

EMODnet marine data for the offshore renewable energy sector in the Mediterranean Sea and Black Sea, a virtual workshop, 20-21 October 2022

Contents

1	Executive Summary	2
2	Introduction and context.....	3
3	Day 1– 20 October 2022: EMODnet services and data use.....	4
3.1	Welcome	4
3.2	EMODnet: The EU <i>in situ</i> marine data service.....	5
3.3	Use Cases of open source EMODnet data and data products, and wider services to support, optimise and innovate the ORE sector	7
3.4	Breakout session 1: ORE marine data needs and requirements in the Mediterranean Sea and Black Sea	10
3.5	Plenary reports on breakout session 1	11
3.5.1	EMODnet connecting across the marine knowledge value chain	11
3.5.2	EMODnet marine data supporting the ORE sector.....	11
3.5.3	ORE sector marine data gaps, needs and requirements	12
4	Day 2 – 21 October 2022	12
4.1	Welcome	12
4.2	Win-win data sharing with EMODnet: Communicating the benefits of data sharing and the EMODnet Data Ingestion Service.....	13
4.3	EMODnet for Business, Associated Partnership and stakeholder engagement.....	15
4.4	Breakout session 2: Data sharing by the ORE sector	16
4.5	Plenary reports on breakout session 2	16
4.5.1	Challenges and barriers to data sharing	17
4.5.2	Potential solutions to overcome barriers and improve data sharing.....	17
4.5.3	Open floor discussion	18
4.6	Closing words.....	18

1 Executive Summary

On 20 and 21 October 2022, [EMODnet](#) together with the European Commission DG MARE, organised an online workshop on 'EMODnet marine data for the offshore renewable energy sector in the Mediterranean Sea and Black Sea'. It was the second in a series of two workshops on this sector, taking place a month after the [first workshop](#) on 20 and 21 September 2022 which had focused on the Northeast Atlantic, North Sea and Baltic Sea.

The October workshop was attended by more than 80 offshore renewable energy experts with representatives from diverse sectors including industry, research, policy, civil society and marine data services. EMODnet was well represented by thematic experts from Physics, Biology, Geology, Seabed Habitats, Chemistry and Human Activities, Data Ingestion, Central Portal and the EMODnet Secretariat. A key goal was for EMODnet to gather feedback from stakeholders in the Mediterranean and Black Sea region on which EMODnet data and data products are already used by the offshore renewable energy sector, emerging marine data needs and requirements, and the existing marine environmental and human activities data collection efforts of the offshore renewable energy sector, so that opportunities for data sharing could be identified and further discussed.

Day one included a demonstration of EMODnet services and enabled cross-sectoral dialogue on *in situ* marine environmental and human activities data needs and requirements for the offshore renewable energy value chain. The agenda included presentations from the Secretariat on the latest EMODnet marine data 'offer', the transition to a fully centralised service by the end of 2022 with a common map viewer and many other upgraded functionalities. It also featured demonstrations of the latest EMODnet services from EMODnet Human Activities (COGEA, Italy), EMODnet Geology (GTK Finland), EMODnet Seabed Habitats (JNCC, UK), EMODnet Bathymetry (SHOM France), and EMODnet Chemistry (MARIS, Netherlands). Additionally, speakers from the University of Aegean, Greece; AZTI, Spain; and the University of West Attica and Hellenic Centre for Marine Research (HCMR), Greece, presented use cases of how they utilise EMODnet's open source data and data products, in addition to other marine data including from the Copernicus Marine Service. BirdLife International then presented a study on the impact of offshore wind development on seabirds, followed by a presentation by AZTI, Spain on mapping the environmental impact of offshore energy.

The second day focused on data sharing, specifically how the offshore renewable energy sector can contribute *in situ* marine environmental measurements to EMODnet through the EMODnet Data Ingestion service. At the meeting, the EMODnet Secretariat presented the benefits of data sharing to increase the interoperability and impact of marine data and the EMODnet for Business activities and opportunities for collaboration. Then EMODnet Data Ingestion Scientific Coordinator from MARIS presented EMODnet Data Ingestion as a public service that supports data collectors and providers in the data management, curation and integration of their data into EMODnet.

The workshop facilitated interactive and inter-sectoral dialogue, with breakout sessions and plenary discussions producing a number of interesting outcomes. Participants recognised the value of EMODnet's centralisation and noted this would facilitate the ORE sector which often requires multidisciplinary marine environmental and human activities data, including for Maritime Spatial Planning. Marine data requirements for the ORE sector included the recurring need for increasing resolution of the existing parameters offered by EMODnet, together with the need for more data on seafloor cables, underwater heritage, engineering specificities such as soil geomorphology, MetOcean data including wind flows and vulnerability maps related to extreme weather events - amongst others. Barriers and challenges to data sharing included commercial sensitivities and in some cases a lack of clear data stewardship. It was recognised that some data gaps are in fact a result of lack of data sharing and that the data exist, but are currently not open. Participants also recommended EMODnet could develop incentives including a certification procedure and/or public acknowledgement of data sharing efforts could help, as well as communicating more about the value of data sharing for Corporate Social Responsibility and concrete impact for the EU Green Deal and UN Ocean Decade.

Recommendations also included how EMODnet could work closer with the ORE sector to address and overcome challenges and barriers to data sharing, including the opportunity for EMODnet to more visibly acknowledge data providers, and to promote the simplicity of sharing data with EMODnet Data Ingestion and the win-win benefits. Key messages, testimonials and feedback on EMODnet data use and opportunities for data sharing are included in this report, and will be used to further advance EMODnet services and collaboration with the ORE sector.

“Our siting studies for floating wind turbines included use of geophysical information from different EMODnet marine data maps.” Theodore Lilas (University of the Aegean, Greece)

“Without access to EMODnet data, none of our VAPEM project’s information, models or tools for identifying suitable areas for offshore renewable energy projects would be possible.” Ibon Galparsoro (AZTI, Spain)

“EMODnet is a very helpful platform for us. It is our reference for accessing standardised marine data in Romania.” Bogdan Ghinea (MDLPA, Romania)

2 Introduction and context

In September and October 2022, the European Commission Directorate General for Maritime Affairs and Fisheries (DG MARE) and the European Marine Observation and Data network (EMODnet) co-organised two online workshops, titled ‘EMODnet Marine Data for the offshore renewable energy sector’, focused on different regional sea basins across European seas:

- 20-21 September 2022: [Workshop #1 ‘Marine Data for the Offshore Renewable Energy Sector in the Northeast Atlantic, North Sea & Baltic Sea’](#)
- 20-21 October 2022: [Workshop #2 ‘Marine Data for the Offshore Renewable Energy Sector in the Mediterranean Sea & Black Sea’](#)

The main objective of both workshops was to facilitate cross-sectoral dialogue and share experiences from key offshore energy stakeholders regarding their *in situ* data needs, the potential for developing targeted data products, tools and methodological approaches that can support the sector based on existing data, as well as to deliberate on the appropriate workflow to ingest data from industry.

