December 2019

Challenger Wave

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

NEWS

Snow sampling technology could help predict flood risk

Technology designed by the Oban-based Scottish Association for Marine Science (SAMS) that could provide early warning for floods has been deployed in the Scottish Highlands. The device, known as SIMBA (Sea Ice Mass Balance Array), was originally developed to analyse sea-ice in the Arctic regions and is now used by researchers around the world but SAMS is exploring the potential of the technology to be used closer to home.

SIMBA units are more commonly used as a research tool to measure sea ice thickness and melt rate in the Arctic.

SAMS has been working with a multi-agency co-operation comprising of the Scottish Avalanche Information Service (SAIS), the Scottish Environmental Protection Agency (SEPA) and the University of Dundee, to test the application of this technology in monitoring of snowpacks forming on the Cairngorm mountains. The equipment remotely gathers data in snow accumulation zones at around 1,000m altitude, primarily measuring ground, snow and air temperature profiles, snow accumulation and melt rates and total depth. It can give readings 24 hours a day during storms and dangerous snowpack conditions when these sites are often not accessible safely by avalanche forecasters.

The team from SAMS deploys a SIMBA unit in the Cairngorms.

The deployment this winter in Glen Feshie will test the ability of the equipment to detect and monitor snow melt, providing data that can help scientists understand the contribution of snow melt in floods and ultimately enhance flood prediction models in Scotland.

SAMS Head of Enterprise David Guthrie said: “In a time of rapid change in our climate, it has become increasingly important to gather accurate data and create predictive models that give agencies the earliest forecasts possible. Thanks to this collaboration, we have an opportunity to test SIMBA in a challenging environment such as the Cairngorms, as we explore its potential for assessing flood and avalanche risk. We are also grateful to the contribution of WildLand Limited Glen Feshie Estate for allowing site access and logistical support, and Northern Engineering and

Welding Company (NEWCO) Ltd for the supply of equipment and expertise."

Dr Andrew Black, a hydrologist from the University of Dundee who is assisting the trial, said: "Snow melt is notoriously difficult to predict accurately because of the variability of snow depths and the difficulty in collecting relevant data. This new system from SAMS presents an exciting new opportunity to monitor snow depth and water content in more detail and will present excellent opportunities to improve forecasting methods in the future. Studying snow melt in the Feshie catchment complements our existing monitoring of rainfall and river flows in that area. Snow which melts on the mountains of this area of the Cairngorms will take at least three hours to reach the River Feshie; this project shows the potential of improved monitoring to inform river flow predictions."

A spokesperson for SEPA said: "With a firm focus on climate change, SEPA is helping Scotland prepare more powerfully for the effects of future increased flooding. Using the latest technology and data, including on snow melt, has real potential to benefit our forecasting and warning services that support communities and local businesses. We're delighted to be working with Scottish Association for Marine Science (SAMS) and the Scottish Avalanche Information Service (SAIS) on this innovative trial."

Trials are already underway on Cairngorm itself, with the assistance of Cairngorm Mountain Resort and the RSPB, to use SIMBA technology to complement other traditional snow analysis techniques and observations conducted by SAIS, to assess avalanche risk. SAIS Coordinator Mark Diggins said: "The objective is to provide additional avalanche start zone information to SAIS in order to enhance public avalanche reports. This will also benefit the SAIS in their ability to remotely access valuable snow stability information, especially during storm cycles and when unable to carry out field observations in high locations due to serious hazard." The testing will continue throughout the winter and extend to several other Scottish mountain areas.

Future Korean submarine rescue capability to be supported by Sonardyne

Underwater positioning and tracking technology from Sonardyne International Ltd. is to be used to support search and recovery operations undertaken by the Republic of Korea Navy's (RoKN's) new auxiliary submarine rescue ship (ASR-II).

The ASR-II concept. Image from DSME.

The ASR-II will be fitted with Sonardyne's Ranger 2 Ultra-Short BaseLine (USBL) acoustic navigation system. This will interface onboard with the vessel's Dynamic Position (DP) control system providing accurate and fast position reference updates during critical station keeping activities. Sonardyne's Ranger 2 system will also be used to simultaneously track the position of, and communicate with, Sonardyne instrumentation fitted to the new, untethered Deep Search Rescue Vehicle (DSRV) that is being built to operate from the ship when it comes into service.

The ASR-II and its moonpool-deployed DSRV are being built under South Korea's Defense Acquisition Program Administration as a replacement for the submarine rescue ship RoKS Cheonghaejin. The 5,200-tonne ASR-II is expected to be delivered to the RoKN by the end of 2022.

