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EMSO ERIC Newsletter No.2 - November 2022

News



Marmara Workshop, Marseille, 7-9 September 2022

From 7th to 9th September a workshop took place at CEREGE, University of Aix-Marseille, organized upon initiatives of scientists from EMSO-France joint research group and from Turkish Universities and Research Centers. The purpose was to review the knowledge status of the **Marmara Sea geo-hazard** sources and processes, to exchange recent findings, activities and projects in the area, and to propose a roadmap for future activities within the EMSO ERIC framework.

Marmara Sea has always been included among the key sites of EMSO in all projects paving the way to the ERIC, from ESONET Network of Excellence on, because of the interest of the scientists for an area where various Earth processes interfere and present risks for the population. In fact, in the past 15 years, hazard assessment in the Istanbul area has been the primary motivation for the deployment of various experiments using submarine autonomous instruments and land-based monitoring and surveying equipment. The workshop touched on various themes:

- **monitoring** issues of the **marine environment** under peculiar conditions (haline stratification, low oxygen deep water body), ongoing processes (sediment transport processes, fluid emissions, basin internal waves), and high sensitivity to climate change;
- **innovative approaches** of offshore fault monitoring by means of piezometers, absolute pressure measurements, acoustics, and by non-conventional use of **OBSs signals**;
- complementary studies of processes in **sedimentology, paleoclimatology, paleoseismology, geophysics, and geochemistry**;
- **data** integration issues across techniques and across **sea and land domains**.

The workshop has reawakened the scientific interest in the Marmara Sea and has boosted newly the proactivity of the community after some years of

slowing down.

The Marmara area is a natural lab with an evident 'vocation' to multidisciplinary and multi-domain approach studies. The Marmara area still deserves a lot of scientific investigations and the long-term fix point observations in deep waters can provide baselines for the discrimination of fast, periodical, and long-term processes also in collaboration with typical Solid Earth experiments, as an example in the EPOS framework.

In the workshop EMSO ERIC performed as a facilitator, providing a stimulus and proposing concrete support to the marine science community for sustained research activity in the Marmara Sea area. In addition, EMSO ERIC offered its leadership function for creating the necessary conditions for Turkey to join the EMSO collaborative framework.

Read more: <https://emsomarmara.sciencesconf.org/>

Authors: Laura Beranzoli, Istituto Nazionale di Geofisica e Vulcanologia, Italy, and EMSO ERIC; Pierre Henry, CEREGE, CNRS, France

Events



SmartBay Observatory Open Day and launch of SmartBay Virtual Tour

The **SmartBay Observatory** is part of Ireland's national marine research facilities and is Ireland's observation facility in the **European Multidisciplinary Seafloor Observatory (EMSO)** research infrastructure. As part of this year's European Maritime Day #InMyCountry, the Marine Institute proudly hosted a **SmartBay Observatory Event** to showcase the key infrastructures that make up the subsea cabled observatory. We also took this opportunity to launch the incredible SmartBay Virtual Tour.

In recent months, the SmartBay Observatory has been undergoing key maintenance and upgrades and is soon to be redeployed to its location **1.5 km off the coast** of An Spidéal at a **depth of 20 meters**.

