EMSO ERIC Newsletter No.1 - April 2022

News

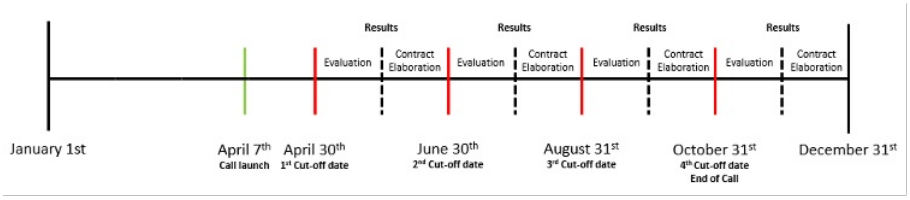
The EMSO ERIC 1st Call for physical access is now open!

We are glad to announce that the 1st Call for Physical Access, after the experience gained in the project EMSO-Link, is now open.

The objective of this call is to offer **physical access** to EMSO Facilities where users' **devices can be installed, including sensors, instruments, systems, new technologies and where new procedures/experiments can be tested/take place**.

The set of Regional Facilities offered for access provides the **broadest scientific and technological capabilities** to future users. At the moment, four Facilities are available and more will be added as the physical access program grows within EMSO ERIC.

This is a **unique opportunity** for scientists and research engineers to avail of **high-quality, interlinked instrumented platforms** operating in the open ocean for carrying out research and/or testing activities.
Regional Facilities' engineers and scientists can also provide **training and co-development** to users interested in learning **specialised techniques/methodologies and developing new products,** taking advantage of **years of experience gathered in EMSO Facilities' labs**. Tailored **data collection** by the Facilities' instruments is another service that may be provided.



The **evaluation of project proposals** will be performed **every two months** and the selected ones will be funded.

Funding consists of Facility Access Units (days of usage) and **economic**

support for operations, travel, shipping and consumables. This economic support amounts to 45000 Euros for all projects in 2022 and will be distributed evenly among the four cut-off dates.
This **2022** call is expected to fund a **minimum of four projects**.

The first **deadline is April 30th**.

Don't miss this opportunity to have access to our world-class facilities!

To know more about the whole offer, the application procedures and deadlines, read more here.

Authors: Simò Cusì, Marco Galeotti, EMSO ERIC

The EMSO ERIC Gender Equality Plan (EE GEP) now available!

Approved by the **EMSO ERIC Assembly of Members** on the 8th of March 2022, on the occasion of the International Women Day 2022, the "EMSO ERIC General Equality Plan" is now available on the EMSO website here.

EMSO ERIC started defying its **Gender Equality Strategy** already in 2017 when the first gender study to assess differences in conditions, participation rates, decision making power and needs was carried out. The study had as its main objective to identify gaps among the Research Institutions, beneficiaries of the projects, and EMSO nodes representatives at the same time. This first step enabled the definition of the context, the main objectives and a set of principles at the basis of the strategy.

Recently, EMSO finalized its Gender Equality Strategy through the preparation of the official document "**EMSO ERIC Gender Equality Plan (EE GEP)**", which embeds a precise plan of actions to promote gender balance, grouped in 5 main areas (Gender dimensions):

1. Gender balance in leadership and decision-making
2. Gender equality in recruitment and career progression and promotion of the condition of access to personal development
3. Work-life balance
4. Integration of the gender dimension into EMSO ERIC organizational culture
5. Gender-based violence including sexual harassment, sexist attitudes and perception of discrimination

The document, structured in **three main chapters**, establishes the actions and the monitoring system **to ensure gender equality** inside the consortium.
Gender equality requires all genders to access and enjoy the same opportunities. Accordingly, aligned with UN SDG 5, EMSO is strengthening its policies for more inclusive work practices to guarantee that all genders can access the same rewards, resources, and professional growth.

In terms of financial commitment, EMSO ERIC assigns economic resources to the implementation of the actions as programmed in the Plan.

The EE GEP has been developed around the **EIGE's gender mainstreaming cycle**, the methodology proposed by the European Institute for Gender Equality.
Following this approach, each phase corresponds to a step to develop the Plan. The EE GEP foresees the possibility to be updated on yearly basis, according to the EMSO ERIC overall strategy to ensure the most current practices in the gender equality issues align with the organisation's needs.

Author: Valentina Tegas, EMSO ERIC

The Spanish Ministry of Science and Innovation and PLOCAN renew the EMSO ERIC participation agreement

The **Ministry of Science and Innovation** and **PLOCAN** have renewed the agreement for Spain's participation in the **EMSO ERIC**, the European Research Infrastructure Consortium dedicated to European Multidisciplinary deep-sea research.
The research work undertaken in connection with EMSO ERIC provides **real-time and long-term data** for monitoring threats such as **climate change**, **resource sustainability** and **habitat destruction**.

EMSO infrastructure, dedicated to European multidisciplinary deep-sea research, is included in the **ESFRI Roadmap** 2021 on Large Scale Research Infrastructures.
The construction of Research Infrastructures is being financed by various EU countries, and the goal is to **study the ocean** through the creation of a **pan-European observation infrastructure** that draws on existing infrastructures.

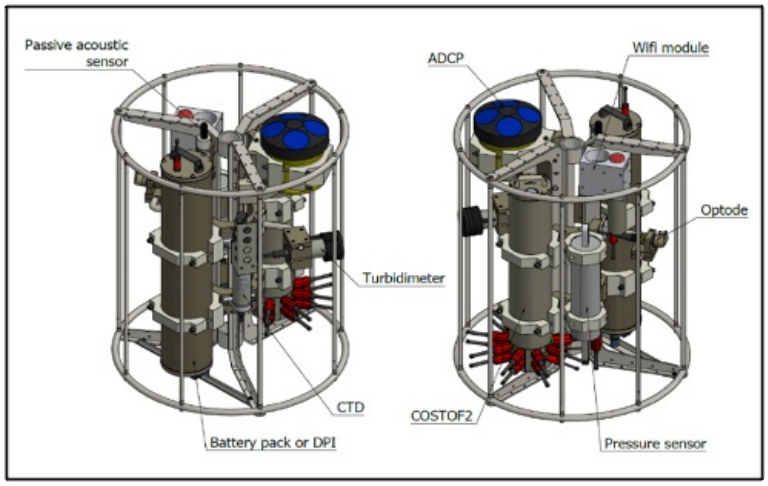
In Spain, the implementation of the commitments required for membership in EMSO ERIC falls to the **General Secretariat for Research** of the Ministry of Science and Innovation and the Oceanic Platform of the Canary Islands (PLOCAN).
The renewed agreement will enable PLOCAN to **promote the participation of Spanish public and private R&D agencies** in tasks related to EMSO ERIC's objectives and capabilities.