To achieve this, the first workshop explored how to:

- Increase the awareness and use of EMODnet services by blue economy sectors (in this instance offshore renewable energy), communicating EMODnet’s diverse, open source marine data offer and services, particularly considering the recent centralisation and new Map Viewer;
- Explore opportunities and applications for EMODnet’s diverse open source *in situ* marine environmental data and human activities data and data products to support and innovate the offshore energy sector in Europe: this should consider potential differences in the sector’s development in the geographical areas identified;
- Gather feedback from experts from private and public sectors on marine environmental and human activities data/data products needs and requirements across the offshore renewable energy value chain (licensing and siting, operations at sea, environmental impact assessments, etc.) and across different European regional seas;
- Discuss opportunities for data sharing/ingestion of marine environmental and human activities data produced by blue economy sectors into EMODnet;
- Provide information on data collection, data coordination and data needs to support the EC Ocean Observation Initiative.

The workshop dialogue was in line with the policy objective of the current European Maritime, Fisheries and Aquaculture Fund (EMFAF) for a greener and low-carbon transition towards a net-zero carbon economy and resilient Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate change mitigation and adaptation and risk prevention and management. In this context,

the European Marine Observation and Data Network (EMODnet) initiated the EMODnet for Business framework, to underline the importance of open marine data and how it supports blue growth and industry.

3 Day 1– 20 October 2022: EMODnet services and data use

3.1 Welcome

The lead moderator warmly welcomed participants to the workshop on European Marine Observation and Data Network (EMODnet) marine data for the offshore renewable energy sector in the Mediterranean Sea and Black Sea, co-organised by EMODnet and the European Commission's DG MARE over two half-days, on 20 & 21 October 2022. It was noted this was the second workshop of its kind, with the first having focused on the Northeast Atlantic, North Sea and Baltic Sea. She noted that a wide diversity of stakeholders had been invited spanning all the main platforms of ORE e.g., offshore wind, tidal energy, etc, and spanning the full value chain of ORE, from the licensing and siting stage to the operational phase, environmental impact assessment, etc. Stakeholders at the meeting also represented diverse groups from the private sector, civil society, research, policy and marine data services.

A summary of the workshop agenda was presented. The first day would start with opening remarks by the European Commission's DG MARE. EMODnet Secretariat representatives would then set the scene, with presentations on what the network has to offer in terms of *in situ* marine data for the offshore renewable energy sector. Representatives from different thematic areas of EMODnet would then demonstrate EMODnet data, data products and services. Use cases would then follow on how diverse stakeholders in the offshore renewable energy sector practically utilise EMODnet products and data for their professional activities and operations at sea. After this, a breakout session of three groups would focus on existing and emerging marine data needs and requirements to support the offshore renewable energy sector. Lastly, day one would feature two further presentations, plus the plenaries and Q&A sessions gathering all the workshop's participants, to discuss the main findings so far.

European Commission welcome

Zoi Konstantinou, EC DG MARE Maritime innovation, Marine Knowledge and Investment (Unit A.1), welcomed participants, noting that participants included the EC Marine Knowledge Expert Group (MKEG) together with EMODnet partners and Associated Partners. She explained that EMODnet is a key marine knowledge service of the European Commission and a flagship initiative that the Commission supports at multiple levels. She explained that EMODnet comprises more than 120 organisations across Europe working together to source, aggregate, harmonise, and standardise marine data from diverse sources, and making these data available in high resolution integrated data layers for hundreds of parameters spanning seven thematic disciplines in the marine domain: Bathymetry, Biology, Physics, Chemistry, Seabed Habitats, Geology, and Human Activities.

She added that the EC is committed to making marine knowledge freely available to all stakeholders, to boost the development of policy and the blue economy. That is why DG MARE is supporting the EMODnet for Business workshops, held in September and October 2022, aiming to bring the work of EMODnet closer to the economy sectors. That includes dialogue with the offshore renewable energy sector, to ensure EMODnet's data products are fit for purpose for the energy sector's needs. The EMOD-network also wants to collaborate more with the sector, to bring in more data and marine knowledge – so these can be made widely available and make the oceans and their health more sustainable. The energy sector can play a role there.

Juan Ronco Zapatero, EC DG MARE Blue Economy Sectors, Aquaculture and Maritime Spatial Planning unit (MARE.A.2), underlined the important role of offshore renewable energy in meeting the EU Green Deal targets to transition to a climate neutral European continent by 2050. This was also vital considering the current energy security issues renewable energy and the REPowerEU plan published in 2022 to reduce the dependence on Russian fossil fuels and fast forward the green transition. He recognised that offshore renewable energy is already well established in some European sea basins, but less so in others where it is

an emerging activity. He highlighted that EMODnet can play an important role in providing a trusted source of baseline marine environmental data and information on human activities at sea, to offshore renewable energy across its value chain from siting and deployment to maintenance and decommissioning.

He added that compared to the North Sea or the Baltic (covered by a related EMODnet workshop that took place in September 2022), the Mediterranean and Black Sea are challenging sea basins for offshore energy. This is largely due to a variety of sociological, physical, environmental conditions, including the deeper sea basins which make it difficult to deploy fixed-point monopole offshore foundations and rather favours floating offshore solutions. He noted that the emerging nature of offshore renewable energy in the Mediterranean and Black Sea made it very timely to demonstrate how EMODnet could support and boost these developments, and to also hear data requirements from this region.

The lead moderator thanked the EC DG MARE representatives and then introduced the next agenda item where EMODnet experts would present and demonstrate the EMODnet *in situ* marine data 'offer' for the ORE sector.

3.2 EMODnet: The EU *in situ* marine data service

Kate Larkin, EMODnet Secretariat, presented an overview of EMODnet. She explained that the EU invests significantly in ocean observation, marine monitoring, and data collection. EMODnet is a flagship Marine Knowledge Initiative of the European Commission, DG MARE that adds value to these efforts, providing open and free access to *in situ* (collected in water) ocean observations that have been assembled, standardised and harmonised to EU and International standards to produce integrated marine data layers and marine data products. The EMODnet offer spans seven thematic areas, namely Bathymetry, Biology, Chemistry, Geology, Human Activities, Physics and Seabed Habitats, each offering tens to hundreds of parameters. Over the last decade, EMODnet has added a lot of value at EU level, gathering data from data collectors, providers and repositories at national or regional levels, spanning public and private data collection efforts, and making it FAIR (Findable, Accessible, Interoperable and Reusable), for the use and re-use by all. EMODnet experts also produce generic data products, for use by the private sector and other stakeholders for other applications. Data products include maps, composite maps, and some services with predictive capability. She added that the focus of EMODnet services has been on marine data from European seas, although coverage is increasingly global in many of the parameters and thematic areas, thanks to more data sharing and collaboration efforts worldwide.

She noted that more than 120 organisations contribute to the EMOD-network, with many more as data providers and users. She noted that many EMODnet experts were attending the workshop, to provide advice and expertise on EMODnet services. She added that EMODnet works very closely with Copernicus Marine Service, which is focused on remote sensing, modelling, prediction and forecasting. Together EMODnet and Copernicus are a key backbone for the marine data space in Europe.

