# EMODnet marine data for the coastal tourism sector in European regional seas, a virtual workshop, 26-27 September 2023

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# 1. Executive Summary

On 26 & 27 September 2023, the European Marine Observation and Data network (EMODnet), together with the European Commission Directorate-General for Maritime Affairs and Fisheries (EC DG MARE), organised the online workshop 'EMODnet Marine Data for the Coastal Tourism Sector'. The workshop was designed to facilitate cross-sectoral dialogue and share experiences from key coastal tourism stakeholders regarding their *in situ* marine data needs. Further goals were to explore the potential for EMODnet marine data services (data, data products) to support the sector, as well as opportunities for marine data sharing with EMODnet by coastal tourism operators and related data producers. The dialogue was in line with the policy objectives of the current European Maritime, Fisheries and Aquaculture Fund, under which EMODnet's business framework underlines the importance of open marine data and how it supports the blue economy.

Key actors and stakeholders were mapped and invited to the workshop, which was attended by over 42 European coastal tourism representatives from the public and private sectors plus policymakers at regional, national and EU levels. EMODnet was represented by thematic experts from Geology, Human Activities, Physics, Data Ingestion, Central Portal and the EMODnet Secretariat.

Day one demonstrated and communicated the existing EMODnet *in situ* marine data 'offer'. It also presented existing and future use cases of EMODnet marine data being used to support, optimise and innovate the coastal tourism sector. Feedback was gathered in a breakout session on existing and emerging marine data needs and requirements to support the coastal tourism sector. EMODnet already offers a wealth of data and data products spanning human activities. These include Vessel Density Maps and area-based management information, e.g. for Marine Protected Areas, as well as marine environmental parameters on water quality (e.g. pollution, beach litter), bathymetry, seafloor sediment and seabed habitat data, coastal zone geomorphology, and more. Parameters like these are utilised by coastal tourism operators. It was noted that coastal tourism requires high-resolution, standardised and harmonised data for more precise analysis, some of which is done in near real-time. Stakeholders also provided recommendations on evolving EMODnet data products to be more fit-for-use by the coastal tourism sector, e.g. adding average speed to Vessel Density composite maps, and supplementing the existing EMODnet offer, including for socio-economic data and human pressures.

The second day focused on communicating and presenting the benefits of data sharing and the EMODnet Data Ingestion Service. The breakout discussed challenges and barriers for sharing by the coastal tourism sector and how EMODnet Data Ingestion service can support this process. Specific requests included for EMODnet to provide further support to citizen science initiatives conducted on coastlines and beaches; and for EMODnet to have more dialogue on the opportunities for data sharing with EU Member States and Associated countries across the full Mediterranean Sea, including the North African coastline.

*"SeaCras uses EMODnet data or other open source data in its business, because they significantly reduce the company's own resource and R&D costs for ground proofing [of satellite images and data]."* Mario Spadina, SeaCras

*"Using the EMODnet Human Activities Vessel Density Map, one can see the ecological vulnerability based on the time that pleasure craft spend in Marine Protected Areas."* Antonio Sánchez Espinosa, European Topic Centre on Spatial Analysis and Synthesis, University of Malaga

*"There are 10,000 marinas in Europe, both inland and coastal. It would be marvellous if just a fraction of these started generating reliable data on a long-term basis, and feeding them into EMODnet."* Melanie Symes, TransEurope Marinas

# 2. Day 1 – 26 September 2023: EMODnet services and data use

## 2.1 Welcome and Opening remarks

**Anne Mette**, the lead facilitator, warmly welcomed participants to the first EMODnet for Business: Marine Data for the Coastal Tourism Sector workshop. Held over two half-days, on 26 & 27 September 2023, this online workshop was co-organised by EMODnet and the European Commission's DG MARE.

The workshop's main objective was to facilitate a cross-sectoral dialogue and share experiences from key coastal tourism stakeholders about existing uses of EMODnet data, data products and services, and the sector's existing and emerging *in situ* marine data needs and requirements. It also sought to highlight the potential for EMODnet marine data services and products to support the sector. A third objective was to identify opportunities for marine data sharing with EMODnet by coastal tourism operators and related data producers. Overall, the workshop aimed to increase the awareness and use of EMODnet services by the blue economy – particularly the coastal tourism sector, and to provide recommendations to EMODnet and EC DG MARE on requirements from the private and public sectors, to help shape future EMODnet developments.

Anne noted that day one's busy agenda would focus on data requirements and use. After opening remarks by the European Commission's DG MARE, the scene would be set for the coastal tourism sector with a Joint Research Centre presentation and the EMODnet for Tourism video. EMODnet representatives would then explain how their network's *in situ* marine data 'offer' can support the coastal tourism sector. There would then be presentations from wider stakeholders on how EMODnet marine data and data products are used to support, optimise, and innovate the coastal tourism sector, including in combination with other marine data, e.g. from the Copernicus Marine Service. She noted that in addition to plenary presentations and Q&A, the first day would also include a breakout session on data needs and uses, before coming back to plenary to share key points and recommendations.

**Zoi Konstantinou**, EC DG MARE Policy Officer, explained the workshop was an important one for the European Commission (EC), which invests heavily in marine knowledge. She explained that more knowledge is essential to sustainably manage our marine and coastal systems, and that DG MARE has multiple initiatives, plus different research projects and efforts to connect with blue economy stakeholders. Moreover, this workshop would show the EMODnet offer, which is a result of aggregating data from different sectors and disciplines, to be able to offer data layers and data products in all European seas and several neighbouring areas. She noted the goal of EMODnet is to increase and strengthen marine knowledge for society, making it openly available for different users from research and innovation, policy and the blue economy sectors.

Zoi explained the EC wants to strengthen links with the blue economy and with the different sectors that need marine data. This will support their activities and make them more sustainable or circular, better adapted to new challenges related to climate change and biodiversity loss. She noted one such sector is coastal tourism and the EC is eager to increase the link with its stakeholders. Coastal tourism requires a lot of data – including good environmental quality in the coastal zone, early warning systems, and adaptation practices. Marine knowledge can provide all this, based on open marine data, multidisciplinary data, plus data from the environmental sector and the economy and society.