Author: PLOCAN

The EMSO Generic Instrument Module (EGIM): Standardized and interoperable instrumentation for ocean observation

The team involved in EMSO-DEV published a paper on **Frontiers in Marine Science** about the EGIM, the **EMSO Generic Instrument Module**, designed to measure variables of broad scientific interest consistently over long periods of time.

The paper describes the system, features, set-up, operation and data management.
A series of coastal and oceanic deployments with various site configurations and deployment scenarios demonstrates that EGIM is **a valuable ocean observation module**, which can **significantly enhance** the capability of the observatories and contribute to addressing questions that link physical, biogeochemical, biological and ecosystem variables.
The diverse use cases presented relate to drivers of **fish activity, hydrothermal vent fluids and particles dispersion, passive acoustic monitoring of marine mammals and to long-term time series of ocean environmental variation in the water column.**



The various perspectives underlined that the EGIM, available to EMSO Regional Facilities and to the wider marine science community (research and industry), can be considered **a milestone to meet the ocean monitoring need** for standardization and interoperability. EMSO ERIC has endorsed the **responsibility** to go forward.

The EMSO Generic Instrument Module (EGIM): **Standardized and interoperable instrumentation for ocean observation**, by **Nadine Lantéri**, Henry Ruhl, Andrew Russell Gates, Enoc Martínez, Joaquin del Rio Fernandez, Jean François Rolin, Jacopo Aguzzi, Mathilde Cannat, Eric Delory, Davide Embriaco, Robert Huber, Marjolaine Matabos, George Petihakis, Kieran Reilly, Mike Van Der Schaar, Michel André, Jérôme Blandin, Andrés Cianca, Marco Francescangeli, Oscar Garcia, Susan Hartman, Jean Romain Lagadec, Julien Legrand, Paris Pagonis, Jaume Piera, Xabier Remirez, Daniel Toma, Giuditta Marinaro, Bertrand Moreau, Raul Santana, Hannah Wright, Juan José Dañobeitia, Paolo Favali, published in Frontiers in Marine Science, section Ocean Observation.

Read the full article here.

Photo 1: @ifremer, The EGIM on EMSO Azores at 1700 m depth, 2017

Author: IFREMER

Events

Marine Imaging Workshop 2022 - October 3-7, Brest

The fourth **Marine Imaging Workshop** will be held from **October 3rd to October 7th 2022** in **Brest, France**, with both on-site and online attendance available.

Marine imaging with cameras is a major method in the science, policy and public understanding of the world's oceans. The topic is **developing rapidly**, driven by the technological evolution and increasing application of marine imaging in all oceans. Photos and videos are used **to explore unseen ocean habitats**, to motivate designation of marine conservation areas, for assessing environmental baselines and **monitoring of human impacts** and communicate ocean narratives.

The international Marine Imaging Workshops assemble around **100 scientists and engineers from different disciplines** to push the boundaries of marine imaging. Biologists, ecologists, computer scientists, end-users and stakeholders **discuss the methods and procedures** for optimising the ways we harvest information through images.

Topics cover everything from the start to finish of marine image analysis: **acquisition planning**, **image collection**, **processing of images** prior to annotation, **still/video annotation**, **the future of annotation**, **FAIR image data management** and **much more**.

The **call for abstracts** is now open until the **18th of May**.

Registrations (on-site and on-line) and photo competition will open in the coming weeks.

To receive further information send an email to: **miw22@ifremer.fr**

Read more about the **Marine Imaging Community** and the workshop on the event website.

Author: Marco Galeotti, EMSO ERIC

EMSO-Azores scientists at the One Ocean Summit, Brest, 8-11 February 2022

"Better protect the ocean and build fruitful initiatives in terms of research and international policy" was the commitment made by **President Emmanuel Macron** when announcing the **One Planet Summit for the Ocean**: the One Ocean Summit.

This summit was held from February 9 to 11, 2022 in Brest at the "ateliers des Capucins", **under the French Presidency of the Council of the European Union** and with the **support of the United Nations**.

The main commitments that emerged during the summit include the preparation of a **treaty on the high seas**, which currently escapes any regulation, **the fight against plastic pollution**, t**he establishment of new marine protected areas** and **the mapping of 80% of the seabed by 2030**.

Alongside the main events that gathered **more than 400 stakeholders from all over the world**, the center for the discovery of the oceans **“Océanopolis”** welcomed the general public with a dedicated one ocean summit program.

The One Ocean Summit pavilion, a genuine 360° deciphering of the themes being addressed at the summit offered open conferences, round tables, expositions, and encounters with experts over **three days and nights**.

In this context, **EMSO-Azores scientists Jozée Sarrazin and Marjolaine Matabos (Ifremer)** were invited to contribute to round tables and exchanges with the public. Wednesday, February 9, was dedicated to the topics around “**Ocean, Science and Society**” and biologist **M. Matabos** participated in the round table "**An ocean with and for society, participatory sciences**” to present **Deep Sea Spy** a program that enables citizens to help in the annotations of deep-sea imagery from the Lucky Strike vent field (https://youtu.be/dhNkAIPMAHU).

Another event was held Thursday, February 10 at Oceanopolis around "**The governance of the high seas and the protection of its biodiversity**". **Biologist J. Sarrazin** was invited to briefly introduce **deep-sea mineral resources**. Her presentation was followed by a debate between two “false” experts (https://youtu.be/1Wz72uyTcGQ) and a vote from the public on the question “**Do you want to exploit deep-see mineral resources?**”.

Photo 1: Marjolaine Matabos (LEP/UMR BEEP), second from left) was one of the four guests at the round table "Ocean, science and society" to introduce the citizen science project Deep-Sea Spy.

Photo 2: Jozée Sarrazin (LEP/UMR BEEP) introduced the debate on deep seabed mineral resources. The two fake experts then debated the issue and the public voted ... mostly against this imminent exploitation.