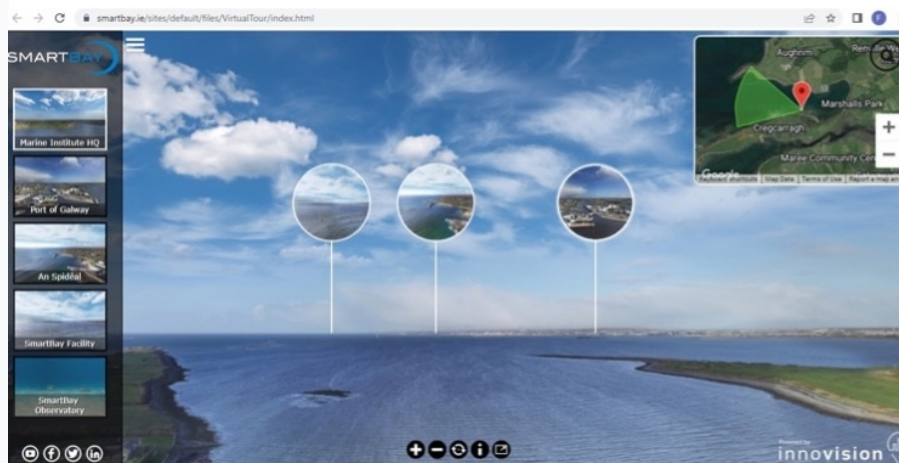


We took this rare and exciting opportunity to showcase the Observatory onshore! Hosted in the SmartBay hometown of An Spidéal, Co. Galway, over two sunny days in early summer (19-20/05/2022), visitors enjoyed a blend of family-friendly **workshops**, activities and **engaging discussions** about the importance of **marine observations** and supporting technologies.

Having the SmartBay Observatory laid out on land as it would be on the seabed providing a unique opportunity for visitors to see up close and first-hand the infrastructure and array of sensors that are usually moored at its fixed point location **20 meters deep**. **Marine Institute scientists, technicians** and the **SmartBay Community Liaison Coordinator** were on hand to welcome visitors and describe and explain the function and importance of each of the sensors which gave a unique and fascinating opportunity for students and the public **to learn and discover** more about how we monitor the **ocean**.

SmartBay Virtual Tour

During this event, the Marine Institute was also delighted to launch the **SmartBay Virtual Tour**! The virtual tour features **incredible panoramic views of Galway Bay**, from the Marine Institute HQ in Rinville to the Shore Station in An Spidéal. Viewers can navigate around **a full 360° vista** and experience an **interactive tour** of the SmartBay facilities including a remarkable sub-sea experience of the Observatory itself.



The SmartBay Observatory will soon be redeployed and once back in the water will continue to **monitor and transmit live data continuously**. The Observatory also hosts two cameras streaming live video footage from 20 meters depth and when redeployed will be available to view via www.smartbay.ie where the **Virtual Tour** can also be accessed. The **freely available online data** is vital in monitoring the marine

environment and contributing to national and international oceanographic monitoring programmes and will be available again post-deployment in the coming weeks via www.digitalocean.ie

Photo 1. SmartBay Observatory – Set up for Open Day 19-20 May 2022 © Marine Institute 2022

Photo 2. SmartBay Open Day – 19-20 May 2022 © Marine Institute 2022

Photo 3. SmartBay Virtual Tour © Marine Institute 2022

Author: Felicity Donnelly, Marine Institute

European marine observation RIs, the landscape / ERICs

Research Infrastructures (RIs) are large-scale facilities encompassing instruments, resources, data and services used by the scientific community to conduct high-level research in their respective fields.

(A) Simplified diagram of the observation capabilities of five pan-European RIs with respect to their hydrosphere components (Y axis) and environmental processes (X axis);

(B) Timeline of the five RIs since their entry in the ESFRI Roadmap (redrawn from www.esfri.eu Strategy Forum on Research Infrastructures, ESFRI, 2018).

Source:

Delfoğlu, D., Poulakis, S., Schmeissner, T., Bassett, A., Cornet, M., Pflüger, F., Fiedler, M., Mariani, P., Goussard, C., Magaña, R., Delory, E., et al. (2020) ESFRI Roadmap, 2020-2025. Luxembourg: Publications Office of the European Union. Retrieved from www.esfri.eu

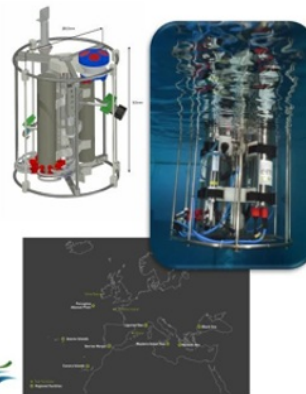


PLOCAN participated in the VIII International Symposium on Marine Sciences held in Las Palmas de Gran Canaria

The **Canary Islands Oceanic Platform (PLOCAN)** has participated in the [VIII International Symposium on Marine Sciences](http://www.plocan.org) held in the Alfredo Kraus auditorium in the city of **Las Palmas de Gran Canaria**, between July 6 and 8. This symposium, organized by the **six Spanish universities** that offer Bachelor of Science and Master of Science Degrees in Marine Sciences is part of the actions of the **Decade of Ocean Sciences for Sustainable Development (2021-2030)**.