Zoi continued by informing the participants that colleagues in this workshop would demonstrate their work in the EU Blue Economy Observatory, launched in 2022. She noted that the EC, working through EMODnet, seeks to reinforce this collaboration with users of the network's open access data. She also invited workshop participants and others to become partners in this effort by providing their data to EMODnet, noting this would further boost Europe's marine knowledge base, thus enabling more sustainable use of marine data for their activities.

## 2.2 Setting the scene for coastal tourism

### 2.2.1 EU Blue Economy Observatory

**Jordi Guillen**, EC JRC (Joint Research Centre) – ISPRA, explained how the EU Blue Economy Observatory is a joint collaboration between the JRC and DG MARE of the European Commission. It aims to analyse and monitor the EU Blue Economy's evolution, by looking at the analysis of different sectors in the technical economy. The observatory seeks to share all the analysis and data, making everything public. Interactive dashboards with graphs and maps enable users to dive deep into the data and make the most of them.

He noted that although 2020 was a bad year due to the COVID pandemic, coastal tourism alone generated 1.72 million jobs and €34 billion. Whilst coastal tourism is concentrated in Spain, Italy, Greece and France, it can still contribute significantly to the Gross Domestic Product (GDP) of smaller EU Member States, particularly those with small islands and archipelagos with a big coastline.

Jordi explained that JRC relies greatly on Eurostat's Structural Business Statistics, together with other sources for other countries worldwide. For coastal tourism, Eurostat provides the expenditure of tourists in the EU countries – by accommodation, transport and other expenses. These data on tourist expenditure are then split between coastal and non-coastal tourism, based on data on nights in coastal and non-coastal areas. The resulting coastal tourism expenditure is compared to the total expenditure (turnover) in the related Structural Business Statistics (SBS) sectors. For example, accommodation includes hotels, holidays, camping grounds, etc. This is done to estimate the employment and Gross Value Added (GVA) profits for tourism.

### 2.2.3 EMODnet for Tourism video

Workshop participants watched the **EMODnet for Tourism video**, one in a series of eight illustrating the fundamental role of EMODnet in society. The video highlighted how EMODnet, as a trusted source of marine and coastal information, can support the EU's blue tourism sector to develop new, more sustainable activities, thus creating a more ocean-aware and ocean-literate public.

## 2.3 Demonstrating the EMODnet *in situ* marine data 'offer' for the coastal tourism sector

The EMODnet Secretariat provided key background on the EMOD-network and how it increasingly supports the blue economy. Three EMODnet Coordinators then delivered presentations on how the coastal tourism sector benefits from the wealth of data and data products from their own EMODnet thematic areas, while identifying some gaps.

### 2.3.1 EMODnet: an EU marine data service for the coastal tourism sector and wider blue economy

**Kate Larkin**, Head of EMODnet Secretariat, presented EMODnet, which is an EU public marine data service and a marine knowledge initiative of the European Commission through DG MARE. She explained EMODnet is delivered by a network of experts from more than 120 leading organisations in Europe that all specialise in different aspects of *in situ* marine data. *In situ* means any data that are collected in the field, namely in the water, the seafloor or in the air above, e.g. seabird observations. EMODnet does not aggregate data from satellites, i.e. remote sensing, for which satellite-derived data services, modelling, forecasting and prediction are delivered by the EC Copernicus Marine Service. EMODnet has been operational for more than a decade, a recent milestone being the unification of the EMODnet thematic services into one Portal in January 2023. Today EMODnet is a European authority and regional best practice in the marine data domain. EMODnet and Copernicus Marine Service collaborate in a number of areas including data flows, and are working together to provide the backbone for the European Digital Twin of the Ocean (DTO).

EMODnet has seven thematic domains, covering the marine environmental thematics of Geology, Bathymetry, Seabed Habitats, Biology, Chemistry, and Physics, together with Human Activities which includes Blue Economy installations and operations at sea. EMODnet publishes data already collected by others, adding value by sourcing, aggregating, standardising and harmonising these data to produce large integrated pan-European data layers. A user can go to

EMODnet and find all the baseline *in situ* data that exist for a specific parameter. EMODnet experts also create data products, such as composite maps, digital terrain models, etc. The coverage is mostly European Seas, plus associated countries – e.g. the Mediterranean Basin, Black Sea, with many thematics extending their coverage to include Overseas territories. For instance, the Caribbean region, and some thematics, e.g. Physics and Biology, already provide a global coverage for some parameters thanks to their partnerships with global initiatives.

Kate briefly presented the EMODnet single centralised Portal and the key features and functionalities. One common map viewer enables users to search, discover, visualise and download marine data from all of the EMODnet offer, currently 140 partners. All of the data and data products are searchable through the EMODnet Portal, thanks to a central metadata catalogue, which provides rich descriptions and associated information together with the data.

According to Kate, EMODnet's public and free service of diverse marine data and data products democratises *in situ* marine data for all. This can underpin the blue economy, relieving organisations or companies of the task and expense of collecting new data. EMODnet users can check the baseline offer of data and then target any extra data collection specific to their needs to fill any gaps. EMODnet marine environmental and human activities data can be used in many ways in the coastal tourism sector, e.g. providing sustainable food production, enabling climate adaptation and coastal resilience, or preserving biodiversity and investing in nature. Marine environment data show environmental status and the health of ecosystems. They can also track the impact of coastal tourism and other blue economy/human activities at sea, while underpinning Europe's green transition of the blue economy. For human activities, EMODnet also hosts national Marine Spatial Plans, in direct cooperation with JRC, the Joint Research Centre.

Kate noted that EMODnet's coastal data offer is vast and will be presented in this workshop, including coastal behaviour; riverine inputs; coastal pollutants, eutrophication and marine litter; bathymetry; sea level; biodiversity; and seabird habitats, etc. EMODnet has, for example, the largest and most comprehensive database of harmonised beach litter, which is very relevant for coastal tourism.

This workshop includes participants from a wide variety of coastal tourism stakeholders, with a focus on EU regional seas. Among them are organisations, NGOs, companies, and initiatives/networks that may need marine environmental data or collect their own marine environmental data. Other participants include EMODnet Associated Partners, DG MARE and its Marine Knowledge Expert Group members, and EMODnet experts.