She added that the EU Strategy on Offshore Renewable Energy highlighted both EMODnet and Copernicus as key data platforms for providing services to offshore renewable energy developers, amongst others. EMODnet offers the most comprehensive and multi-disciplinary *in situ* marine offer, with high resolution, high quality marine data layers and data products that are already used by a wide variety of users, including many sectors of the Blue Economy. Such data provide the much-needed baseline data to reduce the uncertainty and minimise the risk in decision-making and operations, such as finding the optimal location for siting a wind farm. She added that an added value is that EMODnet also offers human activities data, including European Member State Maritime Spatial Plans and many data layers on Blue Economy sector operations e.g., wind farm point and polygon data, and the location of other operations at sea including aquaculture farms.

Conor Delaney, EMODnet Secretariat, presented the latest developments of the EMODnet services, with a focus on the unification and centralisation of all EMODnet services, to be fully completed by the end of 2022. He noted that since 2021, EMODnet's online services are hosted under the EC Europa domain as an official EC DG MARE service. Whilst users can already access the thematic portals from a Central Portal, the added value from full unification will be one single portal with one central map viewer, search and download service,

making the user-experience even more simplified and intuitive and offering additional functionalities and additional web services to further aid data discovery, visualisation and downloading. This would be fully operational, and externally promoted in January 2023.

The EMODnet *in situ* marine data ‘offer’: Demonstrations from EMODnet thematic Coordinators

EMODnet Human Activities

Coordinator Alessandro Pititto (COGEA, Italy) provided a live online demonstration of the datasets that EMODnet Human Activities has to offer, with a particular focus on data and data products most relevant for the offshore renewable energy sector, including existing and planned wind farms, telecommunication cables, national Maritime Spatial Plans, aquaculture and algae production sites and vessel density maps, together with ocean governance layers including Marine Protected Areas and Natura 2000 sites, amongst others. Whatever the data source or country checked, all datasets are completely harmonized: same language, same units of measurements, and same attributes.

He remarked that around 30% of EMODnet Human Activities users are from the private sector and the most downloaded data product currently is the vessel density data product which offers monthly composites of vessel activity including the volume, trajectories and types of vessels, from fishing vessels to tourism and wider shipping. He added that human activities data coverage in the Mediterranean Sea and Black Sea is improving, but relies upon more data sharing and ingestion, to provide higher resolution data layers for users in these regions.

He noted that a particular benefit of EMODnet was that the user could bring together harmonised and standardised data from both human activities and the marine environment, in one place. He added that many offshore energy sector users, especially from offshore wind, now use EMODnet. For instance, they combine layers from Human Activities with Bathymetry or Physics. These layers can be especially useful in the initial phase of a development project. All these data are available to visualise and download for free on EMODnet Human Activities, saving users a lot of time and ultimately costs.

EMODnet Geology

Coordinator Henry Vallius (GTK, Finland) presented an overview of the Geology thematic offer, with many data and data products relevant to the ORE sector, including broad-scale seabed substrate data that are crucial for developers seeking areas that would be ideal for windfarm construction. In addition, EMODnet Geology’s constraint maps of seabed substrates come in useful with sediment distribution being closely related to hybrid and dynamic processes, and thus could pinpoint potential problems related to an area’s geology or physics.

He noted that EMODnet Geology does not yet have any use cases for offshore renewable energy in the Mediterranean or the Black Sea, although this is an emerging area, with several planned ORE sites in the seas of Southern Europe. He noted that in some cases national security issues can be a barrier both to data sharing, particularly in the seas around Finland, Sweden and Russia, but also in the Mediterranean and Black Sea regions.

EMODnet Seabed Habitats

Coordinator Helen Lillis (JNCC, UK) gave a live demonstration of key Seabed Habitats datasets and data products that could be of interest to the offshore marine sector. She noted that EMODnet Seabed Habitats has the most comprehensive collection of existing data, maps and models of seabed habitats in Europe. They include nearly 100 habitat suitability models, some 900 habitat maps from surveys, and nearly 500,000-point records. These can all help offshore energy developers understand the environment they are working in. In the various layers there are four broad types of datasets and data products. Individual habitat maps are produced from survey data, such as classification of the seafloor into different types of habitats. They are shown in a standard format in a standard classification system. Around 1,000 individual habitat maps are available to download or view on the portal.

The survey sample points layer is a collection of observations of the seafloor and classified by habitat type. They include photographs and grab samples. The other two categories include composite data products. With this collection of points, observations and habitat maps from surveys, a user can combine the information and filter out particular habitats of interest. If a habitat is protected, that is a place to avoid.

The EUSeaMap is a full-coverage physical habitat map for all of Europe. It mainly describes the physical habitat types, with broad descriptions of the seabed and is a good example of using products from the other EMODnet thematics, such as substrate information from EMODnet Geology or depth information from EMODnet Bathymetry. This information can be combined with currents and light availability, waves, etc. to classify the seabed into habitat types.

The demonstration also highlighted a category of layers showing how environmental variables influence habitat type. For instance light availability at the seabed, so a user could assess whether conditions are favourable for photosynthesis. Offshore energy developers could look at kinetic energy at the seabed, due to currents and waves, in a high-resolution model, specifically for the Adriatic. These freely available energy models, with models from Copernicus Marine Service with EMODnet, enable assessment of the seafloor conditions.

EMODnet Bathymetry

Coordinator Thierry Schmitt (SHOM, France) noted that Bathymetry data are key for the development and evaluation phases as well as the implementation of offshore renewable energy projects. He noted that EMODnet offers a full inventory of bathymetric data for European seas and beyond, ranging from deep sea areas to coastal areas. Polygons and poly-lines describe the coverage/location of bathymetric information, with associated metadata also available in standardised formats describing and acknowledging the data owner, provider and data policy.

He then demonstrated the flagship EMODnet Bathymetry Digital Terrain Model (DTM) which offers Bathymetry with a grid pixel of 100 metre resolution, in many places with higher resolution e.g., Dover Straits, where it was possible visualise very fine ripples on the seafloor. Key information is linked to the bathymetric measurement, such as the quality of a dataset.

EMODnet Chemistry

Technical Coordinator Dick Schaap (MARIS, Netherlands) presented a [video tutorial](#) on EMODnet Chemistry which noted that EMODnet Chemistry offers a wealth of standardised and harmonised data and data products on ocean chemistry parameters spanning pollution, marine litter, contaminants, eutrophication, oxygen, carbon and more. It was noted that aggregated EMODnet Chemistry data are already used by national Member States and EU policy makers for EU Marine Strategy Framework Directive Good Environmental Status assessments. EMODnet Chemistry was deemed also useful to the ORE sector, in terms of assessing baseline environmental conditions and in environmental impact assessments.

There were no questions at the end of EMODnet service presentations. This dialogue was picked up in later Q&A and break-out session discussions.

3.3 Use Cases of open source EMODnet data and data products, and wider services to support, optimise and innovate the ORE sector

Three speakers highlighted how EMODnet marine environmental or human activities data, as well as marine data from other sources, have helped their company or institute in activities supporting the offshore renewable energy sector.

Estimating wave energy resources in the North Aegean Archipelago

Chrysa V. Efstratiou (University of West Attica & Hellenic Centre for Marine Research, Greece), explored a recent study for estimation of available wave energy resources in in the North Aegean Sea. Wave energy is a promising solution to increase renewable energy sources and to meet the EU's ambitious goals in that sector.