EMSO EGIM and JERICO Coastal EGIM multi-sensor packages

- From shallow water to 6000m
- Candidate platform for coastal observatories in JERICO-S3
- Low-power antifouling technologies
- SWE capable
- Reliability: tested against hydrostatic pressure, Solar radiation, Thermal shock during immersion, Vibrations, Mechanical shock
- Validation performed at several sites
- Standalone and cabled
- 12 ports
- Next steps: integrate ecosystem sensors



The communication entitled "ADVANCES OF EUROPEAN MARINE RESEARCH INFRASTRUCTURES IN OCEAN ECOSYSTEM MONITORING CAPACITY" was given by **Eric Delory**, invited by the EOF (Expanding Ocean Frontiers) symposium.

Author: PLOCAN



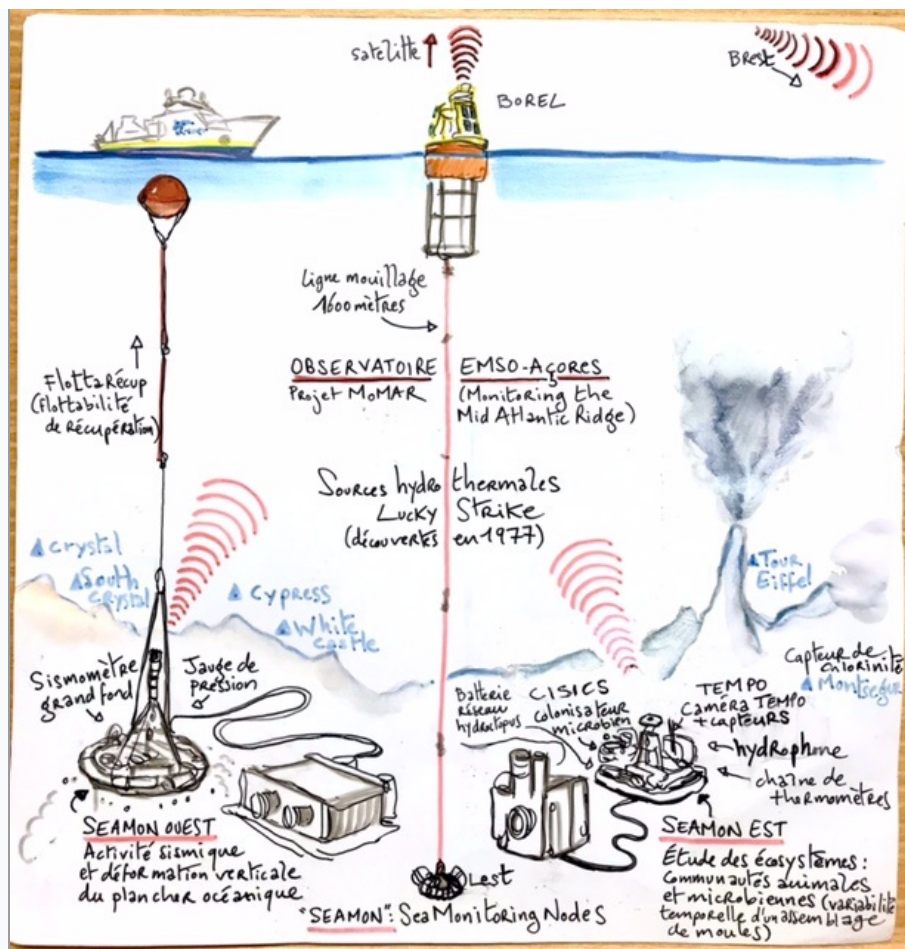
A look back at the Momarsat 2022 cruise

The **Momarsat 2022 cruise** was held from June 6 to June 27th 2022 onboard the French research vessel "**Pourquoi pas?**" at the **Lucky Strike vent** field - northern Mid-Atlantic Ridge - to maintain the EMSO-Azores observatory yearly.