Kate reiterated the key workshop goals, noting that the many EMODnet experts taking part in the workshop would present and demonstrate EMODnet and exemplify what EMODnet can do for coastal tourism operators. She then invited all participants to provide feedback on how they use EMODnet, and also their emerging needs and requirements for marine data to support their coastal tourism activities. Moreover, she noted that EMODnet is very interested to also hear about the types of marine environmental and human activities that the coastal tourism operators and wider stakeholders already collect, and to have more dialogue on opportunities for data sharing, with support from the EMODnet Data Ingestion public service.

Kate concluded by noting that EMODnet is not just a data repository or database, it is really connected to the digital transition, to the European DTO and to the Global Ocean Data Ecosystem. As it evolves, EMODnet is keen to discover the needs or requirements of users and stakeholders and to get their feedback – especially sector-specific and region-specific information.

### 2.3.2 Demonstrations of EMODnet *in situ* marine data 'offer'

Three speakers representing the network highlighted how EMODnet services can benefit the coastal tourism sector, focusing on the network's Physics, Human Activities, and Geology thematics. For all demonstrations, participants were shown the EMODnet Common Map Viewer, which is the single point of access to discover, visualise and download all EMODnet data and data products since the unification of the service in January 2023.

**EMODnet Physics**: EMODnet is a one-stop Portal to find *in situ* data on ocean physics, said **Patrick Gorringe** from the Swedish Meteorological and Hydrological Institute (SMHI). It collects data worldwide and makes it available through the Portal. The nine parameters include temperature, salinity, sea level, currents, waves and winds, etc. EMODnet Physics calls on available marine data infrastructures and programmes. It holds coastal and open ocean data from around 8,000 *in situ* near real-time platforms, each one often measuring several parameters.

The EMODnet Map Viewer enables easy visualisation and downloading of data, so that users can find specific platforms and types, like ARGO floats, tide gauges, and drifters, etc. Calling on filter options, one could explore and download recent data and metadata from sea-level stations with a tide gauge. Patrick demonstrated how to find river flow data, before explaining that EMODnet Physics also offers profiles, such as an Oracle float off the North African coast.

Patrick noted one challenge is to find more data along the coasts. But since 40% of the world's population lives within 200 km of the coast, there are 3.2 billion potential community observers who can help EMODnet with measurements around global coasts. To collect more data in this data-sparse area, EMODnet works with several coastal groups, including Outdoor Portofino (see EMODnet use case), which uses cheap sensors on canoes and sailboats, etc. Furthermore, EMODnet collaborates with TransEurope Marinas by using low-cost sensors, citizen science initiatives and ocean decade projects such as Sailing4Science. EMODnet's data collection – and offer – is also increasingly global. In Malaysia, a sea turtle conservation group is planning to collect temperature data for Physics when they patrol the beaches for turtles. In closing Patrick said that many boats, some unmanned, travel the oceans and collect data. Here too, there are potential collaboration opportunities with the coastal tourism sector.

**EMODnet Human Activities**: a live demonstration of EMODnet's Human Activities offer was given by **Alessandro Pititto** (Cogea – BIP Group), Coordinator of EMODnet's Human Activities, using the EMODnet Portal's Central Map Viewer. He explained that the Human Activity offer of EMODnet includes many datasets that can be useful or relevant to the coastal tourism sector. For example, the dataset on European bathing waters, which are monitored yearly. A user could click on a bathing site and retrieve basic information such as its name, the home country, a specific website and all historical assessments. The same set of information is available for any area in Europe. Geographic data can be downloaded in various ways, e.g. by clicking on a selected area of the map and retrieving a CSV file to open in Excel.

Another dataset relevant to coastal tourism is Marine Protected Areas, which are protected under the Natura 2000 network. Workshop participants watched a live zoom into this dataset and a Special Protection Area, including information on when the site was classified as such. EMODnet has extensive coverage of protected areas under several pieces of legislation, which helps coastal tourism operators. EMODnet's wealth of data on the central Portal can be filtered in each dataset. For instance, a data filter for protected area types can select Special Protection Areas, or maybe an Area of Special Conservation Interests (ASCI), or both.

Alessandro noted that coastal tourism also benefits from the dataset on the vessel density of sailing boats. A user can zoom in to see hours per square kilometre for any month from 2017 to 2022. These specific data, from sailing boats obliged to have a transponder on board, are part of the larger dataset on vessel density. Other types of vessels can be explored on EMODnet's global Vessel Density Maps. These are important for tourism planners, notably because shipping is easily the most common maritime activity. There are several other datasets that could be relevant for coastal tourism, including one on shipwrecks for a flourishing industry of divers, as well as on submerged prehistoric heritage, and lighthouses with historical value. EMODnet is currently developing a dataset that includes the number of nights spent in coastal cities.

**EMODnet Geology**: this thematic's offer was presented by **Sytze Van Heteren**, Geological Survey of the Netherlands (TNO), with a focus on the data and data products offered on coastal behaviour. He noted one of the main challenges for EMODnet Geology is handling many non-numerical, purely descriptive features, so it has to translate everything into English. EMODnet's Geology products are not necessarily directly linked to coastal tourism, although there are some connections. One product is the composition of the seabed – i.e. sandy, gravelly, muddy or rocky – which can

impact the choices of a tourist or sector representative. He noted other key Geology data products that could be relevant for coastal tourism are:

- Seabed composition;
- Seabed subsurface: composition/age;
- Coastal behaviour: the stability of coastlines, and direction of movement (landward/seaward);
- Geological hazards: earthquakes, volcanoes past/present, and landslides;
- Mineral resources;
- Submerged landscapes from the Stone Age: these are of archaeological interest.

EMODnet's Geology data are relevant to the coastal tourism sector for several reasons. Firstly, because this thematic's environmental, safety and economic indicators are related to recreational activities, e.g. swimming, sunbathing, coastal walks, wildlife watching scuba diving, or vessel cruising. But these geological products are not tailor-made for coastal tourism, so EMODnet's Geology data offer helps users to find the information they want from generic types of maps. It provides indicators useful for different recreational activities, which could guide the choice of location for hotels or other types of lodging, dining and entertainment. One example is data on rocky or soft types of coasts. Additional information of potential use to coastal tourism cover the visible part of a coastline, with data on everything above and below water.

