologists, covers 188 exotic fish, of which 107 were not present at the time of our first edition 20 years ago. It documents, with the back-up of hundreds of maps and references, a biological world that is changing in front of our eyes at a crazy, unprecedented rate in the Mediterranean Sea. It is also unique in presenting 88 additional fish species that have been too often, mistakenly, listed as exotic. All in all a must-read for all those interested in the fate of our seas.



Our first printing will be limited to a few hundred copies. Make sure to get yours as soon as the Atlas is out of press (within days) by pre-ordering now, ciesm.org/catalog/atlas_fishes.php.

NOC calls for urgent action to protect and restore global waters

The NOC is calling on political and financial investment to address one of the world's greatest challenges of this generation. Earlier this week, the European Union launched a moon-shot mission to restore our ocean and waters, with backing from research and innovation investment.



One of five EU Missions launched at the end of September, the 'Restore our ocean and waters'

mission sets out ambitious goals to deliver concrete actions by 2030 in response to key human-made challenges including pollution, biodiversity loss and extreme weather events.

The other four Mission actions are:

- The Horizon Europe programme, the European Maritime Fisheries and Aquaculture Fund, Invest EU and other EU programmes will provide around €500 million in the period 2021-23;
- Create a network of lighthouses at sea and river basin scale to implement the mission and expand the networks of marine protected areas;
- Establish an EU-wide 'Blue Parks' initiative to provide new restoration and conservation opportunities;
- Support effective water management through a digital knowledge system with a European Twin Ocean and improved environmental monitoring of ocean health

To learn more visit noc.ac.uk/news/national-oceanography-centre-calls-urgent-action-protect-restore-global-waters.

SALTS

No news from sea this month I'm afraid

I know that this is a favourite section for many readers, where we get the inside information about life at sea, its thrills and spills. So please the next time you are at sea or carrying out any fieldwork, please remember that a simple paragraph or two will get you published here. – **Ed**

CALENDAR

9th September - 9th December 2021: The Challenger Society Virtual Conference 2021 Online

Let's talk about the Oceans !

Instead of our usual biennial meeting, the Challenger Society kindly invites all UK marine scientists to a series of discussion sessions to explore current topics in marine science. The format will be short talks, guided discussions and networking breaks. The Society welcomes

members and non-members, with early career researchers especially encouraged to attend and contribute. Attendance to the sessions is free but a suggested donation of £5 per session can be made via the donate button on our membership page found here, www.challenger-society.org.uk/Members, (please note that members must be logged out to see the button). All sessions will be run on Zoom with links sent to those who have registered. Further details and calls for the sessions will be circulated in due course.

Save the Dates:

18th November 2021 - 13:00-14:30

Science for the UN Decade of the Ocean

Further information including abstract submission guidelines can be found at challenger-society.org.uk/Decade_of_the_Ocean_Event. Abstract submission deadline 18th September 2021 and the Registration Link is www.eventbrite.co.uk/e/science-for-the-un-decade-of-the-oceans-registration-160752124933.

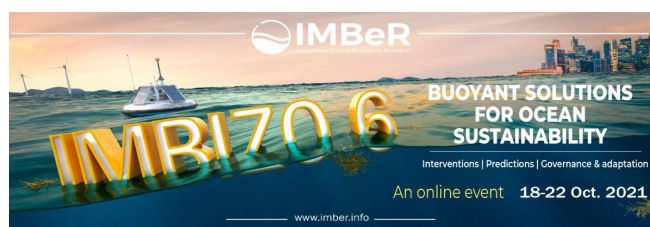
9th December 2021 - 13:00-14:30

Defining Challenger Society's Role in Marine Science

The Registration Link is www.eventbrite.co.uk/e/defining-the-challenger-societys-role-in-marine-science-registration-160750648517.

18th - 22nd October 2021: IMBeR sixth IMBIZO (the Zulu word for a gathering) virtual meeting

IMBeR aims to promote and enable interdisciplinary marine research and governance to achieve improved prediction of, adaptation to and mitigation of global change towards ocean sustainability. Topics addressed during IMBIZO6 will showcase positive, 'buoyant' solutions for ocean sustainability currently being discussed and implemented around the world.



We will follow the usual IMBIZO format of three distinct but interacting workshops. To optimize discussions, the number of IMBIZO6 participants will be limited to about 120 people (around 40 per workshop). The workshop topics are:

1. Exploring potential marine options for climate intervention
2. Lighting the 'grey zone': how can we integrate human dimensions in decadal-scale prediction systems ?
3. Ocean governance and climate adaptation: comparing responses, charting future courses.