Once again, despite a few **Covid cases** on board, we ensured the full platform and sensor array turnover and started another year of data acquisition! The team of **30 scientists** from **Ifremer, CNRS (IPGP, GET, MIO, LPO), the University of Western Brittany (UBO), and the University of the Azores** worked together during the 15 Nautille dives to achieve the substantial **sampling plan** paramount to the **long-term monitoring** of the **vent field**. A novelty this year, in order to **reduce our environmental footprint on the seafloor**, a collaboration with the submersible and ship crews enabled the development of new procedures to limit the amount of weight left at the bottom. Instead of free-fall elevators that release 500 kg of weights on the bottom, a few were deployed using the **deep-sea cable**. In addition, one dive was dedicated to the **recovery of lost weights** using the Nautille and the ship's deep-sea cable. This procedure will be reconducted in the following cruises.

Visit the [Facebook page](#) for more detailed information on scientific and technological achievements.

The presence of a cartoonist on board all along the cruise contributed to reinforcing the synergy between all the people onboard. Through hundreds of illustrations, **Damien Roudeau** described and shared the adventure of scientists, pilots, and crew members working together towards a common objective: **enhance our knowledge about deep-sea ecosystems**. After this month-long journal, **a comic book story** will be prepared (to be released at the end of 2024) to embody the scientific, environmental, and financial stakes of the quest for rare earths and strategic minerals through this mission. This journey was initiated several years ago by researchers **M. Matabos and J. Sarrazin** during a conversation with **N. Le Roy**, a seaman of the "Pourquoi pas?" concerned by **environmental issues related to the sea**. You can have a look at the Instagram pages (Momarsat) to get a sketched overview of the cruise.



The **EMSO-Azores** observatory is part of the [One Ocean Network for Deep Observation action](#) of Ifremer endorsed by the UN Ocean Decade program.

Photo 1: The Momarsat 2022 full team besides the R/V Pourquoi pas? in the port of Horta in the Azores.

Photo 2: Sketch of the EMSO-Azores observatory © Damien Roudeau/Ifremer

Authors: J. Sarrazin, M. Matabos. IFREMER

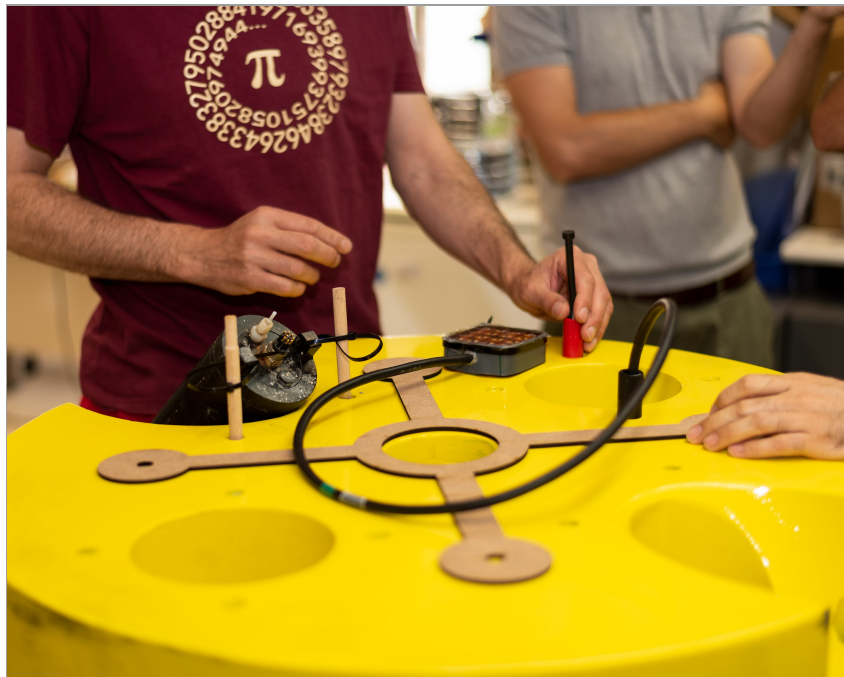
Updates from the EMSO Regional Facilities