Wave energy could also be a good solution for Greece's insular profile, producing significant electricity to tackle high energy costs and a lack of clean water resources.

The study used multi-criteria analysis (including wave energy density and various constraints) to examine the potential of wave energy applications in the North Aegean and to support sustainable marine renewable energy planning in Greece. Good estimates of available wave energy will enable developers to know where to install their offshore wave energy farms, by improving performance and reducing uncertainties. The study looked at various criteria, constraints, parameters plus data on the marine environment, climate and human activities. Data were sourced from national portals and five EMODnet thematics (Human Activities, Geology, Bathymetry, Biology and Seabed Habitats). Screening included long-term time series on significant wave heights and mean wave periods. Notably the Mediterranean Sea waves reanalysis dataset, from Copernicus Marine Service data portal, plus *in situ* measurements from the national monitoring service. The study assessed spatial suitability, according to available technologies, and identified no-go areas, based on the main socio-ecological criteria. It was key to estimate the minimum distance from Marine Protected Areas.

By analysing open data, this study demonstrated how to make comparative evaluations of potential locations for optimal wave energy farm siting. It also evaluated wave power statistics and the sizing of possible wave power plants in the North Aegean, for cost-benefit analysis of proposed plans.

Greece has to deal with land fires every year, so wave energy may not be possible in some areas, but there is huge potential to exploit wave energy farms. Future studies should obtain wave climate data in the coastal zone to analyse the development of onshore wave energy. Greece has not finalised its Maritime Spatial Planning, so researchers must assess conflicts and complementarities with other commercial activities of the blue economy.

Integration of EMODnet data portal information into decision support tools to identify suitable areas for offshore renewable energy projects

Ibon Galparsoro (AZTI, Spain) noted that the European Commission is pushing for faster rollout of renewable energies and the EU Strategy on Offshore Renewable Energy has called for the installation or occupation of 3% of the European maritime space. However, identifying those places for new projects is not easy, due to technical issues and potential conflicts with other maritime activities.

The EU REPower Strategy also calls for identification of suitable areas for offshore renewable energy, to accelerate consenting processes and boost new energy projects. But one must also consider potential conflicts with other maritime sectors. Marine Spatial Planning can also lead to complex and long consenting processes, bringing uncertainties and economic costs. New projects are also complicated by the imperative to do no harm and to protect the marine environment.

He noted that AZTI has developed the [VAPEM](#) tools to support ecological assessment and maritime spatial planning tools. These decision support tools and models can help users identify suitable areas for the development and deployment of offshore renewable energy projects in the marine space. Multiple criteria are considered, by assessing the environmental (pressures and impacts), socioeconomic (conflicts with others uses) and technical/economic dimensions (e.g. energy resources, weather windows, seafloor types). He added that the VAPEM tools are spatially explicit and useful for management, Strategic Environmental Assessment, decision-making, consenting, MSP, and so on. EMODnet data portal information is key for these decision support tools. For example, offshore energy developers need to know the seafloor type when designing the foundations of a system. EMODnet Geology enables easy downloading of such information and the portal classifies different seafloor types. Depth information is also important and this comes from EMODnet Bathymetry, while the Seabed Habitats portal provides data to help identify areas that are potentially suitable for guiding the design and installation of systems.

Copernicus also provides valuable data on good weather windows or wave power, etc. Potentially excluding factors – such as cables, pipelines, fishing activity or maritime traffic – are also integrated. This project's resulting tools and maps are publicly accessible and can be used by different stakeholders with different technical skills. Spain and Portugal already use the tools for siting wave energy farms. Offshore wind installations are another target for the project. The geographical scope is being extended to the (European)

Atlantic region. None of this information, or the models and tools on VAPEM would be possible without access to EMODnet data.

Utilising marine data for the design of a floating multiuse renewable energy platform and expected data from its operation

Theodore Lilas (University of the Aegean) presented on floating multiuse renewable energy platforms. He noted one platform has operated for over 15 years in the Aegean Sea. A hotspot of marine biodiversity, this region is home to traditional and commercial leisure activities as well as shipping, aquaculture, fishing, as well as pipelines and oil & gas facilities. Electricity production is based on autonomous power stations powered by fuel and diesel oil.

Finding a space to install floating wind turbines required extensive spatial multi-criteria analysis in a GIS environment. Information from EMODnet proved a very helpful tool for this project – a floating autonomous environmentally friendly and efficient desalination unit. It operates only with renewable energy, wind and photovoltaics and can provide electricity and potable water (with no chemical treatment). This platform has been tested in the Aegean Sea and works well.

Under the EU Horizon 2020 project ‘Multiple Use of Space for Island Clean Autonomy Blue Growth Solutions’ ([MUSICA](#)), the platform has been scaled up. Its modular configuration has wind energy and wave energy converters, photovoltaics and advanced energy storage systems plus desalination for potable water. It also supports energy for offshore aquaculture, providing energy and feeding the fish automatically. The platform acts as an artificial reef, encouraging more fish to gather around it – a win-win for fishermen.

Siting studies included use of geophysical information from different EMODnet maps, such as of the seabed, plus remotely operated vehicles. The platform includes numerous sensors for the weather, energy production onboard, sea water temperature and salinity, etc., and for assessing motion and water potability. A hydrophone also checks the noise from the equipment onboard, ensuring minimal impact on life underwater. Some of the real-time data generated are open access and can be used for further development in this field. A [video](#) offers more insight into the project.

Impact of offshore wind development on seabirds in the North Sea and Baltic Sea: Identification of data sources and at-risk species

Antonio Vulcano (BirdLife International, UK) presented an overview of a study that aimed to identify the data sources and data gaps on at-risk seabird species in the North Sea and Baltic Sea. It was noted that this regional study could give insight into future studies for the Mediterranean Sea and Black Sea. Identified data sources included the European Seabirds at Sea database, national at-sea surveys, coordinated offshore water bird surveys in the Baltic Sea, plus seabird tracking data from different databases. It was noted that data are collected across diverse sectors from research institutes, universities, NGOs, environmental agencies, intergovernmental organisations, regional sea conventions, and industry. However in some cases it was difficult to identify data holders, particularly in cases where the data were not publicly available, including some private sector data.

Data were compiled or identified from BirdLife’s partners and the national monitoring programmes, plus national offshore monitoring programmes. Coverage varied greatly and data gaps were found. It identified the ESAS database for the North Sea as a key data source, although this was last updated in 2013. The new update includes moving ESAS to a centralised database on ICES.

The offshore surveys in the Baltic were collected for one season, with data on species distribution and abundance including for one of the main species wintering there is the Long-tailed Duck. A lot of tracking data were used, complementing all the other data. This helped to identify species at high risk of colliding or being displaced by offshore wind farms. The project also identified many different gaps and challenges: on the offshore (at-sea) surveys; tracking studies; species-specific interactions with offshore wind farms; and more data is needed on ‘unknown species’. It was suggested that it would be added benefit to produce sensitivity maps from these data, including a variety of methods so that all the available data can be used. This would be an important tool for Maritime Spatial Planning.