Plenary keynote presentations and poster sessions will enable you to learn about the work of participants in other workshops. More information about IMBIZO6 and each of the workshops is available here, imber.info/events/imbizo/. There will also be an opportunity to attend a bonus workshop on 14th and 15th October. This is organised by the Interdisciplinary Marine Early Career Network (IMECaN) and will look at Equity, Diversity and Inclusion in Marine Science.

26th-27th October 2021: 4th biennial IMarEST Oceans of Knowledge conference

London, UK

The Institute of Marine Engineering, Science & Technology (IMarEST) will provide a forum for experts, practitioners and ocean users to discuss climate change and the oceans, the theme of its 4th biennial Oceans of Knowledge conference, www.imarest.org/events/category/categories/imarest-conference/oceans-of-knowledge-2021-climate-change-and-the-ocean. Organised by the Institute's Special Interest Group (SIG) on Operational Oceanography, the 2-day conference, will address three key themes: firstly, the sustainable use of the ocean and its resources, secondly, its role in natural and engineered climate mitigation and thirdly, rising sea levels and coastal vulnerability.

The conference is endorsed by the United Nations Decade of Ocean Science for Sustainable Development and the busy programme includes talks by world-class speakers from leading organisations, including the US National Oceanic and Atmospheric Administration, the Schmidt Ocean Institute and the International Energy Agency. The discussions will focus attention on how better understanding the ocean will help ensure its future use as a source of energy and food is balanced with the need to protect ocean ecosystem services upon which we all ultimately depend.



Scene-setting keynotes will highlight current scientific understanding of the ocean-related aspects of climate change. Policy responses at a national and international level will be placed into the context of the UN Decade of Ocean Science for Sustainable Development and the 2030 Sustainable Development Goals.

Key outcomes of the conference are planned to be conveyed at a COP26 side event and exhibition, and to inform further publications on the subject. Register now for Oceans of Knowledge 2021, where early bird tickets are available, www.imarest.org/events/category/categories/imarest-conference/oceans-of-knowledge-2021-climate-change-and-the-ocean.

26th-28th October 2021: The annual MONGOOS General Assembly and Workshop

The Mediterranean Sea is being impacted by several acute stressors such as frequent extreme events and geo-hazards, the vulnerability of the ecosystems, the over-exploitation of biological resources and of seabed, the severe pollution events and limited remediation actions and the uneven protection of coastal infrastructures and populations, all amplified by the ongoing climate changes. A strong knowledge base and predictive capacities are therefore required to achieve an economic, environmental and societal sustainability of Blue Growth in the Mediterranean area and to advance the knowledge about its role in the Earth system, its impact in our well-being and in the ecosystems. To achieve this goal, ocean science relies on an increasing amount of data from disparate sources (i.e. multi-platform, interdisciplinary in-situ data, satellite and modelling products), where their integration is crucial for improving the knowledge and for an ultimate deliver of the science-based solutions for different stakeholders.

It is now ten years since the Mediterranean Oceanographic Network for the Global Ocean Observing System (MONGOOS) was established to further develop operational oceanography in the Mediterranean Sea. This workshop has the aim to capitalize on these ten-years of achievements to meet challenges of the UN Decade of Ocean Science for Sustainable Development that will contribute in shaping the future of the oceans.

The Objective of the workshop is to integrate science-based knowledge and to promote solution-oriented research in the Mediterranean Sea. Established in 2012, this year's workshop marks the 10th anniversary of MONGOOS. The workshop is a 2-day online event, organised around oral presentations, poster exhibitions and informal discussions. The workshop language is English.

Dates: 26-27 October 2021
Times: CET (Paris): 09:00 - 13.30

Registration and further information will be available from the 1st of September. The General Assembly will take place on 28 October 2021 (CET (Paris): 9.00-13.30H | 14.30-16.30 H). The Organizing Committee: Ruđer Bošković Institute, SOCIB, Puertos del Estado, OGS, IMEDEA (CSIC-UIB). If you have any questions related to the workshop please do not hesitate to contact us at mongoos_workshop2021@inogs.it.