SARTI-UPC team works on the design of the first PLOME Landers prototype

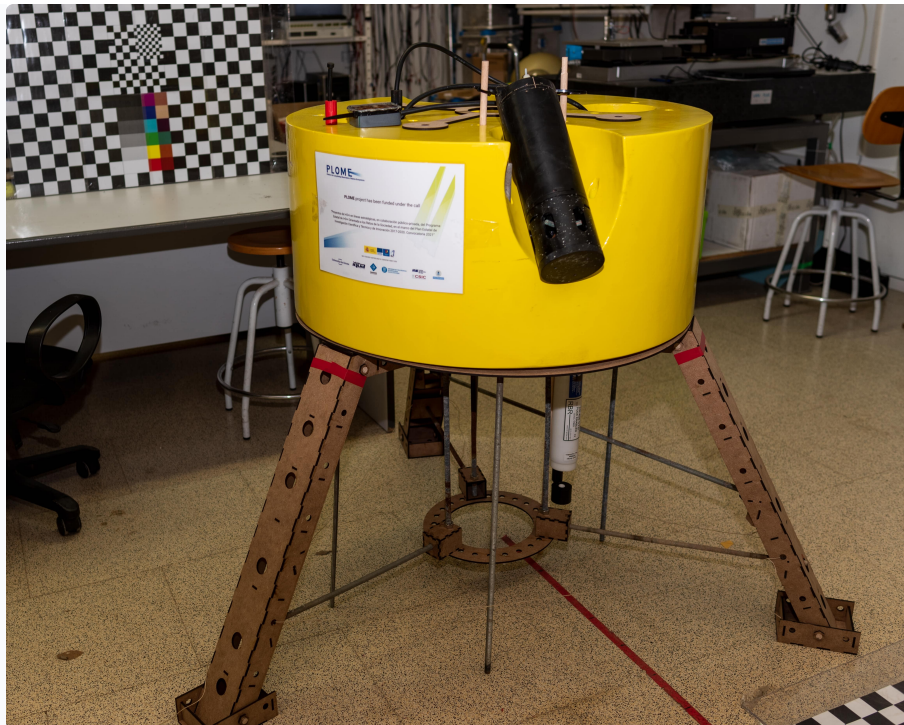
The **#PLOMEproject** wants to develop a **marine robotic network** for ecological monitoring: **Platforms for Long-lasting Observation of Marine Ecosystems**.

We call Landers deployed to the seabed to fixed stations on the seabed that will host different instruments and will act as a proxy between the underwater devices and the sea surface where long-distance wireless communications to shore will be implemented.



During the last few weeks, [SARTI-UPC](#) team was working on the design of the **first PLOME Landers prototype**: a custom buoyancy and mechanical structure has been designed and manufactured to host sensors, communications, and release systems.

During week 20/2022, the integration of the first components has been ongoing. In the picture, it can be seen the Lander already mounted with the final buoyancy system and the first mock-up structure built on wood to validate different mechanical design constraints.



After this validation, the wood structure will be replaced by metal to perform initial wet test underwater at the Obsea observatory.

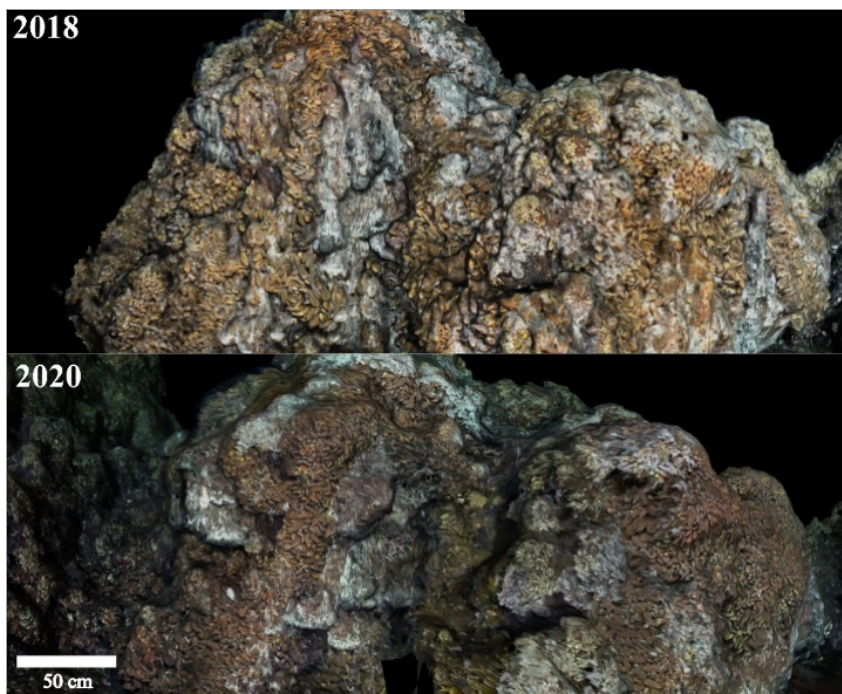
PLOME project (Ref. PLEC2021-007525/AEI/10.13039/501100011033) has been funded by the Spanish "Ministerio de Ciencia e Innovación".