Sytze concluded that EMODnet welcomes feedback from the coastal tourism sector on how it can make its products more relevant to end-users. It is also developing published products of more relevance to coastal tourism, e.g. a new map on coastal vulnerability that could guide tourism developers' investment decisions.

## 2.4 Use Cases of EMODnet and wider data services to support and innovate the coastal tourism sector

Five speakers from around Europe gave presentations on their existing and potential use of EMODnet services for the coastal tourism sector.

### 2.4.1 Coastal and Ocean Data for Sustainable Tourism

**Joaquin Tintoré Subirana**, Coastal Observing and Forecasting System (SOCIB), EMODnet Associated Partner, presented case studies on beach safety, adaptation of human beaches to climate change, and recreational boating carrying capacity. He explained that SOCIB Marine Research Infrastructure is a multi-platform observing & forecasting system, from nearshore to open sea and from events to climate. It utilises gliders, research vessels, Argo profilers, drifting buoys, marine animal tracking, moorings, tide gauges, high-frequency radars, and beach monitoring. SOCIB has provided data resources, knowledge and advice to 10 sectors of society. All of them are related directly or indirectly to coastal tourism, marine and coastal safety, or marine sports.

SOCIB activities in coastal tourism are in partnership with EMODnet, including the thematics of Bathymetry, Physics, Chemistry and Human Activities, covering science to society needs. Over the last decade, they have built trust in each other, through effective public-private partnerships.

For sustainable tourism, it's important to closely observe the ocean, with interactive scales from basin to regional to local. The only way to really understand and manage our oceans sustainably is by creating an ocean and coastal data value chain. This requires an international framework, with various European Essential Ocean Variables, Essential Climate Variables, etc.

The goal is to get the data that are needed today in near real-time, from the nearshore to the open sea and covering from events to climate. SOCIB can gather such data and internationally, but data must be FAIR (findability, accessibility, interoperability, and reusability) and repositories must be trustable, to pave the way for real and useful innovation in coastal and ocean tourism.

SOCIB started in 2011 with an integrated and sustained beach monitoring programme, through public and private partnerships with hotel chains in the Balearic Islands. This involved collaboration with the EMODnet Seabasin Checkpoints. Working with DG Emergencies and the Balearic Islands government, SOCIB has provided Metocean forecast data for detecting rip currents. This supports coastal tourism and beach safety for lifeguards on over 150 beaches. Nowadays, SOCIB also applies artificial intelligence to some of its applications.

SOCIB also provides support to coastal tourism and planning. Its ONA Toolbox enables a regional approach to climate change adaptation plans through what-if scenarios. Citizen scientists with smartphones also monitor the changing coastline at S'Amarador beach.

Under the LIFE Adapt CalaMillor project, SOCIB is developing guidelines for adaptation of urban beaches to climate change, through a process of science-based participatory governance. The project is funded by the EU LIFE programme and co-funded with hotel chains, and includes various public and private actors. Joaquin noted that EMODnet is an excellent example of European leadership and partnership together with all these actors, enabling a move towards sustainable tourism and sustainable management of oceans and boats.

SOCIB monitors recreational boating carrying capacity in the Balearic Islands. This supports sustainability and ensures a sound balance between tourism and residents' quality of life.

### 2.4.2 EMODnet Physics & Data Ingestion supporting Outdoor Portofino activity planning and eco-friendly tourism

In a pre-recorded video, **Arianna Liconti**, Head of Science and Ecosystem Manager from OutBe, a start-up initiative that connects science, nature and people through outdoor sports and citizen science, explained she was sailing across the Atlantic Ocean and gathering ocean data. She noted that sailors may be familiar with many marine species, but scientists are not. The moonfish for example is listed on the IUCN Red List, because it is considered 'data deficient'. Gathering more ocean data is essential but few scientists can do so because this is expensive, requiring big ships and research projects. One solution is to harness the many people who do ocean watersports, e.g. sailing, kayaking, swimming, or boating in general. Besides gathering marine data to boost marine conservation and policy, they will become more aware of their impact on the ocean and vice-versa. This boosts 'ocean literacy' and increases people's sense of well-being. OutBe has a similar focus, linking outdoor sports communities and selected science projects. EMODnet helps with the training about the importance of the ocean in the communities' work and vice-versa, and education about the projects.

Arianna explained that in the MINI_MANTAS project, OutBe and CNR in Genova are testing the collection of microplastics when paddling in kayaks and canoes. They can get closer to the coastline than large boats and collect more microplastics. Without engine disturbance, they also gather a more accurate recording.

In 'Small boats for big ocean science' project, OutBe is testing the usage of oceanographic data devices on very small boats. A 6.5 metre racing boat is currently gathering oceanographic data in a transatlantic race. Arianna is following the race in a support sailing boat loaded with ocean monitoring devices. A Brizo sailing sensor collects sea temperature data, while a connected application gathers atmospheric pressure and sea state data, which are geolocalised. The goal is to roll out similar and inexpensive devices to many sailing boats.

SensOcean is a solar-powered sensor for gathering sea temperature and salinity, also geolocalised. MeteoTracker collects weather data and ENV Logger is an app to measure air quality.

Hand-held loggers are also useful for gathering data such as temperature, ideally for fixed readings such as at anchor. Data like this collected by citizen scientists can be shared with EMODnet and users, including for modelling e.g., weather forecasting. This could be useful for developing different climate change scenarios and ultimately better policy actions.

Watersports enthusiasts often see dolphins and whales, etc. If they take geolocalised photos, these can be uploaded to iNaturalist, and there is potential for these to also be disseminated by EMODnet. All this data go into a big report, which is then given back to the companies OutBe works with, for shared storytelling online. Everyone should work together to protect the ocean without borders as an ecosystem, which is what EMODnet is trying to do.