Lastly, it was noted that BirdLife International is now part of the Offshore Coalition for Energy and Nature (OCEaN). This has expanded to the Mediterranean – going beyond the originally planned northern seas. OCEaN should become a data taskforce, for collecting more data and making them accessible. These data must be standardised, centralised, and made available across different borders. OCEaN will help to remove obstacles to sharing existing data and fostering a data-driven decision-making future for the seas.

Mapping Environmental Impact of Offshore Energies

Ibon Galparsoro (AZTI, Spain) presented a [report](#) on mapping the environmental impact of Offshore Energies, which covered all European seas, completed for the European Environmental Agency by an international consortium. It was highlighted the report aimed to support Member States and the EU in fulfilling the 2050 vision of the EU Offshore Renewable Energy Strategy, whilst ensuring that the expansion of offshore energy does not imperil achievement of the Biodiversity Strategy or Marine Strategy Framework Directive.

Section one identified the main ecological risks, based on a literature review of interactions between offshore energy devices and different ecosystem elements. It identified the most relevant pressures and most sensitive ecosystem elements. Section two dealt with mapping of the current development of projects, and resulted in risk maps of the most sensitive ecosystem components for all the European seas. The last section analysed the renewable energies industry in an MSP context, via policy review, looking at how the renewable sector is considered in plans and potential conflicts due to the sector.

The study focused on offshore wind farms, but also analysed other ORE platforms including offshore currents and tidal farms, wave energy farms, floating photovoltaic farms, and OTEC (Ocean Thermal Energy Conversion) technologies.

In the environmental risk maps, the analysis of pressure types due to different technologies included information on electromagnetic fields, or changes in habitats, the barrier effect, etc., underlining the types of impact that wind farms could produce. The researchers looked at the magnitude and spatial extent (up to 16 or 50 km respectively for the behaviour of birds and mammals from the farms) of the impact or effect, and the lifecycle phase.

Innovative areas of the analysis included analysing the different pressures and ecosystem components affected by floating photovoltaic farms. In addition, an Ecological Sensitivity Index map highlighted how the coastal waters around Portugal, Spain, the British Isles, the Azores archipelago, Madeira and the Canary Islands have high concentrations of ecosystem elements sensitive to offshore energy farms. It was suggested these could be used to assess cumulative impact maps that could have great utility for the offshore renewable energy sector.

3.4 Breakout session 1: ORE marine data needs and requirements in the Mediterranean Sea and Black Sea

The goal of this break-out session #1 was to share experiences in a cross-sectoral dialogue about *in situ* data needs and requirements, as well as to discuss challenges and the potential for using tools ecological approaches that can support the offshore renewable energy sector. This session also aimed to gather participants' feedback about their emerging marine data needs and requirements, and to discover if they use EMODnet data already. Participants in this session were pre-assigned into one of three groups, each led by a moderator. All groups – including a mix of people from the private sector, research, civil society and policy sectors – tackled the same three discussion points:

- What marine environmental and human activities data/data products are required by private sector operators, marine managers, etc. to support the development of the offshore renewable energy sector and to underpin an ecosystem approach in the management of the sector and overall offshore areas?
- How can the services provided by EMODnet support these needs to reduce uncertainty, save costs and drive innovation across the existing offshore renewable energy value chain including the planning, constructing, managing, monitoring and assessment of environmental impact?

- What are the additional data/data product needs/gaps now and in emerging offshore renewable energy platforms? How do these needs differ across different regional sea-basins?

A summary of key discussion points and feedback are presented below.

3.5 Plenary reports on breakout session 1

Each of the three break-out groups reported back to plenary, taking stock of key recommendations on data needs and requirements across different offshore renewable energy sectors and for different regional seas. Key messages from all three groups are summarised below.

3.5.1 EMODnet connecting across the marine knowledge value chain

A representative of the private sector noted that EMODnet is an “incredible resource”, providing free data that used to cost thousands of Euros to access. The network’s data, particularly on human activities, can help cooperation and maritime spatial planning, as well as providing factual data to minimise conflict, especially where there are existing territorial disputes at sea.

Ocean Observation and data collection standardisation

It was noted that the European Commission has consulted widely with ocean observation, marine monitoring and data collection on sharing responsibility for coordinating and rationalising national ocean observation efforts to avoid duplication and reduce costs. Many EU Member States are already setting up national committees for ocean observation, driven by research and legal requirements, and increasingly the committees include the private sector. Such committees would be important also for EMODnet and the coordination of the marine data pipeline.

Following a question on the need for more standardisation in data collection, it was noted that the outcome of the European Commission Ocean Observation: Sharing Responsibility initiative will be published in Spring 2023, and this would propose measures for greater standardisation and harmonisation of ocean observation, marine monitoring and data collection. EMODnet works closely with data collectors and would be taking these outcomes onboard to further streamline the marine knowledge value chain and building on EMODnet’s work to-date on the marine data standardisation and harmonisation.

3.5.2 EMODnet marine data supporting the ORE sector

Environmental impact assessments

It was noted that EMODnet data and data products on marine biodiversity, seabed habitats and conservation data are already proving useful for environmental impact assessments. More feedback from the business sector on its requirements would be helpful in developing the data layers and data products that meet existing and emerging needs.

Maritime Spatial Planning (MSP)

Stakeholders recognised the value of EMODnet data/data products for National Maritime Spatial Planning. Croatia remarked it is developing a MSP Plan, but is missing mostly environmental impact data. The representative also added that in many cases, data can only be used for the MSP in Croatia if it has been produced by a licensed institute/institution in Croatia. Cross-border marine data was also seen as a crucial as well as best practice sharing across sea-basins including countries that span multiple sea-basins.

National representatives of Romania and Bulgaria noted they utilise EMODnet marine environmental and human activities data and they are working together on aspects of their Maritime Spatial Planning in the Black Sea. They noted that National MSP plans are still in the development stage.

It was recognised that further ORE policy incentives are needed in some countries to map and evaluate appropriate places for wind parks, which have high potential for development.

3.5.3 ORE sector marine data gaps, needs and requirements

It was recognised that different ORE technologies have different data requirements, including different needs across the ORE value chain and in the two different sea-basins under discussion. There was a request for EMODnet to provide more regular updates to some marine data layers and products, plus to continue offering higher resolution information and more access to raw data, where possible.

Specific data gaps to be addressed to supplement the existing EMODnet offer included:

- Having higher resolution data is a difficult challenge but is key for the blue economy. It was recognised that EMODnet delivers a high quality service and that more funding could further elevate the service to the high resolution data across all parameters that are required to underpin blue economy operations at sea.
- Climate change modelling, as these data support ORE developers' planning process;
- Small-scale fisheries, one of the main sectors impacted by offshore wind development, is an area with big data gaps;
- Complete data coverage of everything in the sea and competing areas of activity;
- Seafloor cables: EMODnet Human Activities already offers some data which are useful to the blue economy, although it was recognised some of these data have recently been put behind paywalls by the data provider. EMODnet could look into solutions to update the cables data layers, in cooperation with the private sector and wider marine stakeholders;
- Marine Biodiversity: The consenting process for ORE site identification could maybe be accelerated by having more marine biodiversity information, e.g. on the distribution of seabirds;
- Information on faults, earthquakes, landslides as well as data on slopes and other geomorphological data: these services would reduce uncertainty in the ORE sector;
- Underwater heritage, though countries vary on this;
- Bathymetry: European seas have 40,000 surveys and EMODnet can further expand the data ingestion to include all of these, and offer higher resolution;
- Offshore seafloor geology and geochemistry: Higher resolution are required and also more information on soil types;
- MetOcean data including wind flows: farms now affect wind flows, both positively and negatively and more data in this area could be of benefit, together with historical data for wind, which should also be stored in one system;
- Engineering specificities such as soil geomorphology, for planning of structures anchorage;
- Marine litter and noise, the new hot topics;
- Vulnerability maps with information on extreme weather events;
- Adriatic and Gulf Biscay regions;
- Regional datasets (not only at National or project level) should be given more priority recognising there is a need to assess the interaction of marine fauna and energy developers across sea basins and that each sea basin has different marine environmental conditions e.g., slopes, soils in the Mediterranean Sea compared to the North Sea.