Author: IFREMER

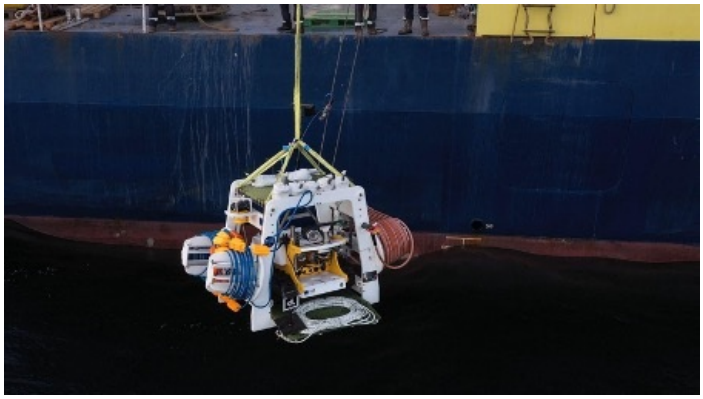
PLOCAN at the Ocean Sciences Meeting 2022: “Critical technologies in situ observation of the oceans”

The person in charge of the Observatory of the Oceanic Platform of the Canary Islands, **Eric Delory**, has presented a paper at the Ocean Sciences Meeting 2022 entitled "**Critical technologies in the in situ observation of the oceans**".

One of the objectives of the session has been to **raise the direct interaction** between early career ocean professionals (ECOP) and leading researchers, academics, engineers and industry experts who are solution providers and manufacturers of sensors and other ocean science kits.

Author: PLOCAN

Cruises



EMSO-WL/BathyCruise campaign

New measuring instruments covering multidisciplinary studies have been added to the **EMSO-WL underwater observatory**. The cruise enabled researchers from the **Mediterranean Institute of Oceanology**, in Marseille, to collect samples for their studies on **marine snow and bioluminescence**.

The **EMSO-WL/BathyCruise** campaign took place from January 31st to February 15th, 2022 on board the research vessel **Pourquoi Pas?**, operated by **Ifremer**, at the **EMSO-West Ligurian site**, located 40 km south of Toulon, France.

The objectives of these 15 days at sea were,

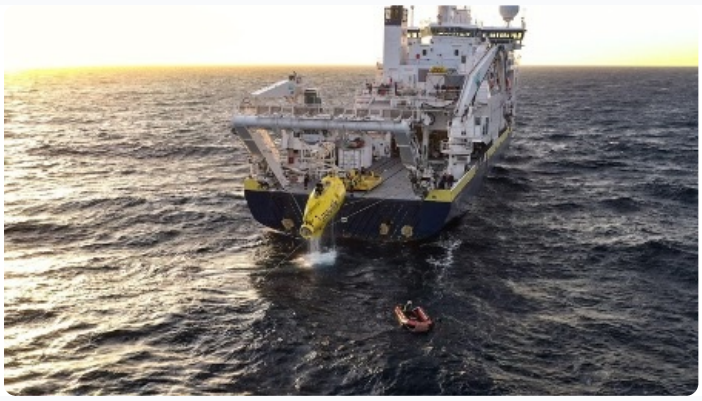
1. **to implement** the Ligurian underwater observatory with the deployment of new instrumentation; and
2. **to collect** water samples and plankton organisms to be studied at the **Mediterranean Institute of Oceanology (MIO)** in Marseille, France.

Engineering for oceanology

Six new devices have been deployed at the EMSO-WL site at a depth of 2420m.

1. **A scientific junction box** (SJB), which is a smart multi-socket designed and operated by Ifremer. It enables new devices to be connected to the power supply and to the internet network on the deep-sea floor which allows it to be remotely controlled.
2. **A new seismometer**, operated by Geoazur, which is dedicated to monitoring seismic activity and tsunamis in the Ligurian basin.
3. **A Gamma Spectrometer**, operated by the **Particle Physics Centre of Marseille (CPPM)**, to measure its 40K decay and Beta radioactivity emission. This is **the first time** that such a gamma spectrometer **has been deployed** at this depth in the Mediterranean Sea and indeed in the global ocean.
4. **The Biocam**, developed and operated by the Institute of **Physics of 2 infinities in Lyon, and the CPPM**, is a smart single photon stereo camera fixed on a tripod, it has been designed to study bioluminescent organisms in 3 dimensions.
5. **The BathyReef** which is an artificial reef designed by **Lab Rougerie+Tangram** and manufactured by **Vicat** in collaboration with the **MIO**. It has been biomimetically inspired by the internal tissues of **ascidia**, so offering a large colonisable surface and great resistance. It was designed with a slope to allow the **BathyBot crawler** to gain height by climbing on it and to avoid seafloor disturbance in its monitoring duties.
6. And finally, our VIP guest on board, **the BathyBot** by the **French National Centre for Scientific Research**, was able to reach its new

living and working place: the seafloor of the Mediterranean Sea! It is a benthic rover that will be the scientists' eyes **at 2420m depth for the next 10 years**. It is operated by the MIO's scientific team to study in situ bioluminescence using a dedicated, unique, hypersensitive camera. It will be able to **observe the deep-sea biodiversity**, as well as identify certain parameters of the environment using its embarked sensors and instrumentation. One of its tasks will be to monitor the BathyReef's colonisation dynamics over time. Real-time videos will be broadcast following its connection (You can follow **@BathyBot** on Twitter for more live information!).



The installation of these devices was carried out by **the Nautile submarine (Ifremer)** which positioned the deployed instrumentation infrastructures **on the seafloor** and deployed and connected their cables to the SJB. We are grateful and full of admiration for the nautile's pilot skill and dexterity in the diverse deep-sea manipulations. We are also grateful to the engineers and RV Pourquoi Pas crew involved in this project.

Biology on board
The ship's laboratory was occupied by researchers from the MIO who studied **marine snow microbiology, plankton bioluminescence, deep-sea bacterial iron-oxidation and the in situ plastic ecotoxicology at 240bar**.