9th-11th November 2021: Marine Autonomy Technology Showcase (MATS 2021) Southampton, UK



MATS 2021 will welcome guests and exhibitors for a packed three days of insightful presentations and networking opportunities. This year's showcase will primarily focus on new developments and innovations, and will also look forward to where marine autonomous technology and ocean exploration is heading in the next five

years. For more information, visit noc-events.co.uk/mats-2021, and register at noc-events.co.uk/mats-2021-delegate-registration.

22nd-25th November 2021: IMBeR West Pacific Symposium

China–Japan–Korea (CJK) online

IMBeR will hold its West Pacific Symposium 2021 “Changing West Pacific Ocean: Science and Sustainability” as a virtual event.



The China-Japan-Korea IMBeR Symposium on the marine ecosystem has been held eight times over the period from 2002 to 2018 to review the achievements and to set the future directions of international ecosystem research in the western North Pacific as a part of the past GLOBEC and the IMBeR regional activities. Responding to the growing needs, the CJK IMBeR community changed its name to the West Pacific Symposium to better represent the entire West Pacific Ocean, as outlined in the *IMBeR Science Plan and Implementation Strategy 2016-2025*. This kick-off symposium centres around the marine biosphere and its biogeochemistry in the West Pacific Ocean from the Subarctic in the North to the Pacific sector of the Southern Ocean and its connectivity with the Arctic, Southern Ocean, and the Indian Ocean to deepen a holistic hemispheric view. All marine habitats including coastal areas (estuaries, salt marshes, coral reefs, etc.), continental shelf to the deep ocean and their seafloors are of interests. Participants in the IMBeR Regional Programmes, Working Groups, Endorsed Projects, and others are welcome to the symposium.

The symposium is organized into the following thematic sessions:

- Session 1: Coastal Blue Carbon: Measurements, Modeling, and Assessment
- Session 2: Strengthening Coral Reef Resilience to Climate Change and Human Impacts
- Session 3: Dried Small Fish: Ecology, Value Chains and Nutrition

- Session 4: Ecosystem-Social Interactions in the Coastal Sea
- Session 5: Towards the Sustainable Indo-Pacific Region (IPR): Marine Biogeochemistry and Biodiversity
- Session 6: Marine Extreme Events: Impacts, Forecasting, and Risk Management
- Session 7: Connectivity of the West Pacific and Southern Ocean: The Importance of Oceanic Top Predators
- Session 8: Ecosystem, Biogeochemistry, and Interventions in the Western Pacific and its Marginal Seas: Beyond the Disciplinary Borders

The outcome of the symposium will be published as a special volume of a renowned peer-reviewed international journal. *Please note, there is no charge for this online event.*

25th-26th November 2021: UN Ocean Decade Kickoff Conference for the Western Pacific and its Adjacent Areas

Online

The UN Decade of Ocean Science for Sustainable Development (2021-2030), is upon us. The UN Ocean Decade provides a once-in-a-lifetime opportunity to strengthen international cooperation needed to develop scientific research and innovative technologies that can connect ocean science with the needs of society.



You are cordially invited to join the UN Ocean Decade Kickoff Conference for the Western Pacific and its Adjacent Areas. The Conference will mark the launch of the UN Ocean Decade in the Western Pacific and its adjacent areas, and represent the beginning of the region-wide efforts in a substantive development and implementation of Decade Actions. It aims to catalyze partnerships among various ocean stakeholder communities in the region, and initiate co-design of transformative ocean science solutions to the

Ocean Decade Challenges in order to achieve the Ocean Decade Outcomes.

The two-day conference will be composed of: a high-level segment featuring commitments from UN agencies, governments, business and private sectors, and other stakeholder groups; and a series of interactive side events entitled "Decade Action Incubator" aiming to facilitate the development of potential Decade Actions such as Decade Programmes and Projects, and key cross-cutting issues including capacity development and Early Career Ocean Professionals (ECOPs). For more information please visit www.ioc-westpac.org/decade-kickoff-conference/.

14th–16th February 2022: International Ocean Data Conference 2022 - The Data We Need for the Ocean We Want

Sopot, Poland

Since IODE-XXII (2013) every Session of the IOC Committee on International Oceanographic Data and Information Exchange (IODE) has been preceded by a Scientific Workshop or Conference. This was also planned for IODE-XXVI in 2021 but due to the Covid19 pandemic this was not possible: the IODE-XXVI Session was held as a fully online event.

The original host of IODE-XXVI (Poland) has kindly offered to host instead the "**International Ocean Data Conference 2022 - The Data We Need for the Ocean We Want**". The Conference will be held as a hybrid event with a number of participants on-site while others will participate through video conference.