Sonardyne's order from GE's Power Conversion business includes everything the ASR-II will need to achieve the best performance from its Ranger 2 USBL acoustic navigation system during exercises or in the event of a submarine rescue operation. This includes a seabed-deployed 3,000 metre rated Dynamic Positioning Transponder 6 (DPT 6) with recovery floatation collar to provide high accuracy USBL positioning for reliable station keeping, even when operating near sources of potential noise interference such as other naval vessels.

Derek Lynch, Global Business Manager for

Marine Vessel Systems at Sonardyne, says, "We have a track record in reliably positioning underwater systems in the deepest waters, as well as shallow water, and for something as critical as a submarine rescue system, you need a system that has proven ability in all situations. The configuration of equipment we're supplying to the ASR-II means it will have everything it needs to arrive on site and begin working immediately to support search, rescue and recovery operations anywhere in the world."

The Marine Facilities Advisory Board (MFAB)
The MFAB, noc.ac.uk/about-us/our-national-role/advisory-bodies, has the task to develop a medium to long-term holistic strategy for future equipment requirements in marine science which will respond to and reflect our community's needs and assess current and future funding. The minutes from our October 2019 meeting, noc.ac.uk/files/documents/about/ispo/MFAB 1 October 2019 minutes.pdf, have just been published. For enquiries about the Marine Facilities Advisory Board, please contact MFAB Secretary Jackie Pearson at the National Oceanography Centre: Email: jfpea@noc.ac.uk or telephone: 023 8059 6097.

VIEWS

EGU's first science-policy pairing scheme held in November
The EGU's first science-policy pairing scheme, which provided an opportunity for a selected EGU member to visit Brussels and work alongside a Member of the European Parliament (MEP), was held from 12–13 November 2019. The scheme paired EGU member Solmaz Mohadjer, a postdoctoral researcher at the University of Tübingen, with Finnish Member of the European Parliament (MEP) Miapetra Kumpula-Natri.

Kumpula-Natri is part of the Group of the Progressive Alliance of Socialists and Democrats in the European Parliament and a member of the parliamentary committees on Industry, Research and Energy and International Trade. She is focused on finding sustainable solutions to climate change, creating quality jobs for Europeans by boosting the sustainable competitiveness of European industry, increasing investments in research and encouraging European cooperation.

During her time in the Parliament, Mohadjer participated in a recorded Q&A about climate change and briefed Kumpula-Natri and her team about the characteristics of the Baltic Sea, including the impact of climate change and the threat of sea level rise for coastal communities. As well as providing scientific information, Mohadjer had the opportunity to experience life in the Parliament by shadowing Kumpula-Natri and her team and attending multiple parliamentary meetings and events.

The pairing scheme provided valuable scientific information to Kumpula-Natri's team, provided Mohadjer with a much better understanding of the policymaking process in the European Parliament, and demonstrated the value of stronger science-policy partnerships. Mohadjer will provide members with more details and her reflections on this scheme in a forthcoming GeoLog post.

Based upon the success of this first pairing, EGU plans on running the scheme again next year. Any comments or suggestions regarding these plans can be directed to policy@egu.eu.

Mediterranean Regional workshop - UN Decade of Ocean Science for Sustainable Development (2021-2030)
Following the First Global Planning Meeting, held in May 2019 (Denmark), a Mediterranean Workshop, oceandecade.org/events/77/Regional-workshop---Mediterranean---UN-Decade-of-Ocean-Science-for-Sustainable-Development-2021-2030, will be convened 21-23 January 2020, in Venice (Italy) hosted by the Italian Oceanographic Commission and co-organized with the IOC - UNESCO, the European Commission, the United Nations Environment/ Mediterranean Action Plan (UNEP/MAP) and the Mediterranean Science Commission.

This event will provide a forum to gather ocean leaders/champions/key stakeholders to further discuss and prioritize the issues identified at the First Global Planning Meeting. Plenary and working groups will facilitate regional, interdisciplinary discussions across sectors (such as: ocean science and technology; ocean policy and sustainable development; business and industry; NGOs and civil society; donors and

foundations) to identify concrete deliverables and partnerships to meet the Decade's six societal objectives.

The Mediterranean Workshop offers a crucial opportunity to co-design mission - oriented research strategies in line with the 2030 Agenda and the Plan of Action for the Protection of the Marine Environment and Coastal Areas, focusing on Mediterranean countries needs and priorities in terms of transforming knowledge systems; accelerating transfer of technology; enabling training and education; and fostering science-policy dialogues.