The lead moderator thanked all participants for Day 1 and welcomed participants to return for Day 2 which would focus on data sharing.

4 Day 2 – 21 October 2022

4.1 Welcome

The lead moderator welcomed participants to the second half-day of the EMODnet Business Workshop #2 'Marine Data for the Offshore Renewable Energy Sector in the Mediterranean Sea & Black Sea'. She briefly summarised the key messages on data gaps and needs, emerging from the day 1 breakout sessions (see Day

1 summary above). She thanked participants for their inputs so far, then introduced the two core items on the agenda for the final half day as:

- Communicating and presenting the benefits of data sharing with EMODnet, the EMODnet Data Ingestion Service, and EMODnet's ongoing activities with the private sector;
- Discussing challenges and barriers for data sharing by the offshore renewable energy sector and how EMODnet Data Ingestion can support this process.

4.2 Win-win data sharing with EMODnet: Communicating the benefits of data sharing and the EMODnet Data Ingestion Service

EMODnet: A best practice in Findable, Accessible, Interoperable and Reusable (FAIR) marine data sharing for the EU Green Deal and UN Ocean Decade

Kate Larkin (EMODnet Secretariat) presented the value of marine data sharing, noting that marine environmental and human activities data are initially collected for one purpose, and yet have so many other applications and uses. These benefits can be unlocked by sharing data with a data service like EMODnet so it can be made FAIR. This also safeguards the data for long-term availability, it creates a better return on investment for the data collection, and adds marine knowledge for society. Building on this, she noted that FAIR marine data is crucial to underpin Blue Economy operations at sea and to support evidence-based policy making to achieve the ambitious targets of the EU Green Deal, the UN 2030 Agenda and the many objectives of the UN Decade of Ocean Science for Sustainable Development.

She underlined that EMODnet is a trusted in situ EU marine data service that already offers a service to collate, assemble, standardise and harmonise marine data from many sources and to make these data as FAIR as possible, so they can be harnessed by the private sector, policymakers, researchers, civil society or wider society. EMODnet follows the European INSPIRE Directive on geospatial data and applies both European and International (e.g., ISO) standards to data and metadata as well as offering a range of data and web services so that data can be discovered by person-machine and machine-machine searches. This is fundamental for an interoperable marine data space in Europe and beyond, and to provide both the infrastructure and the data to underpin the digital evolution, a digital commons and applications such as digital twins, including the EU Digital Twin Ocean.

She added that EMODnet is active at many levels at EU and international levels to strengthen partnerships for international marine data interoperability and to bring regional best practice and high quality marine data to users worldwide. She added that EMODnet is already a key partner globally for data diplomacy, open data, open science and digital data stewardship. It is moving from just the FAIR principles to even more inclusive equitable access to data through the CARE Principles for Indigenous Data Governance.

She noted that EMODnet is continuously evolving its services to meet current and future user needs. She noted that in addition to the centralisation of EMODnet services, the sourcing and ingesting more diverse sources of data to compliment and expand the EMODnet offer was also crucial and she passed the floor to colleagues of EMODnet Data Ingestion to explain more.

EMODnet Data Ingestion: EU public service supporting the Blue Economy towards FAIR marine data sharing

EMODnet Data Ingestion Technical Coordinator Dick Schaap (MARIS, Netherlands) presented the [EMODnet Data Ingestion Service](#), which aims to further enhance and expand the EMODnet data and data product offer, ingesting data from diverse sources including the private sector, civil society and citizen science. Marine data already flows into EMODnet from National Oceanographic Data Centres (through the EU network SeaDataNet), other national and regional repositories and through collaboration with other data services e.g., ICES, Copernicus Marine Service, PANGAEA and others. However there is a wealth of marine environmental and human activities data that are not yet submitted to EMODnet which would add significant value to the EMODnet offer creating even higher resolutions and filling gaps in parameters, temporal/spatial resolution and geographical coverage. EMODnet Data Ingestion was set up in February 2017 to offer a public service to meet this need. It supports data collectors and holders – from government, science, and industry – to submit their data to EMODnet in a fast, efficient way, to allow more data from diverse sources to be

ingested into EMODnet, with the relevant metadata to acknowledge data collectors and provider. Data are submitted through a submission service and go through a principle data workflow. Depending on the region, the dataset is assigned to one of 50 expert data centres and specialised marine centres in Europe for data curation, which includes the Coordinating institutes/organisations of all EMODnet thematics. The data are categorised by domain, such as biology or geology, and made ready for the EMODnet central portal and distributed through EMODnet thematic portals. The FAIR data principles are also applied to the data, to ensure they can be shared and reused by humans and machines.

The Data Submission process, supported by experts, includes two phases: Phase I involves data submission to publishing 'as is' in a Summary Service; or the more complete Phase II, where data are more standardised according to European and international standards. EMODnet aims to educate data providers to send in better organised datasets that can quickly flow through the pipeline and become available for different products. Around half of the datasets received are taken to Phase II level. They can be viewed and downloaded through EMODnet's on-line Summary Service. The network aims to make more data available and works with other data repositories to set up automatic (machine to machine) exchanges. Examples include SeaDataNet/SEANOE data citing service (190 entries so far) and The Crown Estate (TCE) Marine Data Exchange (MDE) for the UK North Sea sector.

The network aims to make operational data available faster, by establishing machine to machine transfers, together with EMODnet Physics. Some 450 platforms, such as weather stations, have been added to the NRT (near real-time) exchange, which is connected to the EU operational Oceanography data exchange.

To date, EMODnet Data Ingestion has received 1,200 submissions, Phase I-II. Most are in the public domain e.g., academia and government, though input from the private sector is increasing with over 200 submissions from private companies. Examples were given of monitoring data from windfarms published at EMODnet Ingestion and ingested into either EMODnet Biology or Physics. Citizen science is increasingly important for the platform, such as data from Romania on marine litter. It was noted that extra emphasis will be given in the future to improving and documenting the availability of data provided for coastal and offshore licensing, e.g. for aquaculture, offshore energy, etc.

Q&A and Open Floor

The lead moderator asked EMODnet experts if they had good examples of marine data sharing or related challenges.