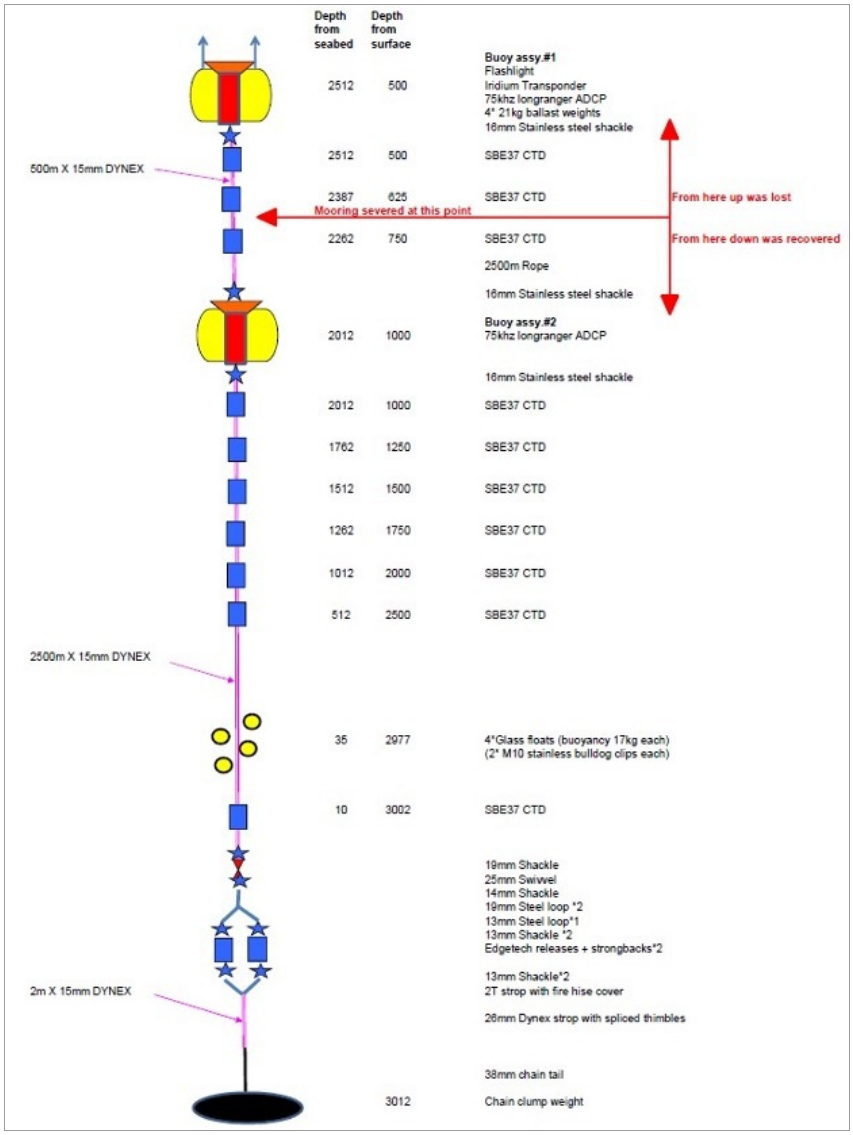
To sample, oceanologists used their usual and favourite tools: t**he marine snow catcher**, **CTD-rosette**, **sediment trap and plankton net**. Samples were taken daily according to nycthemeral plankton migrations involving morning and evening sampling when weather conditions were favourable.
There were few windy days preventing the Nautile from diving as well as operating ship-based instrumentation, but the delay was made up thanks to the non-stop efforts of the onboard working teams! The cooperation between crew and scientists was efficient and friendly.

To conclude
It was an effective cruise, with great encounters, and lots of samples of marine snow, plankton, and bioluminescent bacteria. Interesting discoveries are to come...

Photo 1: Launching of the BathyBot in its BathyDock. Photo credit: @nicolasfromontphoto
Photo 2: Ascent of the Nautile submarine on board the Pourquoi pas ?. Photo credit: @nicolasfromontphoto

Web site, **logbook EMSO-WL/BathyCruise**: https://www.mio.osupytheas.fr/fr/emso-lo-bathycruise available in FR and ENG

Author: IFREMER



Being lost is worth the being found... From EMSO South Rockall Trough Deep Water Pilot to the Isle of Tiree

The **Marine Institute** operates and maintains the **EMSO South Rockall Trough Deep Water Pilot** which is a fixed point sub surface mooring deployed at a site (15.52 degrees West, 52.999 degrees North) in a water **depth of 3012m** in the **North East Atlantic**.

It was first **deployed in 2018** and has been retrieved and redeployed in April 2020, June 2021 with an upcoming cruise to retrieve and redeploy the mooring in April 2022.
The **observations are performed along the water column** from 500m below the surface to 3000m depth.

The mooring consists of **10 Seabird 37 CTDs and 2 Teledyne Workhorse ADCPS** deployed at various intervals along the mooring string and aims to **advance our understanding of key environmental processes in the North Eastern Atlantic Ocean**.

Several different water masses are found in the south Rockall Trough, such as **Labrador Sea Water,** which travels from the western Atlantic, Mediterranean Overflow Water and Sub-Arctic Intermediate Water. Transport of these water masses tells us a lot about **ocean circulation** in the northeast Atlantic.
The **autonomous mooring deployment** complements a long standing annual survey to the Rockall Trough Site by the Marine Institute since 2004.

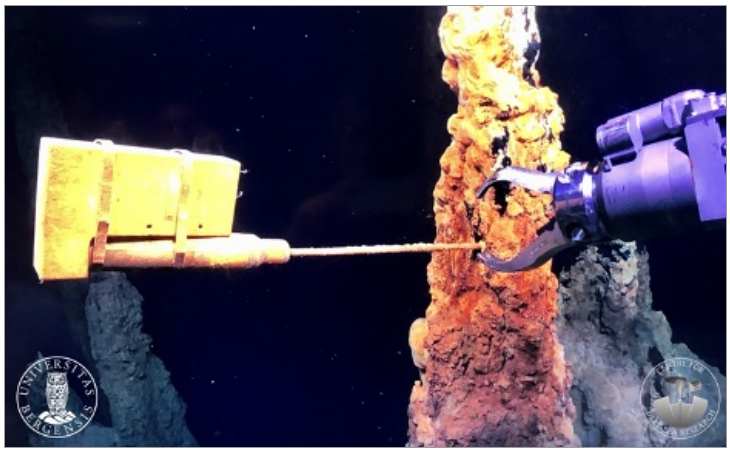
During a Research Infrastructures recovery and replacement cruise on the **RV Celtic Explorer** to swap out the **Rockall Trough mooring** and replace it with a new mooring in June 2021, it was discovered on retrieval of the mooring string that **a section of the mooring was lost**. An acoustic release was fired to bring the string to the surface with an **Iridium locator beacon** installed on the top float section of the mooring intended to fire and alert the scientists as to the location. It became apparent that the float recovered was the second (deeper) float of the mooring string. The top float with a **Teledyne ADCP** and a **CTD** attached to the mooring line were missing and presumed lost.