The Mediterranean Workshop aims to:

- Tailor the Decade goals by addressing knowledge and technology gaps for unlocking the Mediterranean Sea potential;
- Consolidate the Mediterranean blue identity as a hotspot of innovation for environmental protection and sustainable development;
- Enhance cooperation opportunities, focusing on blue capacity-development and training; Structure regional leaderships to address Mediterranean Sea key priorities in the Decade roadmap;
- Promote continuous dialogue among scientists, policy makers, industry, NGOs and civil society; and
- Consider best practices and other regional initiatives and meetings to be aligned with the Decade.

This workshop will be part of a continued global dialogue throughout 2019 and 2020 via conference side-events, further thematic workshops and the Decade Online Community Platform to inform the planning of the Decade. The Decade of Ocean Science is an inclusive and truly global initiative, and broad engagement will be key to success. Please, express your interest in participating in the Mediterranean workshop before the 13th December 2019 by visiting: docs.google.com/forms/d/e/1FAIpQLScMhGoPNkdvT93zjhA9W0g-2S7zivQ9LC27OM2eG4-lTrxOqw/viewform.

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

20th - 24th January 2020: 9th EUROLAG conference on coastal lagoons and transitional environments
Venice, Italy.
www.eurolag9.it/

16th February 2020: Ocean Obs Research Coordination Network (RCN) OceanObs'19 Conference follow-up meeting
San Diego, USA
The Ocean Obs RCN will host an OceanObs'19 Conference follow-up meeting immediately preceding the AGU/TOS Ocean Sciences Meeting (https://www2.agu.org/ocean-sciences-meeting/).

The Ocean Obs RCN annual meeting on 16 February 2020 will be dedicated to the synthesis of threads and recommendations emerging from the OceanObs'19 Conference in Hawaii during September 2019. Of particular interest will be focusing the community on the planning for the implementation of initiatives emerging from OceanObs'19.

The meeting will advance links between observation networks and operational users to facilitate the delivery of critical information to stakeholders, and to address critical policy issues that require multidisciplinary ocean observing systems.

The OceanObs RCN is an NSF-sponsored forum on all aspects of ocean observing. Discussions identify advances and challenges in ocean observing and may identify new technologies and promote their cost-effective development, identify policy priorities, and highlight capacity building requirements for the next decade. This includes discussion of a Decade of Ocean Science for Sustainable Development (2021-2030) being organized by the IOC (https://en.unesco.org/ocean-decade), and balancing ocean observations, science, use, and conservation requirements.

Jay Pearlman, Ph.D. Fellow IEEE, IEEE France, Director, Four Bridges jay.pearlman@ieee.org.
"Submit your Best Practices in Ocean Observing for peer-review: https://www.frontiersin.org/research-topics/7173/best-practices-in-ocean-observing

16th – 21st February 2020: AGU Ocean Sciences meeting
San Diego, USA
agu.confex. com/agu/osm20/prelim.cgi/Home/0.

Announcing session PS011 – "Vertical Transport: Pathways from the Surface to the Interior".

The vertical transport of properties, including carbon, oxygen, and heat, is crucial for the production and export of organic carbon, ventilating the subsurface ocean, and modulating ocean-atmosphere exchange. However, vertical transport is poorly constrained observationally, and a challenge for models because vertical velocity is highly sensitive to small-scale processes and model resolution. We will discuss both physical and biological mechanisms for vertical transport on scales ranging from the mesoscale to smaller scales, and including processes affected by surface forcing, seasonality of the mixed-layer, restratification, advection, subduction, mixing, sinking and topography. We will address the underlying dynamics and kinematics for vertical transport of water and properties using multi-platform observations, modeling and theory, while exploring three-dimensional Lagrangian pathways and their spatial and temporal scales of coherence. The effects of such transport on the biological production and export of organic matter is of interest, as also, the large-scale and long-term implications for exchange between the upper ocean and interior. **Primary Chair**, Dhruv Balwada, Courant Institute of Mathematical Sciences. **Co-chairs,** Amala Mahadevan, Woods Hole Oceanographic Institution, Julius Johannes Marian Busecke, LDEO/Columbia University, Daniel L Rudnick, Scripps Institution of Oceanography. **Primary Liaison**, Daniel L Rudnick, Scripps Institution of Oceanography.

17th – 19th March 2020: Oceanology International
London, UK

Celebrate the world's largest ocean technology exhibition and conference. Oceanology International is turning 50, and you are invited to the celebration. The event brings the industry together, from businesses to government and thought leaders from different sectors, to offer the latest information and technology that are moving our oceans.

On the 50th Anniversary of Oi 2020, we look to the next half-century of ocean technology. A highlight of the show will be our 2020 Future Tech Hub, showcasing innovations that are set to have a far-reaching impact. It's a one-off chance to meet and learn from those who are shaping the future of oceanology. And with a full programme of sessions in our dedicated theatre, we've made it easy for you to focus on the content that

matters for you. Register online now to attend Oi 2020: www.oceanologyinternational.com/.