Photo 1. Team working on the prototype

Photo 2. Prototype detail

Photo 3. First PLOME Landers prototype

Author: Joaquin Del Rio, Universitat Politècnica de Catalunya (UPC), OBSEA



3D temporal monitoring of deep-sea vent mussel communities

Conventional imaging methods are commonly used to investigate the spatial distribution and temporal dynamics of **deep-sea vent habitats** and **biological communities**. This is the case for the **Eiffel Tower hydrothermal edifice** (Lucky Strike vent field) where a temporal monitoring from 1994 to 2008 already depicted the remarkable stability of vent mussel communities at **1700 m depth**. However, the use of 2D images considerably limited the uncertainty of the results especially because Eiffel Tower is a vertical structure exhibiting a complex topography. Hereby, we annotated in **3D three high-resolution models** retrieved in 2015, 2018 and 2020, during the **MoMARSAT cruises** dedicated to the maintenance of the **EMSO-Azores** observatory.

We categorized any change observed in the **edifice topography, vent fluid distribution** as well as **faunal and substratum cover**. Innovative cartography of changes allowed the detection of changes at infra-metre scales, down to centimeters scales in some cases. A quantitative successional model confirmed high stability in **habitat distribution** and **highlighted constant transitions among the studied assemblages over time**. Small-scale changes corresponded mostly to the induration of hydrothermal material, which was rapidly colonized by migrating mussels.

This confirms the **high stability of the vent habitat** that seems to characterize slow-spreading centres. This study (Van Audenhaege et al.) is the first to use **high-resolution quantitative 3D models** to characterize temporal dynamics at fine spatial scales despite the remoteness and complexity of those deep-sea vent environments. Results raise concern regarding the resilience of such stable communities towards large-scale anthropogenic disturbances such as deep-sea mining.

Photo: Example of an area with active venting depicting small-scale change in the position and texture of the white hydrothermal material. Bathymodiolus azoricus mussels adapt their positions to cope with such fine-scale modifications of the habitat. **The use of 3D annotations provides data on the exact repositioning of the mussel patches and the transition among size classes.**

Authors: Loïc Van Audenhaege, Marjolaine Matabos, Sarrazin Jozée. Ifremer

EU Projects



eRImote Project: European Research Infrastructures - Pathway to Improved Resilience and Digital and Remote Access

The 2020 pandemic highlighted the crucial role of remote access to Research Infrastructures, enabling access to external technologies without the need for travel.

eRImote project is a newly funded **Horizon Europe** project, tailored to consider solutions for digital and remote service provision across RI domains and to look for transferable practices and new developments that will improve the accessibility and resilience of **RI infrastructures**.

The project started on the **1st of June 2022** and the project Kick-off Meeting took place in a hybrid format on 28 and 29 June 2022 at **DESY, Hamburg, Germany**.

eRImote is built upon a relatively small consortium with eight beneficiary participants representing four main **ESFRI domains: Environment**, represented by **EMSO ERIC, physical sciences** and **engineering, health** and **food**, and social and **cultural innovation**. However, the consortium extends more broadly through the existing contacts and networking partners of each project participant, increasing the reach to hundreds of individuals, other European and global RIs, scientific networks, RI users, industry partners, and policymakers.