All presentations, papers and posters should be made available by the authors by mid to end of December 2021. For more information visit www.iode.org/index.php?option=com_content&view=article&id=645:first-international-ocean-data-conference&catid=74&Itemid=100407.

27th February – 4th March 2022: Ocean Sciences Meeting 2022

Honolulu, Hawaii, USA

The session list for the Ocean Sciences Meeting 2022 scientific program is now available, www.aslo.org/osm2022/scientific-sessions/.



The Ocean Sciences Meeting 2022 will be held in Honolulu, but with virtual components. Attendees will have the option of participating in-person or remotely.

9th–12th May 2022: Fourth ICES PICES Early Career Scientist Conference

St. John's, Newfoundland, Canada

Hosted by Fisheries and Oceans Canada (DFO), www.dfo-mpo.gc.ca/index-eng.html, The International Council for the Exploration of the Sea (ICES), www.ices.dk/about-ICES/Pages/default.aspx, and North Pacific Marine Science Organization (PICES), meetings.pices.int, welcome you the fourth conference of this series, where early career scientists will have the opportunity to meet colleagues from around the globe who share similar interests and an enthusiasm to improve equality and diversity in marine science. The conference aims to foster the development of contacts, collaborations, and associations among early career scientists that will persist for decades and to establish personal and institutional networks that will help to advance our understanding of the marine environment.

The scientific sessions will be organized around the following themes:

Ecosystem and ocean processes

1. Biodiversity and ecosystem functions
2. Understanding food webs and biogeochemical cycles
3. Developments in taxonomy and systematics
4. Connecting biological, oceanic, and atmospheric processes of different scales

Inclusive, interdisciplinary, and transparent ocean sciences

1. Human–ocean interactions
2. Science, management, and policy for a sustainable and productive Blue Economy
3. Science communication, inspiration, and engagement

Emerging technologies and techniques for ocean science

1. Using remote and *in situ* technologies to inform marine science
2. Advances in techniques and technologies: from 'omics to gear modifications to data analysis
3. Towards open-source science: freely available methods and data in the marine research

Visit the ECSC4 website, www.ices.dk/events/symposia/ecsc4/Pages/default.aspx, to read more about the conference and the theme sessions and stay up-to-date by following us on Twitter [@ECSC_4](https://twitter.com/ECSC_4) for announcements of keynote speakers, the programme, and important dates. Registration and call for abstracts will open in October 2021.

16th–20th May 2022: 53rd International Liège colloquium on Ocean Dynamics, and GO2NE oxygen conference

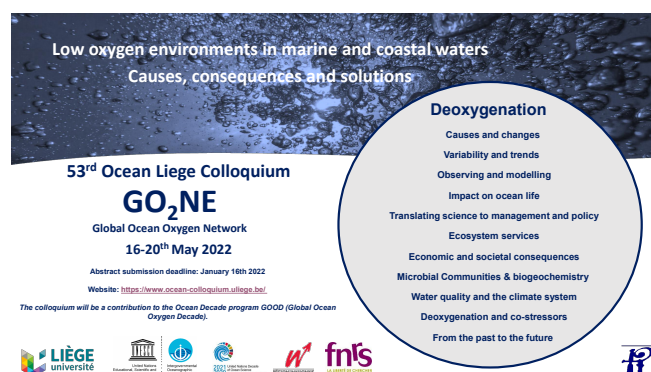
Liège, Belgium

Oxygen is critical to the health of the planet. It affects the cycles of carbon, nitrogen and other key elements, and is a fundamental requirement for marine life from the seashore to the greatest depths of the ocean. Nevertheless, de-oxygenation is increasing in the coastal and open ocean. This is mainly the result of human activities that are increasing global temperatures (CO₂-induced warming) and increasing loads of nutrients from agriculture, sewage, and industrial waste, including pollution stemming from power generation using fossil fuels and biomass.