Visit the show to:

- Have access to a free and interactive educational programme that will inspire and inform you on key industry topics.
- Meet experts and do business – the show offers more than 500 exhibitors, global suppliers of cutting-edge technology.
- Stay up to date with regulations and policies to make more effective decisions for your business and projects.
- Explore features such as the Ocean ICT Zone, focused on marine and ocean IT, communications, satellite and data solutions.

Here are some of the exciting developments for 2020:

- Expanded Dockside Demonstrations - we doubled the number of companies demonstrating technology at the dockside so you have even more options for an immersive experience.
- New tracks at this year's conference - Asset Integrity and Monitoring, Coastal Zone and Shallow Water, Data Interpretation and AI, and much more. Full programme coming soon.
- Expanded Ocean ICT Zone – More exhibitors and technology at the area dedicated to the latest IT and Communication Technologies for the Ocean Space.

To succeed in your future ocean strategies, you need to be where the people shaping them are. Register now to Oceanology International 2020 and celebrate our 50th anniversary where the industry is.

Presentation subjects include:

- Offshore energy development
- Asset integrity and monitoring
- Hydrography, geophysics and geotechnics
- Coastal zone and shallow water
- Navigation and positioning
- Imaging and metrology
- Ocean observation and sensing
- Marine pollution and environmental stressors
- Automation and AI
- Unmanned vehicles and vessels
- Ocean ICT

In its 50 years, Oi has consistently advanced with the community involved in exploring, monitoring, developing or protecting the world's oceans by providing networking across different sectors, knowledge exchange from various disciplines and valuable business opportunities. That reflects on the developments of the show programme year by year and the new benefits for attendees.

3rd - 8th May 2020: European Geophysical Union (EGU2020)
Vienna, Austria
The programme for EGU 2020 is now available at meetingorganizer.copernicus.org/EGU2020/provisionalprogramme.

Nearshore processes: fluid motions and sediment transport
The nearshore zone is one of the most dynamic places on earth. Here, the perpetual interaction between waves, tides, wind and the seabed drive the fluid motions that initiate sediment transport and, ultimately, shape the world's coastal areas. The magnitudes and spatiotemporal scales at which these processes act vary tremendously, and understanding the small-scale processes that underlie large-scale coastal dynamics remains a challenge.

This session welcomes contributions that focus on small scale (from turbulence to mean flow, sand grains to ripples) physical processes in the nearshore zone of wave-dominated coasts. Ranging from approximately 10 m water depth up to the shoreline, this region comprises the shoaling, surf and swash zones. Topics include cross-shore and alongshore wave field evolution, wave-breaking and turbulence, swash-zone processes, cross-shore and alongshore current structures, extreme events, sediment mobilisation and transport, and biophysical interactions. This session will include abstracts describing field measurements, numerical and laboratory modelling, theoretical analysis, and model-data assimilation. We particularly welcome studies including innovative data collection approaches,

or with a focus on uncertainties in measurements and predictions.

Further details of the session, abstract submission and general assembly: https://meetingorganizer.copernicus.org/EGU2020/session/36177

Abstract deadline: **15 January 2020, 13:00 CET** or, for those applying for EGU travel support, December 1st 2019. This year we decided to go for a PICO session (Presenting Interactive Content). PICO sessions are a great way to share results, ideas and experiences by combining the advantages of both oral and poster presentations and enhancing the interaction between authors and the audience. With this session we hope to further raise the current coastal research profile at EGU. For those that are not familiar with EGU, but do know AGU: the annual General Assembly is similar to the AGU Fall meeting, hosting a wide range of interesting sessions that link to our field.

Please consider submitting your abstract on small scale (from turbulence to mean flow, sand grains to ripples) physical processes in the nearshore of wave-dominated coasts to our session. In addition to a wide range of topics, we explicitly strive for a diversity of gender, nationality and career stage. We hope to see many of you in Vienna! and spread the word!

Co-conveners:
Timothy Price - Utrecht University, the Netherlands
Matthieu de Schipper - Delft University of Technology, the Netherlands
Nadia Sénéchal - University of Bordeaux, France
Àngels Fernández Mora - SOCIB Balearic Islands Coastal Observing and Forecasting System, Spain

25th - 29th May 2020: 52nd International Liège colloquium on Ocean Dynamics: **towards an understanding and assessment of human impact on coastal marine environments**
Liège, Belgium
The first announcement of the 52nd Liège colloquium is now on the Web site: http://labos.ulg.ac.be/gher/home/colloquium/.