The eRImote project activities could be grouped into four main areas:

1. **Collect information** on all aspects of remote and digital access across domains through workshops and expert groups;
2. Develop an information platform to make the compiled best practices and tools for **remote/digital access openly available**;

3. Develop joint **recommendations** for the transition to remote/digital access through use cases and a green paper;
4. Reach out beyond the consortium and **engage stakeholders**.

EMSO ERIC participates in several activities with primary involvement in the development of strategies and recommendations for the transition, through the implementation of five different remote access use cases and their analysis which will lead to the “**eRImote green paper**”: the document will address the challenges and barriers in the transition to remote RI service provision; it will present joint and RI-domain specific strategies and already identified best practice-examples and solutions to overcome these barriers.

On the 21st and 22nd of September 2022, the consortium already organized the first virtual workshop on “**Remote training for users and RI staff & User networking and interactions in remote/digital RI service delivery**”; it was a great opportunity where more than 100 participants, coming from different Research infrastructures of different domains, had the opportunity to learn and exchange knowledge on remote training for RI users and staff, as well as exploring the impact of remote/digital service provision on user interaction and networking.

The 2nd workshop was focused on “**Remote operations of RI services and Data and access security**” and was held in virtual mode on the 24th of October 2022.

More information is available on the [project website](#).

Author: Valentina Tegas, EMSO ERIC



iMagine project at the starting box!

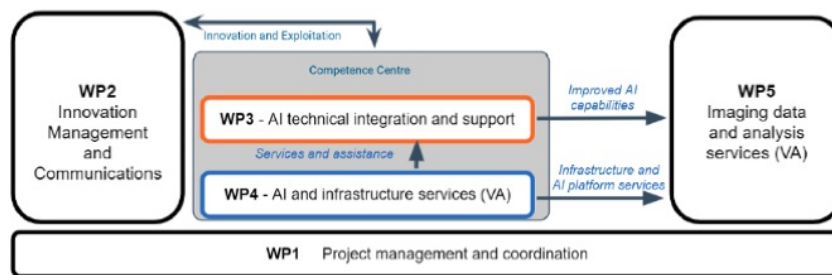
On September, 23rd, in Prague, the **iMagine project** had its official beginning sanctioned by the Kick-off Meeting organized in the framework of this **Czech edition** of the **EGI conference**.

iMagine, within its three years of duration, aims at providing a portfolio of free at the point of use image datasets, high-performance image analysis tools empowered with **Artificial Intelligence (AI)**, and **Best Practice documents** for scientific image analysis.

These services and materials will enable better and more efficient processing and analysis of imaging data in **marine** and **freshwater research**, accelerating scientific insights about processes and measures relevant to **healthy oceans**, seas, coastal and inland waters.

By building on the computing platform of the **European Open Science Cloud (EOSC)**, the project brings a generic framework for AI model development, training, and deployment, which can be adopted by researchers for improving their AI-based applications for **water pollution mitigation, biodiversity** and **ecosystem studies, climate change analysis** and beach monitoring, but also for developing and optimizing other AI-based applications in this field.

The overall work of the project will be performed within a framework composed of five different work packages strictly linked to one another.



The face to face Kick off Meeting held in Prague followed an online administrative KoM focused on Work Package 1 (Project Management) and Work Package 2 (Dissemination, Communication and Exploitation) and, therefore, it has been almost totally devoted to the most technical Work Packages and, in particular, to WP3 – AI technical integration and support, to WP4 – AI and infrastructure services and at the end also to WP5 - Imaging Data and Analysis Services which is strictly linked to WP3.

EMSO ERIC is involved both in WP3 and WP5 as task leader of the **Marine Ecosystem Monitoring use case** and the virtual access related to it, together with three different EMSO ERIC organisations, namely Ifremer (FR), Universitat Politècnica de Catalunya (ES) and Marine Institute (IE).

It's already possible to be constantly updated about the latest outcomes of iImagine through its social media pages and through the official website that will be soon released!

More information at https://twitter.com/eu_imagine and on the official [LinkedIn](#) account.