It was suspected that **high intensity fishing activity** in the area may have been responsible **for cutting** this top section of the mooring. On interrogation of the **CTD data** from the remaining part of the mooring, it became clear that the mooring was split on March 16th 2020.
Fast forward 6 months later to December 2021, the Marine Institute received a notification from our colleagues at the **Scottish Association for Marine Science (SAMS)** that they had recovered the float along with the **ADCP and attached CTD** after it had washed up on a shingle beach on the **Isle of Tiree** off the west coast of **Scotland** on December 4th 2021.
Unfortunately, there is no positional data recorded to document the path that the equipment took on its 600 km journey to the **Isle of Tiree**. The sensors retrieved were in full working order with minimal damage and have provided us with an alternative unanticipated dataset documenting the **water temperature and salinity** along the path of drift between March and December!

We were delighted to retrieve the equipment and grateful to **SAMS** for their vigilance and assistance in sending back the equipment to us. The incident will help feed into the design of future mooring deployments at the site. It is anticipated that **sensors in the range of 500-1000m will now be deployed attached to the M6 Weather buoy mooring** which is also located in the **Rockall Trough**.

Photo 1 Schema of Rockall Mooring array may not be sufficient quality.
Photo 2: Location SouthRockall to Tiree
Photo 3: ADCP+CTD Recovered

Author: Paul Gaughan, Marine Institute



Deep-Sea Centre GS21 cruise

The 2021 **UiB - Centre for Deep Sea Research** **cruise** explored the **Mohn's Ridge** using the **Research Vessel G.O. Sars (IMR/UiB**), and **ROV Ægir 6000 (NORMAR)** with the following aims:

- **Locate, map, monitor and sample** hydrothermal vent fields and mineral deposits. (Photo 1).
- **Obtain geophysical and stratigraphic data**, as well as sample material from Deep Sea sediments and mounds in the region. (Photo 2).
- **Deploy a glider** over the Mohn ridge.

Among the objectives, one was to characterize and monitor the newly discovered **hydrothermal Fåvne Vent Field** as part of the **NorEMSO** initiative.
Indeed, Fåvne is the locus for the upcoming **EMSO-Mohn** fixed-point seabed-water-column-coupled observatory with a **multidisciplinary approach** - from **geophysics** and **physical oceanography** to **ecology** and **microbiology**.

Fåvne Vent Field is located on the ultra-slow spreading Mohn's ridge where the oceanographic front between the cold waters in the **Greenland Sea** and the warm waters in the **Norwegian Sea** meet.

During the cruise we performed a **CTD survey** to measure and map the extent of the hydrothermal plume and its physical parameters.
We performed **7 CTDs** above the vent field and one in the background **to record depth-profiles of turbidity, density, temperature, ORP and currents (using LADCP)**.
This experiment was primarily directed at **understanding the dynamics and**

magnitude of the coupling between the hydrothermal plume, rough bathymetry and oceanographic processes and its **impact on the biosphere** and surrounding water masses in the **Nordic Seas**.

We also recovered and redeployed **autonomous sensors** to **monitor the hydrothermal fluid flow** exiting the seafloor (i.e., temperature probe, photo 1), performed **gravity coring** in deep-sea sediments (photo 2) to gain **a better understanding of the sedimentary history** off the Northern Norwegian coast and deployed a glider above the Mohn ridge as part of the **NorEMSO initiative**.

Photo 1: High-temperature probe recording the exit-fluid temperature in a black smoker vent at the Fåvne vent site.
Photo 2: Gravity corer being deployed.

Author: Thibaut Barreyre, Researcher at the Department of Earth Science, UiB

Updates from the EMSO Regional Facilities

EGIM recovered after nearly three months of operation off La Palma Island's volcanic eruption

On the 21st of January 2022, **PLOCAN** observatory's team recovered the EGIM, deployed in **500m depth** last October in waters off the volcanic eruption of **La Palma Island**, with the support of **Research Vessel IEO Angeles Alvariño**.

The **EGIM (EMSO Generic Instrumentation Module)** has been developed to serve EMSO ambitions for **interoperability, flexibility and capability** for future evolution, standardization to measure **Essential Ocean Variables (EOVs)**. It complies with EMSO best practices for reliability, and **data quality** and thus meets the fundamentals of the future **EMSO Label** frame of technical and scientific requirements.

Using different fixed and mobile observation platforms and in collaboration with several institutes, the scientific objective of the oceanographic mission coordinated by PLOCAN around La Palma eruption is **to study the disturbance that the intrusion of the volcanic flow is having in the marine environment**, both in the immediate coastal ecosystems and in the oceanic zone.
In particular, the effect that noise and the **variation of chemical parameters** are producing **on the species present in the environment**, as well as the effects on the variation of **oceanographic** and **biogeochemical** dynamics will be studied.