The coastal ocean is under increasing multiple (climate and not-climate) pressures that affect its functioning and health, and compromise the provision of services to society. The set-up of a scientifically underpinned ecosystem-based management scheme for the coastal ocean requires a thorough understanding of human impacts on the physics, biogeochemistry and biodiversity at large scale. Such a management scheme should be firmly embedded in the science-management-policy interface, taking account of selecting useful and communicable indicators for the ecosystem health, targeting ecosystem services and making use of novel analytical tolls acknowledging the complexity of Drivers-Pressures-Stressors-Impacts-Responses (DPSIR) interactions.

The 52nd international colloquium will gather an interdisciplinary community of scientists to overview the progress in our capabilities to understand, monitor and forecast the impact of human activities on coastal marine environments to guarantee a productive and healthy system as requested by the EU Marine Strategy Framework Directive and the UN Sustainable Development Goal 14.


Towards an understanding and assessment of human impact on coastal marine environments
The 52nd International Liege colloquium on Ocean Dynamics
Liège, Belgium 25th - 29th May 2020

Terms of reference

The coastal ocean is under increasing multiple (climate and not-climate) pressures that affect its functioning and health, and compromise the provision of services to the society. The set-up of a scientifically underpinned ecosystem-based management scheme for the coastal ocean requires a thorough understanding of human impacts on the physics, biogeochemistry and biodiversity at large scale. Such a management scheme should be firmly embedded in the science-management-policy interface, taking account of selecting useful and communicable indicators for ecosystem health, targeting ecosystem services and making use of novel analytical tools acknowledging the complexity of Drivers-Pressures-Stressors-Impacts-Responses (DPSIR) interactions.

The 52nd international Liege colloquium will gather an interdisciplinary community of scientists to overview the progress in our capabilities to understand, monitor and forecast the impact of human activities on coastal marine environments to guarantee a productive and healthy system as requested by the EU Marine Strategy Framework Directive and the UN Sustainable Development Goal 14.

Regular sessions will be held on the following themes:

- Assessing the impact of sedimentary changes on the coastal ocean physics, biodiversity and biogeochemistry.
  KEYNOTE : **Martin Solan** (University of Southampton, United Kingdom)
- Assessing the impact of marine structures on the coastal ocean physics, biodiversity and biogeochemistry.
  KEYNOTE : **Jennifer Dannheim** (AWI and HIFMB, Germany)
- Assessing the impact of land-based pressures on the coastal environment, river-estuary-coastal ocean coupling.
  KEYNOTE : **Marjorie A.M. Friedrichs** (Virginia Institute of Marine Science, USA)
- Multiple stressors, multi-use, cumulative effect assessment, including climate change.
  KEYNOTE : **Philip Boyd** (University of Tasmania, Australia)
- Ecosystem services.
  KEYNOTE : **Tara Hooper** (Plymouth Marine Laboratory, United Kingdom)
- Indicators definition for ocean health assessment in connection with SDG14 and GES assessment.
  KEYNOTE : **Ángel Borja** (AZTI, Spain)
- Science base for marine spatial planning.
  KEYNOTE : **Vanessa Stelzenmüller** (Thünen Institute, Germany)

SIDE EVENT:
A special event gathering scientists, stakeholders and industries is foreseen for reviewing current knowledge and gaps on offshore wind farms impacts on biodiversity and biogeochemistry. The special event will set the scene for a follow-up discussion during a networking reception directly following the presentations.

Website: http://labos.ulg.ac.be/gher/home/colloquium/

Place of the Conference:
University of Liège - Place du 20-Août, 7 - 4000 Liège - Belgium

Organization Committee:
Ulrike Braeckman (UGent, BE)
Arthur Capet (ULiège, BE)
Steven Degraer (RBINS, BE)
Marilaure Grégoire (ULiège, BE)
Tom Moens (UGent, BE)
Karline Soetaert (NIOZ, BE)
Jan Vanaverbeke (RBINS, BE)
Gert Van Hoey (ILVO, BE)

Scientific Committee:
Tundi Agardy (Marine Conservation, US)
Salvatore Arico (IOC-Unesco)
Silvana Birchenough (CEFAS, UK)
Angel Borja (AZTI, SP)
Denise Breitburg (Smithsonian, US)
Joop Coolen (Wageningen Marine Research, NE)
Valérie Cummins (University College Cork, Future Earth Coast, IE)
Farid Dahdouh-Guebas (ULB, BE)
Minhan Dai (Xiamen University, CN)
Ghada El Serafy (Deltares, NE)
Emmanuel Hanert (UCL, BE)
Stéphane Isoard (EEA)
Philippe Laleye, (UAC, Benin)
Diego Macias (JRC, IT)
Patrick Meire (UA,BE)
Angélique Mélet (MOI, FR)
George Petiakis (EuroGOOS)
Pierre Petitgas (IFREMER, FR)
Nadia Pinardi (UB, IT)
Augustin Sanchez Arcilla (Polytechnic University of Barcelona, SP)
Irene Schloss (University of Ushuaïa, AR)
Emily Snail (NOAA, US)
Emil Stanev (HZG, GE)
Adrian Stanica (GeoEcoMar, RO)
Vanessa Stelzenmüller (Thünen Institut, DE)
Michiel Vandegehuchte (VLIZ, BE)
Johan van der Molen (NIOZ, NE)

Abstract submission by: **January 17th 2020**.