The 53rd Liège colloquium will investigate new developments and insights related to de-oxygenation in open and coastal waters. It is jointly organized with the Global Ocean Oxygen Network (GO2NE) and is a contribution to the Global Ocean Oxygen Decade (GOOD) program endorsed by IOC-UNESCO. The following sessions are considered:

- De-oxygenation: understanding causes and attributing changes

- Assessing open ocean and coastal de-oxygenation variability and trends
- De-oxygenation: observing and modelling
- De-oxygenation and ocean life
- De-oxygenation and co-stressors: understanding, monitoring and mitigating deoxygenation in the context of multiple stressors
- Ocean De-oxygenation - how the past can inform the future?
- Microbial Communities and their controls on biogeochemical feedbacks and interactions
- De-oxygenation, water quality and the climate system: understanding processes and feedbacks and developing actionable indicators
- De-oxygenation: ecosystem services, economic and societal consequences.
- Confronting de-oxygenation and its impacts: translating science to management and policy



Deadline for Abstract submission: January 16th 2022. Further details (scientific committee, submission, registration, deadlines, venue etc...) are available on the web site <https://www.ocean-colloquium.uliege.be/>.

5th - 9th September 2022: Challenger Society Biennial Meeting – celebrating the 150th anniversary of the Challenger Expedition

London, UK

To be hosted by the National History Museum, just a 'date for the diary', stay tuned.

The CSMS email address is info@challenger-society.org.uk. Contributions for next month's edition of Challenger Wave should be sent to: john@vectisenvironmental.com by the 29th October.

We continue to send printed copies of Challenger Wave to members of the CSMS without email addresses. However it is in everybody's interest to send your email address to Jennifer Jones, jxj@noc.ac.uk, as soon as possible

JOBS and OPPORTUNITIES

POSTDOC POSITION Physical Oceanography, Woods Hole Oceanographic Institution

The department of Physical Oceanography at the Woods Hole Oceanographic Institution is seeking a **Postdoctoral Investigator**. This is a full-time position and is eligible for benefits. The initial appointment will be for one year with the possibility of an extension for an additional year based on satisfactory performance.

JOB SUMMARY:

Research will involve studying three-dimensional Lagrangian motion in eddies and fronts and its biogeochemical implications. The postdoc will be expected to participate in ship-based fieldwork, in analyzing observations, and using three-dimensional modeling for process understanding. The project offers scope to explore ocean submesoscale dynamics, microbial planktonic distributions, and will further understanding of pathways for subduction from the upper ocean. It is funded by ONR, is an international collaboration and involves several PIs. The postdoc will play a key role in the design and execution of research and the interpretation of scientific results.

The institution has a top-rated postdoctoral program (www.whoi.edu/postdoctoral/) that supports a thriving postdoctoral community with formal mentoring and career guidance programs. While the primary focus is research, the postdoctoral investigator will have an opportunity to participate in educational and outreach activities associated with the project.

EDUCATION & EXPERIENCE DESIRED:

- PhD
- Knowledge of physical oceanography
- Strong computer and programming skills, numerical modeling, data analysis and visualization. Demonstrated ability to communicate effectively and work collaboratively.
- Interest in making measurements at sea is a plus
- Interest in physical-biological interactions is a plus

APPLICATION INSTRUCTIONS:

Please apply online, <https://careers-whoi.icims.com/jobs/1530/postdoctoral-investigator---physical-oceanography/job>, by uploading the following documents: a cover letter, cv (resume) that includes the names and contacts of at least 3 references, statement describing research interests and career goals, up to three relevant publications (or preprints).

Applications will be reviewed as received until the position is filled. To be eligible for this position, applicants should not have previously held a postdoc position for more than three years. Please contact Amala Mahadevan (amala@whoi.edu) with any questions about the position.

WHOI is an Affirmative Action/Equal Opportunity Employer/Disabled/Veterans/M/F. We encourage Veterans and those with Disabilities to apply. Applications are reviewed confidentially. Applicants that require accommodation in the job application process are encouraged to contact us at +1 (508) 289-2253 or email eeo@whoi.edu for assistance.