Photo: iImagine Work Packages structure

Author: Gabriella Quaranta, EMSO ERIC



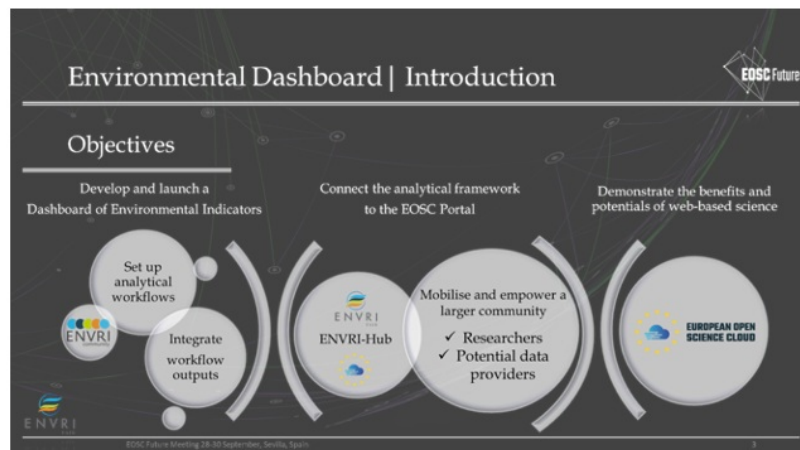
EOSC-Future: halfway through the project

From September 27th to 30th, in **Seville, Spain**, the **EOSC-Future** had its Work Package 6 meeting to show and explain to all partners the advances during the project's first half.

EOSC-Future builds on the existing baseline for the **European Open Science Cloud (EOSC)** to deliver a platform with a durable set of user-friendly components designed for the long haul. It adopts a system-of-systems approach to the **EOSC platform**, linking other research portals, resources, and services to respond to the data needs of a wide range of researchers. One way to think about EOSC is as a fully operational web of data and related services founded on **FAIR (Findable, Accessible, Interoperable, Reusable) protocols, principles, and standards** for accessing interoperable datasets.

EOSC-Future works with key stakeholders to ensure **a smooth user experience**, developing a set of enabling services needed to operate the EOSC exchanges registering resources and services from **research**

infrastructures, other EOSC projects, and science clusters to the EOSC and integrating them with the EOSC core functionalities. The EOSC interoperability framework will provide guidelines for providers that want **to integrate services or data** into EOSC and will engage with users throughout the development stages to ensure the EOSC matches researchers' needs and is intuitive. In addition, support and training activities provide users can make the most of the EOSC platform.



Together with partners and other **European Research Infrastructure Consortia**, such as **LifeWatch ERIC** and **ICOS ERIC**, **EMSO ERIC** is developing the **EOSC-Future Environmental Dashboard** within WP6. The Dashboard provides easily understandable **real-time indicators** to inform the broader public and policymakers **on the state of the environment across four subdomains, covering the Earth system in its full complexity: atmosphere, marine, solid earth, and biodiversity/ecosystems**. It will serve as a front end of virtual platforms for FAIR data and services such as the **ENVRI-Hub**, and as an input for the **Climate-neutral Cities project**.

During the meeting in Seville, **EMSO ERIC presented the prototype** and provided current developments of the Dashboard, including a real-time demonstration of the **services already available online**. **The Dashboard is operated by the EMSO ERIC Central Management Office** using EOSC resources supplied by the **EGI Foundation**. The demonstration illustrated the powerful yet simple mechanism to define Dashboard components (i.e., Frames) **using a common human-readable data serialization language** and web services' access through the application programming interface (API), reactive front-end interface, **and authorization and authentication infrastructure developed by EMSO ERIC**. The demonstration explored the Dashboard components, including indicators access functionalities and how to add new Frames to deliver new indicators. It also showed how developers could use the Dashboard API to build their applications upon the existing developed dashboard technology.

The demonstration received **excellent feedback** from the audience, and EMSO ERIC was invited to deliver it in Amsterdam on the 10th of October as part of an **ENVRI-Hub** workshop. EMSO ERIC will provide an updated demonstration with new developments during the **EOSC Symposium in Prague**, Czech Republic, from 14th-17th November.

Photo: Credit: A. Adamaki (ICOS ERIC)

Authors: Raul Bardaji, Andreu Fornos and Ivan Rodero. EMSO ERIC

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