Regular sessions will be held on the following

themes:
Assessing the impact of sedimentary changes on the coastal ocean physics, biodiversity and biogeochemistry.
KEYNOTE Speaker: **Martin Solan** (University of Southampton, United Kingdom)

Assessing the impact of hard substrate introduction on the coastal ocean physics, biodiversity and biogeochemistry.
KEYNOTE Speaker: **Jennifer Dannheim** (AWI and HIFMB, Germany)

Assessing the impact of land-based pressures on the coastal environment, river-estuary-coastal ocean coupling.
KEYNOTE Speaker: **Marjorie A.M. Friedrichs** (Virginia Institute of Marine Science, USA)

Multiple stressors, multi-use, cumulative effect assessment, including climate change.
KEYNOTE Speaker: **Philip Boyd** (University of Tasmania, Australia)

Ecosystem services.
KEYNOTE Speaker: **Tara Hooper** (Plymouth Marine Laboratory, United Kingdom)

Indicators definition for ocean health assessment in connection with SDG30 and GES assessment.
KEYNOTE Speaker: **Ángel Borja** (AZTI, Spain)

Science base for marine spatial planning.
KEYNOTE Speaker: **Vanessa Stelzenmüller** (Thünen Institute, Germany)
SIDE EVENT:
A special event gathering scientists, stakeholders and industries is foreseen for reviewing current knowledge and gaps on offshore wind farms impacts on biodiversity and biogeochemistry. The special event will set the scene for a follow-up discussion during a networking reception directly following the presentation.

Further details (scientific committee, submission, registration, deadlines, venue...) are available on the web site (http://labos.ulg.ac.be/gher/home/colloquium/). We are looking forward to welcoming you in Liege ***- Organizing committee***

15th - 17th June 2020: INCISE 2020 "Canyons: human connections to the deep sea"
Cork, Ireland
On behalf of the international and local organising committee we would like to announce early details for this event hosted at University College. The official INCISE 2020 website can be found at https://www.incise2020.com/ where we will provide updates as the conference develops.

INCISE (International Network for Submarine Canyon Investigation and Scientific Exchange) is an annual forum bringing together scientists from around the world working on all aspects of submarine canyon research, and to stimulate discussions across disciplines. This cross-discipline approach allows scientists to collaborate and initiate a holistic approach to canyon research. The bi-annual conference brings together 80 - 100 geologists, biologists, engineers, oceanographers, ecologists and environmental managers. It provides a truly multidisciplinary and exciting forum for the exchange of knowledge and generation of ideas that underpin sustainable submarine canyon management.

At this early stage, we also welcome proposals and suggestions for pre-conference workshops to be hosted at INCISE 2020. For ideas, suggestions and proposals, please email: incise2020@gmail.com. We look forward to welcoming you to the City of Cork to experience our culture, engage in scientific discussion and discovery and enjoy the benefits that INCISE engagement offers. ***- Prof Andy Wheeler and Dr Aaron Lim***

21st - 25th June 2020: 6th International EcoSummit Congress, EcoSummit 2020 - Building a sustainable and desirable future: Adapting to a changing land and sea-scape,
Gold Coast, Australia
This conference series was founded in 1996 in Copenhagen, as a forum for scientists, practioners, and policy-makers working across disciplines to solve the integrated environmental, social, and economic problems facing the world today. Since 1996, EcoSummits have occurred around the world (Canada, China, USA and Europe), with EcoSummit 2016 hosting 1400 participants from 87 countries in Montpellier, France.

EcoSummit 2020 will have a focus on coastal and marine ecosystems including adjacent terrestrial ecosystems and all habitats that are integrated within those ecosystems, including river networks, wetlands and catchments. We expect all aspects of environmental modelling, engineering, science,

and policy to be covered under the focus of climate adaptation and the need for developing socio- economic and environmental resilience and sustainable prosperity around the world. Further focus will be placed on fragile systems that are more likely to suffer the consequences of climate change and anthropogenic pressure such as islands, coastal communities and arid landscapes.