Author: Eric Delory, PLOCAN

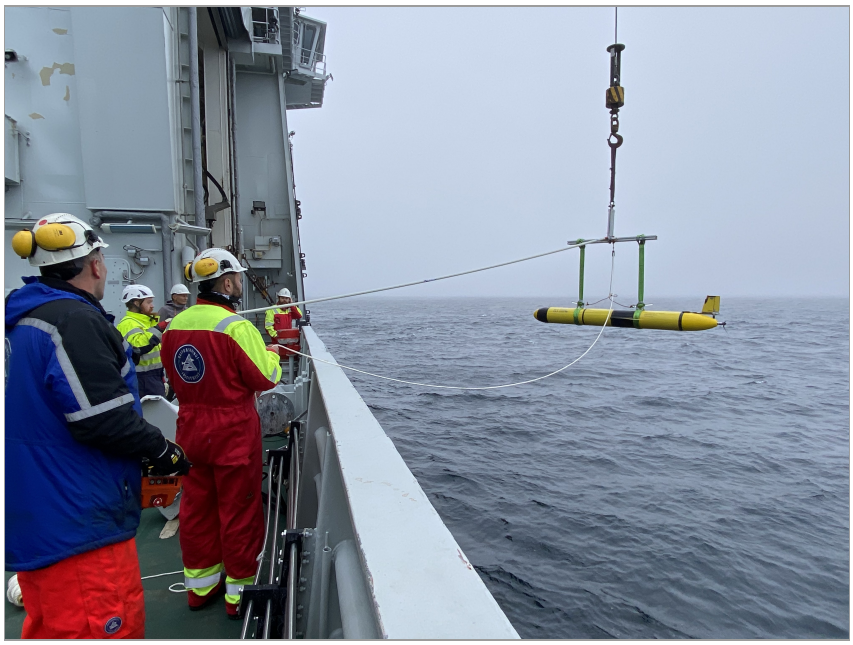
Seasonal ocean-observing program in the Canary Islands: ESTOC-Canary Islands Deep Section

PLOCAN, the Spanish Institute of Oceanography (IEO) and **the University of Las Palmas de Gran Canaria (ULPGC)** continue to collaboratively promote and strengthen the **ocean-observing strategy** in the **Canary Islands** through the seasonal program of glider missions at the **Time Series Station ESTOC** (deep node of the PLOCAN Integrated Observatory) and **Deep Section of the Canary Islands**: Study and observation of the **climatic variability** of the subtropical gyre in the Eastern Central North Atlantic (RAPROCAN Section), managed by PLOCAN and the IEO, respectively.

Proof of this is the start of a **new mission**, the first for 2022, which under the distinctive **ESTOC 2022_1**, and an estimated duration of **three weeks**, has a scheduled journey of approximately **two hundred nautical miles** making dives every three hours **down to thousand meters deep** using a **SeaExplorer** unit, belonging to PLOCAN's fleet of autonomous marine vehicles, recently procured through the **BlueUpgrade project**.

The ESTOC 2022_1 mission will allow the **collection of nearly one million data** on each of the **five biogeochemical parameters** of seawater observed (temperature, conductivity, dissolved oxygen, chlorophyll and turbidity), in line with current programs, projects, standards and international methodologies related to the observation of the oceanic environment.

Author: Carlos Barrera, PLOCAN



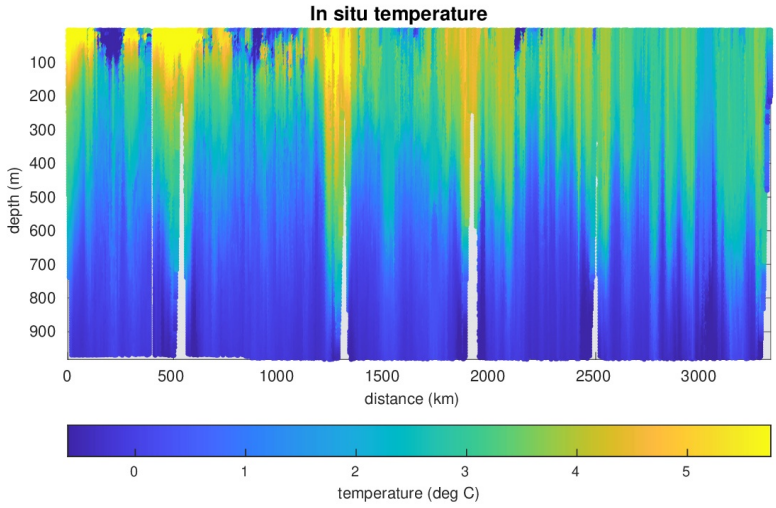
Ocean Gliders in NorEMSO

The **Nordic Seas** play a key role in the **global climate system** and one of the ways in which **NorEMSO** is trying to fill this gap in **EMSO** is with the use of **Ocean Gliders**.
These vehicles provide **sustainable**, **fine resolution observations** in remote environments and can operate in severe weather conditions. They allow us to **better understand** the drivers for the temporal and spatial changes of water mass transformations and **ocean circulation**. NorEMSO

makes available **high-quality, near real-time data**, which are fed into forecasts and ocean models.

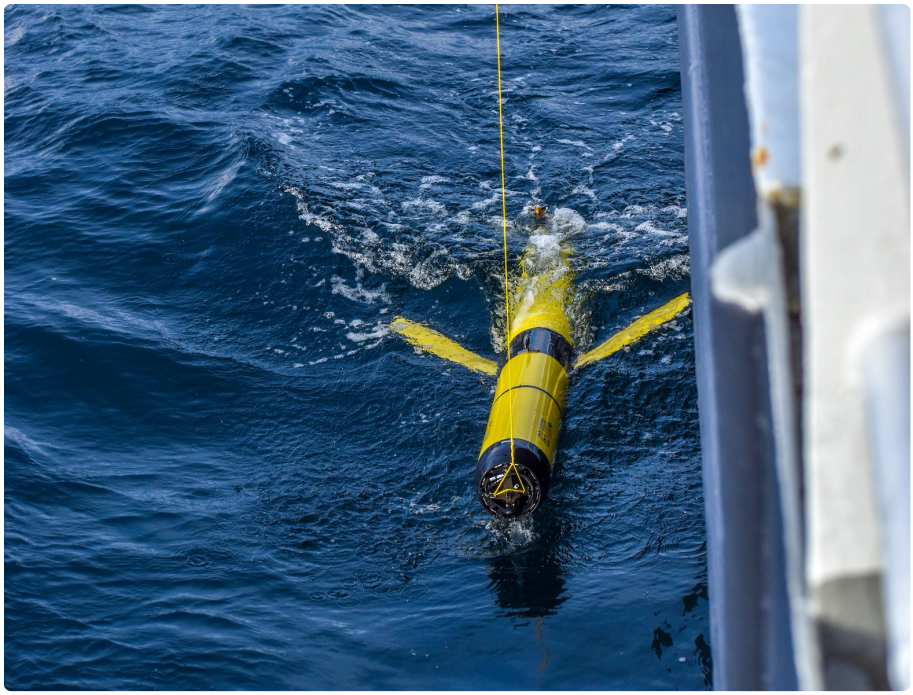
Ocean gliders are semi-autonomous buoyancy driven robots that sample the upper 1000m of the ocean in a 4–6-hour cycle, covering distances of 20-25 km/day and horizontal speeds of 0.1-0.2m/s. The vehicles communicate with the shore via the **2-way Iridium satellite network** and have a deployment period of 1-14months depending on the sensor and battery payloads.