### 2.4.3 Sustainable monitoring of coastal waters by high-resolution : applications in the tourism sector of Croatia, a Copernicus Marine Service use case

**Mario Špadina**, CEO of SeaCras, explained how this Croatian start-up specialises in sustainable monitoring of coastal waters by high-resolution satellites. Although mainly a commercial project, it provides certain data for open access as a part of the company's marketing and PR activities.

SeaCras uses EMODnet data or other open source data in its business, because they significantly reduce the company's own resources and R&D costs for ground proofing. It takes satellite images in high and very-high resolution, before calibrating and ground proofing this data with auxiliary data from EMODnet, Copernicus Marine Service or national databases. Output data are calibrated, so the company can offer value-added services and insight for continuous monitoring and surveillance. Services now include ESG reporting on marine resources. For the Croatian market, the goal is to implement services in Maritime Spatial Planning and Marine Protected Areas for feasibility studies.

SeaCras has around 1,600 square kilometres under monitoring and surveillance for different temporal and spatial resolutions and applications. Its portfolio of detection and monitoring services include detection of fuel and blackwater tanks discharges, discharges from large vessels, monitoring of biochemical parameters, and detection of small floating debris, and seabed mapping. These are available in advanced visualisation tools and specialised reporting formats. Services are offered to port authorities, sports, national nature parks. Companies and public entities are all part of the coastal tourism and maritime transport value chain.

SeaCras marine environmental data are used in the management of Croatia's Telašćica Nature Park, which includes a natural harbour and offshore islands. Data include water quality data on eutrophication levels in terms of chlorophyll-a concentration. The park, which can now distinguish between human influences and seasonal 'natural' occurrences, is developing a data-driven action plan to limit boats' access to semi-closed parts of the park area waterbody.

SeaCras had identified business to government demand and gaps for destination marine resources management. While there is demand for this kind of data-driven approach, especially in marine data, most stakeholders wonder how they can distinguish anthropogenic from naturally occurring events, including climate change events. For example, in coastal urbanisation, they are most interested in seeing pollution emissions by boating tourism, the cruise industry, and the microbiological water quality of public beaches. Yet there are marine data gaps over the entire value chain, for both civilians and companies in the field. The biggest challenge is low temporal frequency of on-site sampling in Croatia, due to lack of funds. The legal framework on sampling and certified sampling entities should be updated, to help technology providers of marine data like SeaCras. It is essential to raise public awareness locally and regionally, to ensure new technologies and marine data are well integrated in coastal tourism.

SeaCras has been simplifying data and insight visualisation stakeholders in the traditional sectors who are not experts in marine data or satellite data or any new technologies. For example, pollution events are classified as a red colour on the map, prompting the city of Zadar to preventively reduce pollution in the tourism season. SeaCras is also developing future operational oceanography, a regional digital twin, in partnership with the Centre for Marine Research (CMR) – Institut Ruđer Bošković. It strongly emphasises multiple access point integrations with different databases.

### 2.4.4 Marina Networks & Marine Science

**Melanie Symes**, TransEurope Marinas, introduced the network which has nearly 80 marinas across 12 countries in Europe. It promotes responsible boating and marina management by sharing good practice and working with the international boating community to further the industry. The association covers several sea basins, from the Baltic to the Aegean. Its members learn a lot from each other, as each location and their water-based activities are different. One goal is to develop as a network of observers and data providers.

Coastal marinas can sometimes harbour thousands of boats. They focus on protecting their space from adverse weather and tidal surge, while facilitating safe access to the sea. Finally, they need to ensure long-term viability, i.e. economics, solid infrastructure, and the health of local surroundings. So coastal resilience, the use of green infrastructure and marine stewardship are key issues today.

To protect their local waters, boaters are increasingly taking sensors on board and sometimes sharing them at neighbouring marina hubs. Recreational boaters are familiar with the colours of their local waters. In France's Ifremer project Phenomer, they are helping to detect and track harmful algal blooms by taking samples to labs for analysis.

Increasingly, marinas are building communities and forging alliances with other entities. Their dinghy sailors, paddleboarders, kayakers, and swimmers are motivated to protect and practise their sport in clean waters. This can turn them into citizen scientists who record observations or take water samples. Others could emulate this by installing remote sensors, among them excursion companies and aquaculture farms. All types of mariners would benefit from better and more accurate weather and sea state information from locally installed instruments, to improve safety and perhaps prevent local accidents. The same applies to eco-tourism projects, where tourists contribute to data gathering.

Boating services, like navigational and routing platforms, already gather significant data on boating traffic. These data can contribute to assessing carrying capacities, for vulnerable habitats or deciding where to install eco-moorings.

Marinas face multiple challenges, from hydrocarbon spills to dredging impacts, and boat waste to underwater noise. But the sector lacks R&D funds, since it mainly comprises SMEs or micro-SMEs. Collaboration among stakeholders is essential, plus better awareness and knowledge of the characteristics and vulnerabilities of their surrounding water and biodiversity, is driving that movement. Recommended solutions include: more sensors and training on data use/uploading; more stakeholder collaboration, especially in line with new eco-labelling certification; and learning how to generate useful and viable data.

Marinas need marine science for four other key reasons: regulatory compliance and governance; resilience and risk reduction; environmental certification and company culture; and boating services. To benefit the boating community, the association already works with five EMODnet thematics: Physics, Seabed Habitats, Human Activities, Chemistry, and Bathymetry. Much of the data is already of interest to navigational and routing platforms.

TransEurope Marinas has joined LandSeaLot, a project funded under the EU Horizon programme 2024-2028. This land-sea interface observation project is a big opportunity and important step towards capacitation in marinas, thanks to the use of sensors and generation of useful data.

### 2.4.5 Assessment of ecological vulnerability to tourism in marine protected areas of the Mediterranean using vessel density data

**Antonio Sánchez Espinosa**, from the European Topic Centre on Spatial Analysis and Synthesis (ETC-UMA), University of Malaga, explained he is part of a research group focused on spatial analysis, information on environment, and conservation. One of the group's activities is studying environmental pressures on the ecosystem, both terrestrial and marine, including the pressure from tourism.