In the current context of an increasing world population, in particular in coastal regions, it is evident that building sustainable cities and using resources sustainably is inevitable. It is envisaged that the Summit will produce a declaration encompassing its vision and policy recommendations. We welcome your participation and look forward to seeing you at EcoSummit 2020.

Side events will also take place during Ecosummit 2020. If you wish to participate in a side event, please contact the organiser by email beforehand, as the number of places is limited in each event. There is no abstract submission to side events. Still time to submit a symposium or side event proposal: www.ecosummitcongress.com/participation-events.asp. For more general information Visit the EcoSummit 2020 website: ecosummitcongress.com.
EcoSummit 2020 Co-Chairs:
Robert Costanza, Crawford School of Public Policy at Australian National University, Australia.
Bai-Lian (Larry) Li, University of California, Riverside, USA.
Jan-Olaf Meynecke, Griffith University, Australia

7th - 11th September 2020: Challenger Society Biennial Meeting
Oban, Scotland

The biennial Challenger conference attracts around 300 leading UK marine scientists, science managers and early career scientists. As well as showcasing cutting edge marine science and technology, the conference is noted for its training of young scientists and networking events, including a public lecture by an eminent authority on relevant societal marine issues.

Once again the call is out for sponsors and exhibitors wishing to participate in next year's conference. The conference is a great place to be if you are recruiting marine science graduates.

The range of sponsorship opportunities are listed below. The conference organiser is Professor Nick Owens, and commercial exhibition organiser Terry Sloane will be happy to discuss any requirements that you may have.

Terry Sloane by email: terry@planet-ocean.co.uk or phone 01276 427 971

www.challenger2020.co.uk **www.challenger-society.org.uk**

❖ Sponsorship Packages

Headline sponsor of conference (one only):
- 3m x 2m exhibition stand in prime location with 2 delegate passes
- Prominent name and logo on the conference website and abstract book acknowledging **MAIN SPONSOR**
- leaflet in delegates bag,
- Full page advert on inside front cover of abstract book
- Free "Gold upgrade"

£1600

Individual sponsorship opportunities:
Sponsors of individual elements of the event will be acknowledged in the lecture theatres, abstract book, on the conference website and on posters. Those sponsors with manned exhibition stands are able to upgrade to the **Gold package**, where they will have the opportunity to have a 5 minute speaking slot at the start of the plenary sessions.

• Manned exhibition stand 3m x 2m with 2 delegate passes	£600
"Gold Upgrade" (*only five slots available*)	£100
• Co-sponsorship of conference dinner	£750
• Co-sponsorship of ice breaker reception	£700
• Co-sponsorship of poster session	£500
• Co-Sponsorship of public lecture	£500
• Sponsorship of keynote speaker	£550
• Exhibition banner unmanned	£200
• Brochure in delegates bag	£200
• ¼ Page advert in conference handbook	£150
• ½ Page advert in conference handbook	£300
• One A4 leaflet in delegates bag	£100

Corporate society members benefit from a 15% discount

For the only the third time, the conference will be held at SAMS (Scottish Association for Marine Science in beautiful OBAN. SAMS hosted the first post war conference back in 1946 and since then only once more since in 2006.

11th – 14th January 2021: The Fifth Xiamen Symposium on Marine Environmental Sciences
Xiamen, China
The State Key Lab of Marine Environmental Science (MEL), Xiamen University and the Earth Science Division of the National Natural Science Foundation of China (NSFC) are going to hold the fifth bi-annual meeting XMAS-V. The theme of XMAS-V is **Multidisciplinary Sciences Serving a Sustainable and Healthy Ocean.** More

information about the meeting can be found at http://melmeeting.xmu.edu.cn/xmas5/.

Background

To promote interdisciplinary studies in marine environmental science and to foster the next generation of ocean scientists, the State Key Laboratory of Marine Environmental Science (MEL, http://mel.xmu.edu.cn/en), Xiamen University initiated the Xiamen Symposium on Marine Environmental Sciences (XMAS) in 2014, with the overarching theme **The Changing Ocean Environment: From a Multidisciplinary Perspective**. XMAS has grown to be one of Asia's largest conferences in marine sciences and acts as a hot spot to exchange research interests in global and regional oceans.

Its fifth iteration, XMAS-V (http://melmeeting.xmu.edu.cn/xmas5) will be held in Xiamen from **January 11th to 14th, 2021**. XMAS-V will focus on how **Multidisciplinary Sciences Can Serve a Sustainable and Healthy Ocean**. It will be one of the important hallmarks of Xiamen University's centenary celebrations. The symposium will consist of different, interconnected sessions covering physical oceanography, marine biogeochemistry, biological oceanography, and marine ecotoxicology along with workshops for emerging topics in marine environmental sciences such as how to achieve the goals outlined in the United Nations Decade of Ocean Science for Sustainable Development (2021-2030).