Two glider configurations were specified for the project: **an 'endurance' glider**, capable of long-term deployments (up to 12 months*) in isolated locations, and a **'rechargeable' glider** powered by li-ion batteries that would operate for up to 4 months1 in the Norwegian seas. Glider payload would include a pumped CTD. **Five target sites** comprising three endurance transects and two rechargeable transects were chosen to meet the project's goals.



The Norwegian National Facility for Ocean Gliders (NorGliders) is based at the **University of Bergen (UIB)**, it coordinates a team of pilots and engineers distributed across UIB, **The Institute of Marine Research (IMR)** and **The Norwegian Polar Institute (NPI)**.
NorGliders aims to maintain and develop Ocean Glider infrastructure and expertise in Norway. The NorGlider fleet of fourteen vehicles includes 5 Teledyne Slocum G3's that were purchased as part of NorEMSO, 1 Slocum G3, 3 Slocum G1's and 5 Hydroid SeaGliders. All vehicles are capable of diving to 1000m and have payloads that may include: an Aanderaa dissolved oxygen optode, a SeaBird multichannel ECOpuck and a Seabird CTD. Deployments tend to focus on the Nordic Seas with some missions also conducted in the Southern Ocean and freshwater lakes.

To date gliders deployed across the **5 NorEMSO transects** have completed **over 1261 days in water sampling**. The first 3 gliders were launched in November 2020 from the RV Johan Hjort on the Svinøy, Greenland and Icelandic transects and since then 16 10 rechargeable and 6 endurance deployments have been or are currently being carried out.



Since November 2020, the rechargeable Svinøy glider has been continuously deployed with servicing conducted during the **IMR Norwegian Sea** cruises that operate four or five times a year as part of a monitoring project that has been maintained in some form since the 1950s.
The Svinøy and Gimsøy glider transects run along the established IMR CTD lines. The pilot navigates the glider to the coastal end of the transect, the glider is recovered using an **ejected buoyant dome** and line fixed to the nose of the glider. Downloading and recharging of the glider takes approximately 15hrs and occurs during the completion of CTD line, after which the glider is redeployed and left to the shoreside pilot to conduct in water tests.

There are, of course, issues that arise when one puts dynamic platforms into dynamic environments. **The main hazards** we experience with these gliders are **strong currents**, **sea ice** and the resulting effects that these have on the battery life. Software and hardware faults are quite common and 95% of the time are resolved or mitigated remotely. We have experienced two mission ending failures two weeks into the first glider deployments it became apparent the Greenland and Iceland gliders were struggling to operate their buoyancy pumps at depth.
Eventually, both gliders blew their ballast weights (a 500g weight a Slocum can eject in event of emergency to gain buoyancy) effectively ending both deployments after only 40 days. This was due to the **pump motor microcontroller** being sensitive to the near freezing temperatures and was eventually resolved with a software patch provided by the manufacturers. Fortunately, colleagues at the **Icelandic Marine Institute** were able to come to the rescue of the Iceland glider and we will be able to collect the Greenland glider during the next scheduled Svinøy cruise.

NorEMSO Glider Sites

1. Site: Fram Strait
    1. Type: Endurance glider
    2. Duration: 260 days
2. Site: Greenland Sea
    1. Type: Endurance glider
    2. Duration: 260 days
3. Site: Iceland Sea
    1. Type: Endurance glider
    2. Duration: 260 days
4. Site: Gimsøy
    1. Type: Rechargeable glider
    2. Duration: 100 days*
5. Site: Svinøy
    1. Type: Rechargeable glider
    2. Duration: 100 days

* The maximum length of time we have found the Teledyne Slocum extended bay G3's with Lithium Primarys and Lithium Rechargeable is 260 and 100 days respectively.

Photo 1: Fram Strait glider deployment August 2021. Photo credit: Laura de Steur
Photo 3: Svinøy glider recovery via nose release system March 2021. Photo credit: Fiona Elliott

Author: Fiona Elliott, Head Engineer at the Geophysical Institute, UiB

The NorEMSO is excited to introduce a new promo video to our project!

NorEMSO is a coordinated, **large-scale deep-ocean observation facility** to establish a **Norwegian node** for the European Multidisciplinary Seafloor and water column Observatory (**EMSO**) European Research Infrastructure Consortium (ERIC).

NorEMSO is coordinated by **GFI-UIB** and the project leaders are **Ilker Fer (GFI) and Benedicte Ferre (UIT)**.
Our team has been working on a **promo video** since June 2021, when we had an exciting crash course provided by **Zulfikar Abdelhamid Fahmy** from the **Department of Information Science and Media Studies**. The NorEMSO team could use the tips and tricks from the crash course on the field trips and shoot additional materials about our activities.

After the warm and sunny summer was over, the only thing left was to shoot the interviews. A team of students of **Information Science and Media Studies** guided us through the interviews and started their work on video production. They quickly oriented themselves in our audio-visual storage and created some additional animations explaining the structure of our facilities in the **Nordic Seas**.

It was a very exciting, fun, and for some of us challenging experience **how to communicate science to the public**.
Thank you so much, **Thomas Vallestad Drageset** (Adviser, Cluster coordinator), **Erlend Havsgård Martinsen** (leader of the production team), and other **students of Information Science and Media Studies**, and everybody else who helped us to produce this video.

We are looking forward to more collaboration in the future!

You can watch the video on our website and follow us on Twitter.