DestiMED PLUS, Interreg MED Programme, is developing ecotourism in Mediterranean protected areas. The project aims to improve the integration between tourism and conservation policies in particular areas of the Mediterranean region. One product is a map on ecological vulnerability in coastal areas. It features spatial data on various tourism pressure indicators, from golf courses coverage to cruise passengers, and moorings per km of coast to the numbers of beds per $km^2$ or number of arrivals, etc.

Using the EMODnet Human Activities Vessel Density Map, one can see the ecological vulnerability based on the time that pleasure craft spend in Marine Protected Areas. Vulnerability was measured as the average monthly time that ships spent in the MPAs. Although not detailed, this analysis gives the project a general overview of Mediterranean areas under the greatest pressure – and suggests ways to reduce environmental pressures from growing tourism there. Further analysis could be carried out by combining EMODnet Vessel Density data with the location and capacity of marinas, on European, regional or local scales.

Data proved essential in assessing the pressures of maritime traffic on cetaceans, in the NW Mediterranean Sea. Key partners for this were ISPRA, the Italian National Institute for Environmental Protection and Research, EMODnet (Vessel Density data), and the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS), for the predicted abundance of fin whales. The International Maritime Organization (IMO) has since designated that sea region as a Particularly Sensitive Sea Area for these animals, in danger of collisions with fast passenger and cargo vessels. These pressures increase in summer, when passenger vessels are most active.

Main shipping routes were classified according to the intensity of traffic, which was used as an indicator of pressure on cetaceans: collisions, noise disturbances, etc. The assessment also relied on historical records of fin whales and vessel collisions, to highlight routes of greatest danger for them.

The presentation concluded with final remarks on EMODnet Vessel Density data. Working with data from AIS (Automatic Identification System) data is very complex, because it's difficult to obtain, manage, and analyse, etc. Although EMODnet Vessel Density data are aggregated, they save ETC-UMA plenty of time and computing effort. Methods presented here are focused on environmental and conservation aspects, but could be used for any other process or service providers in the marine industry or boating sector. Traffic data, and the location of ports and marinas, could be used to identify business opportunities for service providers in the marine industry or service sector.

### 2.5 Breakout session 1: Gathering feedback on existing and emerging marine data needs and requirements to support the coastal tourism sector

Registered participants were pre-assigned a breakout room to ensure diversity of stakeholder profiles and expertise across the three break-out rooms. Breakout sessions then took place on day one and day two, retaining the same group allocations, with each breakout group discussing the same questions in parallel for each session.

In the day one breakout session, the goal was to share experiences about *in situ* data needs and requirements to support the coastal tourism sector. This session also aimed to discover if they use EMODnet data already and feedback on ways to improve the service. 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 discussion points:

1. What marine environmental, human activities, other data do you need for your coastal tourism/related activities, and why?
2. Are these data needs regional (sea-basin) specific?
3. How do you access marine data/data products for your coastal tourism activities? Do you use EMODnet services (online Portal)? If yes, can you indicate which data parameters/data products you use? If not, why not?

4. Are there any marine data/data products (environmental/human activities/other) that you cannot find openly accessible that would help your coastal tourism sector activities?
5. How does the lack of data affect your decisions and operations within the coastal tourism sector?

Stakeholder feedback is summarised in the following points, based on the individual breakout room discussions and key points raised in plenary by the three facilitators, as well as further plenary discussion.

Many participants already use EMODnet data, because these data save them time and computing effort. Some use data on vulnerable seabed habitats, e.g. for enhancing eco-friendly tourism through better anchoring in delicate marine areas. Others use the Vessel Density Map together with EMODnet marine environmental data to look at human impacts.

In all three groups, participants noted they wanted to learn more about EMODnet and its services, notably at pan-European level. Some are working on regional or national coastal tourism projects and many are undertaking data collection, using various environmental sensors, drones and apps. It was noted that coastal tourism stakeholders want to learn how to gather marine data and share them with the EMODnet. Sailors, divers, kayakers, aquafarmers, etc. also need education and ocean literacy on data gathering and interpretation.

**The use of EMODnet**: in addition to the use cases already presented in the plenary, stakeholders noted that they use a wide range of EMODnet data and data products, spanning the marine environment (particularly physical, bathymetrical, geological and seabed habitats data, together with data on human activities at sea). It was underlined that EMODnet's marine data could usefully support eco-tourism. This was the case for one company that does AI-based digital environmental surveys to map marine wildlife and biodiversity. The company was attending this EMODnet workshop to get an overview of EU data, and potentially to start sharing company data with others abroad. An NGO noted it uses EMODnet for reports on implementing MSPs and the blue economy, while another uses EMODnet for regional assessments and reports, e.g. a Compendium for Coast and Sea.

**Citizen Science** was highlighted as an emerging sector where EMODnet could increase its dialogue to increase awareness and use of EMODnet data and data products, e.g. in the planning and implementation of citizen science projects, and via the European Atlas of the Seas for education and ocean literacy. A stakeholder noted that user trust in the EMODnet data/data product offer is very important. One example was given: in order to use citizen science data, there should be very clear quality assurance for the data, e.g. for alien species. EMODnet data and wider information are now used to inform marinas about vulnerable seabeds and potentially to use more ecologically friendly methods than anchoring in a delicate area. EMODnet is working with citizen science initiatives to further standardise this, so that data are collected with a minimum set of metadata and quality control. This is particularly needed as citizen science continues to diversify, e.g. with the use of apps for beach and water monitoring. Data collection and data sharing by citizen scientists were discussed in breakout session 2.

**EMODnet usability**: it was noted that EMODnet is a public service, for users to freely access, visualise and download data and data products via data and web services. Users are recommended to start with the EMODnet Central Map viewer, where you can search across all thematics and parameters. All data/data products come with metadata that describe the data with information on the data collection, data owner and providers, data province, etc. All data products are open access since they are the property of the EU, produced by EMODnet experts. EMODnet data layers include aggregations of data from diverse collectors and providers. In some cases, the underlying data are open source. This means they are not openly accessible, but rather the user can find a full description of the data and the data owner, listed in the metadata, and can then request access. Stakeholders were encouraged to provide feedback on the EMODnet Portal, and to provide recommendations for future upgrades and developments.