There are jobs on the IMBER web site

<http://www.imber.info>



Integrated Marine Biosphere Research

Jobs and opportunities

New

- Postdoctoral Research Fellowship: Observations and Modelling of Polar Aerosols University of Cape Town. Open until filled; **apply now**
- Program Manager: OV Launchpad, Ocean Visions. Applications reviewed as received; **apply now**
- Fisheries Consultant: MRAG, London, UK. Open until filled; **apply now**
- Research Assistant Professorship: Coral Reef Ecology and Management, Center for Global Discover and Conservation Science, Arizona State University, US. Open and reviewed until filled; **apply now**
- Impact Assessment Research Scientist 1, University of Washington, Tacoma, US. Open until filled; **apply now**
- Marine Scientist: Ecosystem Mapping and Assessment, South African National Biodiversity Institute, Cape Town, South Africa. Apply by **22 October**
- Fishery Protection Officer, Falkland Islands Government, Stanley, Falkland Islands. Apply by **24 October**
- Last call - Postdoc (18 positions): Shaping European Leaders for Marine Sustainability (SEAS), University of Bergen. Final reminder to apply by **31 October**
- Postdoc: Biodiversity and connectivity of marine protest areas, Helmholtz Institute for Functional Marine Biodiversity, University of Oldenburg in Bremerhaven, Germany. Apply by **31 October**
- PhD: Beyond the known drivers of marine carbonate mineral dissolution, Royal Nioz – Texel, The Netherlands. Apply by **31 October**
- Professor: Marine ecology/adaptation to ocean extremes, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel University, Germany. Apply by **10 November**
- Post doc: Deep-sea taxonomy, ISA-Ifremer, Brest, France, . Apply by **30 November**

In case you missed it...

- PhD: microbial pathways that lead to nitrous oxide production, Florida State University and Stanford University, USA. No deadline given; **apply now**
- Research Fellow: fisheries management, University of Wollongong, Australia. No deadline given; **apply now**
- Manager of Equitable Ocean Communities, Ocean Conservancy., remote working. No deadline given; **apply now**
- Project Manager: Synoptic Arctic Survey, Bergen, Norway. No deadline given; **apply now**
- Technician, associate research or postdoc scientist: development of seagoing instrumentation, Duke University, Durham, NC, USA. No deadline given; **apply now**
- Director of Ocean-Climate Justice, Ocean Conservancy., remote working. No deadline given; **apply now**
- Director, Marine and Coastal Conservation, National Fish and Wildlife Foundation, Washington, DC, USA. No deadline given; **apply now**
- Assistant Professor: Alaska Sea Grant Marine Advisory Program, Bristol Bay, Alaska, USA. Open until filled but apply by 24 September for full consideration; **apply now**
- Postdoc (multiple): High resolution remote sensing for Hawaii Decision support; Carbon Mapper Mission Science Applications Team, Center for Global Discovery and Conservation Science, Arizona State University. Application review begins 20 September and continues until positions are fill; **apply now**
- Senior Consultant in Environmental Policy, ICF. no deadline given; **apply now**

- PhD: population genomics of the *Limacina helicina* species complex. Nord University, Bodø, Norway. Apply by **20 October**
- PhD: Social license in onshore lobster aquaculture, University of Tasmania, Australia. Apply by **29 October**
- Grant: FY2022 Marine Debris Prevention. Full grant application deadline: 11 February 2022. Letter of intent must be submitted by **29 October**
- Postdoc: ERCProject MARIPOLDATA, University of Vienna, Austria. Apply by **31 October**
- Chemical Oceanographer/Aqueous Trace Element Biochemist, tenure-track position, Florida State University, USA. Apply review begins **1 November**
- Postdoc: Marine Trace Metal and Isotope Biogeochemistry, The Royal NIOZ Texel, The Netherlands. Apply by **12 November**
- Postdoc: Environmental humanities, Harvard University, Cambridge, MA, USA. Apply by **12 November**
- Postdoc: Ocean chemistry, ecological change and coastal communities, University of California - Davis, USA. Apply by **31 December**

Visit the IMBeR Website

imber@imr.no

There are jobs on the MASTS web site

30 New Roles - Marine Scotland includes...

Marine Mammal Scientist – closing date 28 October
Senior Marine Mammal Scientist – closing date 28 October
Senior Benthic Ecologist
Senior Bio-acoustician – closing date 28 October
Senior Diadromous Fish Scientist (Salmon & Sea Trout Scientist) – details will be available soon
Senior Marine Fish & Fisheries Scientist
Renewables Advice Officer – closing date 28 October
Lead Marine Ornithologist closing date 28 October
Marine Ornithologist (x 2) – details will be available soon

Bird Island Science Manager – British Antarctic Survey

Senior Policy Officer – Strategic Research, Marine Scotland

SUPER DTP Project Co-Ordinator – University Of St Andrews

Research Assistant/ Research Associate In Climate Repair (Fixed Term) – University Of Cambridge

Social Science Research Officer – Marine Conservation Society

Offshore Renewable Energy – Research Fellow, ERI

Executive Director – COAST

Stakeholder Engagement Officer- Scottish Wildlife Trust

Rank Jackson Foundation Professor of The Environment – Gresham College (Part-Time)

For more details, visit <https://masts.ac.uk/vacancies/>