Author: Lucie Mottlova, NorEMSO Project Manager

UN Ocean decade

One Ocean Network for Deep Observation

The **deep ocean** remains the last **unexplored** frontier of our planet.
A place that holds secrets about the **origin of life** and could provide ecosystem goods and services for the **sustainable development** of humankind.
On the other hand, **serious threats** to coastal communities and infrastructures from **earthquakes** and **tsunamis** are often associated with the **volcanism** that occurred on the seafloor.
High-tech devices and expertise from multiple scientific areas are necessary to further our **understanding** of how to solve these coast-abyss interactive threats.
To do this, we propose **a step-change in deep-sea science** by connecting inter-/multi-disciplinary observatories and surveying technologies at various sites in the global ocean.
The coordination will contribute **to integrating knowledge on deep-sea**

ecosystems functioning under global changes, advancing hazard mitigation from natural hazards and engaging citizens with the deep ocean that faces growing pressure from human activities.

The objectives of the network are:

- **Facilitate** the coordination and promote partnership among multi-national and large-scale observatory projects, and initiatives;
- **Integrate** knowledge and expertise in order to understand the deep ocean's complexity and anthropogenic impacts;
- **Encourage** technology innovation and transfer, enhancing cooperation with industries and businesses;
- **Engage** the public and boost ocean literacy through citizen science initiatives, increasing the awareness of the importance of the deep ocean in Earth processes like Climate Change;
- **Develop** capacity building and training for research communities;
- **Strengthen** coherent and continuous cooperation between research infrastructures by contributing to GOOS and its deep-ocean component DOOS.

The action is led by IFREMER.

Key partners:
- EMSO ERIC
- Japan Agency for Marine-Earth Science and Technology (JAMSTEC)
- Ocean Network Canada (ONC)

Read more about this UN endorsed action here.

EU Projects

EurofleetsPlus - Education and Training program - Open Calls

The **EurofleetsPlus Education and Training program** offers **training activities** to early career technicians, marine scientists and (future) Research Infrastructure managers and will contribute towards EurofleetsPlus' objective of **Building a Career in Blue Growth**.

Education, along with research and innovation, comprises the knowledge triangle and therefore plays a **vital role** in the advancement of knowledge, therefore, we aim to:

- **Build capacity** in European ocean sciences research through a series of innovative webinars, blue skill labs and floating universities targeted at postgraduate students, early career researchers and professionals
- **Facilitate the transfer of knowledge** and technology by facilitating broader access to European RV and Infrastructures
- **Promote**, in collaboration with the EGU GIFT program, the Teacher@sea access to Eurofleets+ RV to attract primary and secondary school pupils to marine sciences careers.

Browse the opportunities:
- Floating Universities
- Blue Skill Labs
- Marine Internship

Read more on the EurofleetsPlus website.

ENRIITC - #ENRIITCyourCoffee S5E3: registrations open!

This session will cover the scope and results for establishing a **Neutron Quality Label (NQL)** in Europe through the **BrightnESS²** Project.

Particularly, the assessment of positioning uncertainties has been addressed at ISIS, FRMII, ILL and NECSA. It will take place on **Thursday, 05 May 2022, from 15:00 to 15:30 CEST**.

Register here!

Read more about the ENRIITC project here.

ENRIITC - Enjoy the BSBF with a 20% discount and join ENRIITC in Granada!

BSBF2022 will be the 2nd edition of the single **one-stop-shop** for European **companies** and other stakeholders to learn about **Europe's Big Science** organisations' future investments and procurements worth **37,100 millions of euros**.

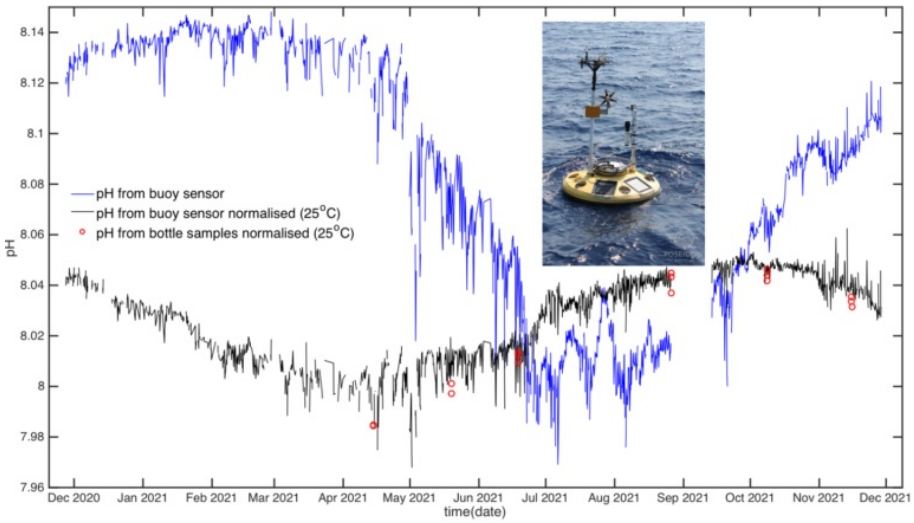
More than **1000 delegates from 500 businesses** and organisations across Europe are expected to participate throughout the 4 days (**4-7 October**).

The **deadline** to register using the Early Bird reduced price is **30 April 2022**! If you want to enjoy BSBF with a 20% discount, click here!

MINKE - A first pH annual cycle in the Cretan Sea

The absorption of excess **atmospheric CO2** by the oceans causes **changes** in **seawater pH**, a phenomenon called **ocean acidification**.
To contribute to ocean acidification observation, **since December 2021** a pH sensor (**SP200-SM, Sensorlab**) deployed at the subsurface in the **Cretan Sea**, on the **POSEIDON Heraklion Coastal Buoy (HCB)** provides pH data **every 3 hours** in near real-time (NRT).

In parallel, **water samples** for pH analysis are taken approximately **every month** to check the sensor's operation.
The samples are analysed using a lab pH instrument (**AFT-pH, Sunburst Sensors**), which is regularly checked against TRIS buffer as reference material.



It is the first time that an **annual pH cycle** is obtained in the Cretan Sea and to the best of our knowledge the second time at high frequency (<day) in the eastern Mediterranean (another cycle done in Saronikos Gulf in 2013; **González-Dávila et al. 2016**).

The delayed mode data provided by the **pH sensor**, after processing, are in good agreement with data from samples (shown in the figure).
A preliminary analysis suggests that **temperature is the dominant factor** controlling the diel to seasonal pH variability.

The activity will be pursued **until November 2022** (i.e. two annual cycles), after what will be interrupted due to lack of funding.

Read more about the MINKE project here.

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