It was also noted that the EMODnet offer is continuously evolving and expanding in terms of geographical coverage, resolution and parameters. This includes the land-sea interface and the coastal zone. There are links with the European Blue Economy Observatory, which publishes more socio-economic data. EMODnet is also working in partnership with Copernicus Marine Service to create common data lakes of interoperable data across these two EC marine data services, to serve the European Digital Twin of the Ocean.

Participants were invited to engage with the EMODnet Secretariat, Coordinators and wider experts to develop use cases that could be communicated on the EMODnet Portal, in order to raise visibility about the use and demand from the coastal tourism sector for EMODnet data.

The following **coastal tourism data needs and gaps** were highlighted, including some requirements specific to individual regional sea basins:

**Southern Mediterranean and Black Sea**: there is a general lack of high marine data in these regions, with stakeholders highlighting biological and human activities data in particular. It was noted that EMODnet aims to promote more data sharing in these regions by enhancing dialogue and partnerships with the Regional Sea Conventions, the private sector and NGOs, also in cooperation with IODE and IOC/UNESCO. EMODnet Geology remarked that it is delivering data and maps on coastal vulnerability in 2024 and they include these regions. But this work is time-consuming, as it includes a lot of non-digitised data and maps (legends/information) in multiple languages that require translation. Stakeholders were invited to provide further ideas on how to increase this engagement and data sharing.

**Tourism accommodation hotspots**, with a focus for instance on the number of beds, incoming visitors and the type and location of tourism establishments, e.g. residential and commercial areas. Tourism planners need data on the number of tourists/visitors in a coastal community, especially data broken down by city or municipality, to assess hotspots for tourism. It was noted that EMODnet is looking into obtaining disaggregated datasets from Eurostat, in order to create a map of nights spent by tourists in coastal municipalities. Another useful EC communication tool is the European Atlas of the Seas (EU Atlas), which includes many data from EMODnet, and other sources used for ocean literacy. The EU Atlas does include some aggregated Eurostat data, including some on tourism establishments and wider land-based population data, although it currently lacks a map of the nights spent in hotels on the coast.

**Coastline carrying capacity**, i.e. the number of tourists in specific coastal regions. As coastal tourism has a big impact on coastal ecosystems, it would be useful to have data on the number of tourists accommodated in specific coastal regions. This was highlighted as a difficult topic in the age of mass tourism, but it is key for sustainability and quality tourism. A stakeholder suggested EMODnet could support this by creating a 'tourism pressure index', but it would need to be practical, with transparent indicators. If there is consensus on how to measure such capacity, this index could help Member States and other countries when assessing the current capacity of coastlines. EMODnet experts said that previous stakeholder dialogues had also proposed a 'human pressure index'. However, it was concluded that human pressure is difficult to measure, and EMODnet does not conduct analysis and interpretation of data.

**Information on beach lifeguarding**: if tourist offices are to better inform people about the sea's dangers, it would be helpful to introduce an overview of which beaches in the EU and wider European regional sea-basins have lifeguards, together with time stamps for this information.

**Vessel speed in Vessel Density Maps**: this was considered a critical parameter for organisations assessing and putting in place measures to protect cetaceans, and it could be useful for the wider boating industry, e.g. for boat anchoring. Currently the EMODnet Vessel Density Maps do not include the vessel speed, and EMODnet Human Activities noted it would look into this as such maps would clearly add value for many users.

**Underwater noise**: this was seen as another useful parameter for the coastal tourism sector, especially in Marine Protected Areas, where noise pollution is a growing problem for marine wildlife due to the increase in volume and

density of watersports. EMODnet already includes some passive acoustics data, e.g. by providing underwater noise data from hydrophones, and it was noted that EMODnet is looking for data collection partners to share their data and help increase EMODnet's offer in this area.

**Meteorological and surface ocean (met-ocean) data**: these are very useful for watersports and wider coastal tourism. For example, the data users can assess the weather conditions and the ocean physical environment, e.g. in order to identify and track riptides. It was noted that EMODnet already offers a wide diversity of ocean physics information, some in near real-time. This offer is evolving and higher resolution data are clearly needed to further optimise information for coastal tourism operators.

**The boating sector** would like more data on Marine Protected Areas, including on seabed habitats and wider biodiversity data and mapping. Local regions could integrate eutrophication data, to highlight and mitigate the sector's impact on the sea.

**Seabed habitats** are utilised widely, and more information on vulnerable seabeds – including more historical and seasonal data – could be useful to a range of coastal tourism operators.

**Dredging data** could be useful at national level (EMODnet already offers a pan-European data layer on this parameter).

**Q&A**

When asked about EMODnet's offer for wave and currents data, **Patrick Gorringe**, EMODnet Physics expert explained that the network collects wave and currents data along the coasts of Europe, wherever access is possible. However, this is hard to do, whether in Europe or worldwide. EMODnet Physics is addressing this issue, e.g. with high-frequency radars on coasts. Some wave-related data are also available in other EMODnet thematic areas.

**Kate Larkin**, Head of the EMODnet Secretariat, tackled an audience query about the extent to which users can place their trust in marine data. She noted that EMODnet "sits in the middle of this marine knowledge value chain". It does not collect data itself, but works with the ocean observation and monitoring community, before adding value by standardising the process of harmonising and integrating all these data. EMODnet has protocols for the data and the metadata standards, which are also provided to everyone sharing their data with EMODnet. This is key for the quality assurance of the network's data, as well as the fact that EMODnet also works actively with the ocean observing community and increasingly with citizen science. This has resulted in constantly developing protocols across Europe, plus the streamlining of data collection into EMODnet data services. One such protocol was developed for marine litter for ingestion into EMODnet Chemistry, in partnership with the Regional Seas Conventions on existing protocols for collecting marine litter. Citizen science projects often use this protocol, ensuring that the data gathered are good for ingestion to EMODnet as well as being a standardised protocol that can be trusted. EMODnet users can also double-check metadata that describe how the data were collected. This clear provenance also builds trust.