- A representative from EMODnet Physics replied that they had been successful in seeking operational datasets, by contacting operators of observing stations for waves or currents, etc. The key argument is: if you are willing to share the data with us, within a short time (even one day) EMODnet experts can make your datasets visible as part of the EMODnet Physics portal so that others can see it. EMODnet then also does the work to fully standardise the data and make it fit for long-term use so it can be integrated into EMODnet data layers and data products;
- An expert from EMODnet Seabed Habitats remarked that interpreting a habitat type requires lots of different physical data, such as on sea depth or sediments, and that there are many data gaps there. Thus, EMODnet Data Ingestion, and promoting the co-benefits of marine data sharing, is generally the best and easiest route for filling those gaps. Participants were encouraged to visit [EMODnet Data Ingestion](#) and to see how easy it is to upload your data with minimal metadata and the data centre partners in Data Ingestion will do the rest;
- A marine biologist attending the workshop highlighted the benefits of EMODnet Data Ingestion, remarking that marine biological data management is time-consuming and expensive to standardise and harmonise and EMODnet Data Ingestion and Biology experts offer key resources to help with this. The participant added that the more data is ingested into EMODnet the more value will come back individual data providers, since they can receive feedback to the network on the quality of their data;
- There was also a call for any licensed activity in the ocean to stipulate data provision to open source data services e.g., EMODnet, after a period of commercial sensitivity, if required. It was noted that

this was currently lacking and would significantly increase the amount of data being submitted to EMODnet;

- EMODnet Data Ingestion noted they are working more closely with various government organisations, through national contacts in the network, acting as Ingestion Ambassadors. The aim was to learn more about the data monitoring procedures in different countries, so as to improve efficiency and build a common approach for the blue economy and to make marine data more available;
- EMODnet Human Activities highlighted that it benefits from Data Ingestion, giving the examples of working with the Crown Estate in the UK, although recognising that its data submissions related to offshore renewable energy are so far limited. It was underlined that anyone involved in an ocean energy project usually collects lots of data and this should ideally end up being submitted to EMODnet, to be made FAIR and available for multiple uses, to drive further innovation and for the benefit of society. There was a special plea for data on the position of power cables, which could be valuable for all ocean renewable energy or offshore wind energy projects.

4.3 EMODnet for Business, Associated Partnership and stakeholder engagement

A short [EMODnet video](#) was shown, highlighting the huge potential of renewable energy in Europe, especially in the seas around the continent, and how it contributes to the EU's ambitious plans to tackle climate change. Development of Europe's ORE, including wind, wave, tidal platforms, etc, is a key focus, in line with the EU Green Deal and blue economy goals. The European Commission has set deployment targets for ocean energy in the EU, such as 300 GW of offshore wind energy in 2050 and 40 GW of ocean energy. Achieving these targets will require a huge scaling up of ORE, whilst protecting biodiversity, backed by extensive and reliable marine data to guide project developers and policy-makers. EMODnet is a global gateway for marine data and data products, in areas from bathymetry to human activities, and the network supports the whole ocean energy sector.

Kate Larkin (EMODnet Secretariat) then presented EMODnet for Business activities, spanning EMODnet participation in industry-led events, dialogue with private sector at EMODnet events and through workshops such as the ORE workshops, and closer dialogue through the EMODnet Associated Partnership Scheme.

She highlighted that EMODnet's dialogues with the private sector span the full marine knowledge value chain from data collection to use, since the private sector are not only key users of marine data but also important marine environmental and human activities data collectors and holders. She noted that EMODnet works closely with EC DG MARE to achieve this, including supporting the EC Ocean Observation initiative 'Sharing Responsibility', designed to support the coordination of data collection efforts.

She highlighted EMODnet aims to further communicate the benefits of EMODnet data and data products for the Blue Economy and also to promote the win-win benefits of data sharing, acknowledging that the private sector is already sharing some data and that these contributions can be recognised more, to promote further data sharing efforts.

She underlined that in addition to attending and presenting at multi-sector industry events e.g., Ocean Business, Oceanology and others, EMODnet also organised sector-specific workshops including the ORE workshops of September – October 2022 and previous workshops with the Aquaculture sector in 2020-2021. She added that EMODnet has close dialogue also with the European Commission Marine Knowledge Expert Group, which brings together representatives from across the Blue Economy that provide input and feedback from a user perspective on EMODnet services and the private sector needs and requirements.

She explained the main benefits for the private sector to use and share data with EMODnet including access to high resolution, harmonised EMODnet marine environmental data that can be used to assess baseline conditions without the need for further marine data collection, saving costs and improving knowledge and reducing risks. She underlined that EMODnet does not produce tailored products but rather generic data and data products for use by all. In this way, EMODnet stimulates innovation so that businesses and other users

can use EMODnet services to produce added value applications based on EMODnet data and data products. She referred participants to the EMODnet Central Portal EMODnet for Business leaflet for more information.

She noted that the [EMODnet Sea-basin Checkpoints](#) had been a crucial activity that stress-tested the EMODnet services system to see the data provision and adequacy for concrete user applications such as monitoring an oil spill and the siting of an offshore wind farm. Interestingly, when this was conducted in 2018, offshore energy operators at the time noted that EMODnet had the parameters but lacked the high-resolution data needed for the micro-siting of offshore wind installations. However, the evolution of EMODnet services meant that now in 2022 EMODnet had a number of testimonials e.g., from the ORE workshop in the Northeast Atlantic, North Sea and Baltic Sea, where

offshore energy companies noted they can now use EMODnet's high resolution data and data products for this purpose. She highlighted that the EMODnet central portal has a wealth of [use cases](#) and communication resources on different sectors, such as business in general, maritime spatial planning, and data ingestion, and per the thematics.

She underlined that EMODnet welcomes feedback and ideas from all stakeholders on emerging needs and requirements for marine data, data products and services. She added that two key events for stakeholders to join in 2023 would be the EMODnet Open Sea Lab 3.0 hackathon (March 2023) and the EMODnet Open Conference 2023 (November 2023). For those wishing a closer dialogue with EMODnet, she highlighted the [EMODnet Associated Partnership Scheme](#) as a flexible and open network for any stakeholder to apply to. It has proven as a useful platform for wider stakeholders to have a closer dialogue on data sharing and data use, share best practice and capitalise on the vast expertise in the EMOD-network on *in situ* marine data. The scheme includes 28 members, from SMEs to much larger industry, plus private public partnerships and spin-offs from universities and the public sector.

4.4 Breakout session 2: Data sharing by the ORE sector

In the day two break-out session, three groups, each led by a moderator, debated the challenges, barriers and benefits of sharing marine data with EMODnet, with a focus on the ORE sector. All groups – including a mix of people from the private sector, research, civil society and policy sectors – tackled the same six discussion points:

- Do you/your organisation already share marine data with EMODnet or other public data repositories and services e.g., at national, regional, EU level?
- What types of data can be shared e.g., marine environmental data (baseline data or also operational data?), human activities data e.g., offshore platforms, socio-economic data, other?
- What are the challenges and barriers for data sharing? How does this vary across the value chain e.g., from location siting/licensing to operations/monitoring, environmental impact assessments, etc.?
- Are there specific challenges for each regional sea basin?
- With EMODnet Data Ingestion offering a free, public service for ingesting data, how likely are you to share marine environmental or human activities data in the future?
- How can the offshore renewable energy sector contribute more to EMODnet databases through data ingestion of its *in situ* marine environmental measurements? What incentives / actions are needed?