MEL was established in 2005 under sponsorship from the Ministry of Science and Technology of China (MOST). It has been awarded The Excellent State Key Laboratory twice in two recent official reviews by MOST. MEL is dedicated to interdisciplinary cutting-edge research in marine environmental sciences, with particular strengths in marine biogeochemistry and ecosystem studies.

Originally known as Amoy, Xiamen is an island renowned for rich cultural relics, a pleasant climate, and beautiful natural scenery. It is located on the southeast coast of China and has a long history of international commerce. It has a monsoonal humid subtropical climate characterized by mild and dry winters (average January temperature around 15 °C /59 °F).

Important Dates

January 1, 2020: Call for Session/Workshop Proposals Begins
April 30, 2020: Call for Session/Workshop Proposals Ends
May 15, 2020: Decision of Proposals Sent
June 1, 2020: Abstract Submission Begins
August 31, 2020: Abstract Submission Closes
September 30, 2020: Authors Notified of Acceptation
October 1-31, 2020: Registration
November 15, 2020: Scientific Program Posted

Chair of XMAS-V

Minhan Dai, Xiamen University

Local Organizing Committee

Yawei Luo
Zhimian Cao, Yongxiang Huang, Xing Jian, Xin Lin, Jian Ma, Dalin Shi, Shanlin Wang, Siqi Wu and Wei Zhuang

Organizers

State Key Laboratory of Marine Environmental Science, Xiamen University
Department of Earth Sciences, National Natural Science Foundation of China

Contact

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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', stayed 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 30th December.

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

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JOBS

There are jobs on the IMBER web site

http://www.imber.info

IMBeR

Integrated Marine Biosphere Research

Jobs and opportunities

- Science technician/IT crew member. Volstad Shipping. Norway. Apply by 30 Nov
- Delta Science Fellowship: Research projects for coupled natural-human systems in California Bay-Delta. Apply by 20 Dec
- Two track-tenure marine policy positions, WHOI, Woods Hole MA, USA. Apply by 31 Dec
- Contribute to the TBTI ebook on Blue Justice for Small-Scale Fisheries. Submissions by 31 Dec
- Postdoc: Ocean/atmosphere extreme weather events. ETH Zurich, Switzerland. Apply by 15 Dec
- PhD: Ocean biogeochemical modelling and data analysis. ETH Zurich, Switzerland. Apply by 15 Dec
- Postdoc: (Southern) ocean modelling. ETH Zurich, Switzerland. Apply by 15 Dec
- PhD: Responses of marine copepods to Arctic climate change, NPI, Tromsø, Norway. Apply by 15 Dec
- Postdoc: Marine social science. ANU, Canberra, Australia. Apply by 22 Dec
- Postdoc: Ocean carbon data/model analyses. ETH Zurich, Switzerland. Apply by 1 Jan
- Marine Plankton Ecologist (Assistant/ Associate Prof.), Sultan Qaboos University, Muscat, Oman.. Apply by 15 Jan
- Analyst: Illegal fishing and transparency, Oceana, Washington, DC, USA. Apply by 14 Feb
- Assistant or Associate Professor: Global Sustainable Development, University of Warwick, Coventry, UK. No deadline given but interview dates TBA in Jan
- Erasmus Mundus: 24 fully funded international Masters scholarships in Water and Coastal Management for 2020/2021 academic years. Apply by 16 Dec
- ICES Science Committee Chair. Copenhagen, Denmark. Apply by 16 Dec
- Delta Science Fellowship: Research projects for coupled natural-human systems in California Bay-Delta. Apply by 20 Dec
- Postdoc/Researcher: Big Data applications on climate models, NORCE-Climate, Bjerknes Centre for Climate Research, Norway. Apply by 31 Dec
- Postdoc: Physical oceanography, Ifremer, Brest, France. Apply by 31 Dec
- Two track-tenure marine policy positions, WHOI, Woods Hole MA, USA. Apply by 31 Dec
- Contribute to the TBTI ebook on Blue Justice for Small-Scale Fisheries. Submissions by 31 Dec
- 12 Postdocs, Protecting/restoring the ocean, Sustainability of marine resources, or Ocean data Ifremer, Brest France. Submit proposals by 15 Jan
- Postdoc: Analytical Chemistry / Molecular Biology / Microbiology. University of Gothenburg, Sweden. Apply by 31 Jan
- Postdoc: Microbiology / Molecular Biology. University of Gothenburg, Sweden. Apply by 31 Jan

Visit the IMBeR Website

imber@imr.no