A summary of key discussion points are presented below.

4.5 Plenary reports on breakout session 2

In this session, all participants reconvened in plenary to report back on breakout session discussions and to take stock of key challenges, barriers and opportunities for data sharing with EMODnet.

It was recognised that currently, seventeen percent of data shared with EMODnet Data Ingestion comes from the private sector. EMODnet has seen an increase in private sector proactively contacting EMODnet to share data. Others would like to, but they lack the time and/or incentives. Indeed, especially small companies, often have difficulty with the availability of resources for data stewardship. A key goal now is to encourage more

companies and others to share marine data. There is an opportunity for the private sector to help promote the EMODnet Data Ingestion service to wider companies to act as a 'catalyst' for other private sector organisations to join the data sharing revolution.

4.5.1 Challenges and barriers to data sharing

It was recognised that some data gaps are in fact a result of lack of data sharing and that the data exist, but are currently not open. EMODnet experts noted that whilst there is a lot of effort at thematic and data ingestion level together with the Secretariat, it can be challenging within the current EMODnet budget to maximise the dialogues that are required to leverage these data into the open data space.

Regarding data sharing from neighbouring countries, it was noted that Regional Sea Conventions (RSCs) play an important role to cooperate on data sharing and that EMODnet already connects with RSCs and plans to do more at a regional and national level to further expand data sharing opportunities. EMODnet partners and Data Ingestion ambassadors could also play a greater role in demonstrating the benefits of data sharing.

It was underlined that some parameters e.g., wind and wave data, ornithological and marine mammal data were often considered sensitive. In addition, it can be challenging to get data back from the ORE sector after companies have installed their facilities. For these reasons it was suggested that licensing tenders, arrangements and contracts should include clauses for companies' data to be submitted to EMODnet as a public open marine data service. It was also noted that the full diversity of stakeholders e.g., civil society, private sector, national authorities, academia and beyond would benefit from working closer together on data sharing to reduce concerns and maximise the benefits and the data sharing results.

4.5.2 Potential solutions to overcome barriers and improve data sharing

EMODnet has a large, diverse and expanding data provider community and is seeking diverse data sources and cooperation with the private sector, civil society and beyond. EMODnet also works closely with ocean observation, marine monitoring and data collection efforts in Europe and beyond to ensure an expanding flow of data into the EMODnet data service pipeline, and to support the EC Ocean Observation Initiative: Sharing responsibility.

It was noted that incentives including a certification procedure and/or public acknowledgement of data sharing efforts could help, as well as communicating on education and awareness about Corporate Social Responsibility. A high-level certification procedure could be an incentive to share data.

Some experts believed that companies should be compelled to share data with EMODnet, because data are a by-product of their activities. For example there could be a requirement as part of the licensing phase of an ORE or wider blue economy contract to share data to open source services e.g., EMODnet, recognising that there remains a certain time-frame for commercial sensitivity. This was seen as particularly relevant to ORE where often Consortia with multiple partners and organisations are invested in a ORE project and yet there is no clear data management plan or data steward. This could be solved by naming EMODnet which offers an open and public service for supporting data ingestion and curation.

It was noted that it is important for EMODnet to:

- Further raise awareness about EMODnet e.g. via dissemination and by helping researchers. However, the network and other sources should adopt a more systematic approach to disseminating materials on EMODnet;
- Communicate and showcase the flagship EMODnet data / data products to attract more users e.g., for the EMODnet Digital Terrain Model (DTM) of Bathymetry that is the best on the public data service space for resolution (110 m) in a grid;
- Communicate and engage more with the private sector about the win-win benefits of sharing marine data with EMODnet, and that EMODnet can support this process. It was recognised that EMODnet Data Ingestion is an important service in these efforts which works together with the data provider to ensure minimum metadata information and acknowledgement of the data

collector and provider together with enhanced data standardisation to EU and International standards;

- Increase dialogue with the private sector to assess the data services and functionalities that most meet user needs e.g., assessing data formats, interoperability etc.

4.5.3 Open floor discussion

A representative of EMODnet acknowledged that whilst the user base of EMODnet is expanding and diversifying, there is still more to do to communicate the EMODnet service and benefits of private-public collaboration on data sharing to the ORE sector and wider Blue Economy. They encouraged participants of the workshop to promote EMODnet to their colleagues and to contact the EMODnet Secretariat and wider EMOD-network for further information to optimise their use of EMODnet services and to discuss opportunities for data sharing.

The lead moderator thanked all participants and noted that reports would be produced on both the EMODnet for ORE Workshops (see Executive Summary for public website links). They then passed the word to EMODnet and the EC for Closing words.

4.6 Closing words

Kate Larkin (EMODnet Secretariat) thanked everybody who had joined or helped to organise and facilitate this second Business Workshop, whether presenting or in the breakout sessions. These workshops were designed to hear from the wider stakeholder community and EMODnet really values such participation.

She noted that Offshore Renewable Energy (ORE) is an emerging area in the Mediterranean and Black Sea, so this particular workshop proved a great opportunity for EMODnet to discuss people's data needs and requirements there. The event should also pave the way for the network to work more with operators in those seas. Possibly by sparking ideas for those in a funding organisation or doing calls for tenders for such operations or looking at ways to embed open data policies and EMODnet into their contracts, etc.

She underlined that EMODnet is a public service and there for people to use. It offers many win-win benefits, but the goal is to make better use of the network and its services and products. A further aim is to diversify the network's communication and make it work for everybody. Hence the call for more user feedback on using the network's data and requirements, especially now there is a central portal. Anyone sharing data should consider submissions to EMODnet, as it works very closely with data centres at national and regional levels. Data sharing enables users to raise the visibility and impact of their data beyond the national level and increasingly at a global level. She reminded participants that this workshop was the second of two workshops on the ORE sector, focusing on different sea basins. Both workshop reports and presentations would be made available in due course on the EC Maritime Forum. A list of participants would not be included for data protection reasons. Lastly she reiterated that EMODnet is constantly evolving to meet user needs and she invited participants to visit the new EMODnet Central Portal to discover the many services and diverse data and data product offer. She noted there were also many ways for the private and public sector to get involved in EMODnet, including providing use cases and feedback on services, sharing data, attending EMODnet and related events and joining closer dialogue e.g., through the EMODnet Associated Partnership Scheme. She encouraged participants to contact the EMODnet Central Portal helpdesk or Secretariat for any questions, and to subscribe to the free monthly newsletter.

Zoi Konstantinou (EC DG MARE) remarked that this workshop had resulted in useful reflections on how EMODnet could evolve as well as the needs around ocean observations and marine environmental and human activities data by the ORE industry and related sectors. The European Commission would take note and is working on various initiatives that can bring these together. For example, by promoting a culture change for oceans observation and the sharing of data. Not only for marine data, but as part of a larger effort focused around the digital strategy and the European data spaces. This change of culture will hopefully bring in more information for better environmental management and better management. It is also hoped there will be further cooperation with industry and stakeholders working in the Mediterranean and the Black Sea.