To a question if EMODnet offers data on traditional water resources, apart from the desalination units, **Alessandro Pititto,** EMODnet Human Activities, responded this is a data gap in the network. He added that water resources data could be useful for the coastal tourism sector. **Sytze Van Heteren**, EMODnet Geology, noted that the network is more focused on water resources on the marine side, but it should aim to add more data on the geological side, e.g. freshwater that emerges under water. However, there is significant data available on EuroGeoSurveys' European Geological Data Infrastructure, with a portal on groundwater resources.

Day 1 was closed by the lead facilitator, noting that day 2 would focus on data sharing.

# 3. Day 2 – 27 September 2023: Benefits of data sharing with EMODnet

## 3.1 Taking stock of key outcomes of Day 1: EMODnet 'offer' and data needs and requirements

Anne Mette, the lead facilitator, welcomed participants to the second half-day of the EMODnet Business workshop on marine data for the coastal tourism sector. She reminded participants of some key highlights from the previous day's workshop (see summary above). She then noted that the session would focus on the benefits of data sharing with EMODnet, with a presentation on the EMODnet Data Ingestion service that supports marine data sharing efforts from the public and private sectors, particularly when there is no established data pipeline already to EMODnet. She encouraged participants to provide examples of data sharing with EMODnet, and also to identify and communicate any challenges and barriers for data sharing by the coastal tourism sector, with recommendations on how EMODnet (the full network and Data Ingestion Service) could better support this process.

For this second day of the workshop, the aim was to communicate and present the benefits of data sharing and EMODnet Data Ingestion service, and to discuss some of the challenges and barriers for data sharing in the coastal tourism sector. There would also be information on how EMODnet Data Ingestion can support this process. Participants would have the opportunity to contribute to the workshop in question-and-answer sessions and breakout discussions.

## 3.2 Win-win data sharing with EMODnet: The EMODnet Data Ingestion Service and EMODnet for Business

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

**Ruth Lagring**, Marine Data Manager at the Royal Institute of Natural Sciences (RBINS), explored the benefits of data sharing through EMODnet Data Ingestion. Firstly, it provides a free and open service to everyone. The main goal is to facilitate data holders, both public and private, to become part of the EU data management network and share their data with EMODnet as open data. EMODnet Data Ingestion interacts with a network of data centres, experts in handling data from specific themes and data types, as well as with all EMODnet thematic experts. Lastly, use is made of EU standards and best practices for making marine data FAIR. External data providers can ingest their data into the EMODnet system via the expert data centres, who elaborate and process the data for publishing in EMODnet.

FAIR data are a set of principles applied to data, so they can be shared in a way that enables others to find, access, interoperate and reuse the data. This enables and enhances the reuse of data by both humans and machines.

EMODnet implements the FAIR principles by making the data discoverable, by assigning persistent identifiers for unique identification and versions management, and then by providing rich descriptive metadata for searching and finding. Secondly, it makes the data available to others, on the internet or by other applications, and it provides access restrictions or conditions that should be clearly specified. The data can be integrated with other data by applying open standards, standardised formats, vocabularies, and using identifiers to link with other data, metadata, and information. Lastly, EMODnet ensures that the data can be reused by others, thanks to clear licences plus provenance or language information on how the data was created.

The EMOD-network consists of 50 data centres all over Europe and specialised marine data centres and EMODnet coordinators covering all EMODnet data themes: together they ensure the high quality of the delivered data and products. A wide range of marine environmental parameters support the EU marine policies (blue economy). Of the data originators, about 60% are in research or academic, followed by governments, private business and NGOs. Regarding submissions by theme, around 40% of the data submitted is related to EMODnet Physics, followed by

EMODnet Chemistry and the other teams involved. EMODnet has received over 1,300 submissions from more than 190 data submitters.

Five successful use cases were cited: Marine Scotland Science has provided numerous data on eutrophication and contaminants; JRC Biomass Mandate has mapped Europe's algae producing industry (spirulina farms) in synergy with EMODnet Human Activities; the Berring Data Collective's data from sensors in fishing nets are processed with EMODnet Physics; there is now an ingestion service for marine litter data from NGOs plus monitoring and research centres; and data are being monitored from wind farms in the Dutch North Sea sector.

Data are submitted online in two phases. Phase I involves the data being submitted to publishing in 'as is' formats. In Phase II, the data that are important for EMODnet and its stakeholders are further elaborated and standardised by the national, European and EMODnet expert data centres for publishing and sharing with the wider community. The ownership of the data is transparent and clear throughout the process.

Everyone was invited to join EMODnet Ingestion and share their data with it, because of these benefits of data sharing:

- More data generate better knowledge of the marine environment and its challenges, higher quality data products, better science-based decisions and better management for healthy oceans: these benefit all marine stakeholders of the blue economy;
- Prevention of duplication of effort on data collection, thus reducing costs for operators and environmental impact;
- Safeguarding of long-term data availability for wider use;
- Proper acknowledgement and increase of citation scores;
- Satisfying funding requirements for open access of data;
- Data becoming FAIR, their accessibility and use are increased, accelerating their analysis by data applications and modern technologies for innovative solutions needed for the blue economy.

Finally, it was noted that EMODnet Data Ingestion is currently undergoing centralisation into the EMODnet Portal, to be completed in 2024. This follows the centralisation of the seven thematics of EMODnet in January 2023.

### 3.2.2 EMODnet for Business, Associated Partnership and stakeholder engagement

**Megan Tijssens**, EMODnet Secretariat, explained how EMODnet connects to the EU blue economy sector through various activities. EMODnet works closely with the marine and maritime industry in Europe and beyond, including private sector representatives, to support their data use, best practices, and data sharing. This is done through the:

- EMODnet Associated Partnership scheme;
- European Commission's Marine Knowledge Expert Group;
- EMODnet for Business workshops, e.g. on aquaculture (2021), offshore renewable energy (2022) and coastal tourism (2023);
- Wider dialogues with the private sector, from companies to European associations and technology platforms, etc. including at industry-led events.

She highlighted the main benefits for the private sector to use and share data with EMODnet include access to high-resolution, harmonised data that can be used without the need for further marine data collection. This saves costs, enables development of new products and services, adds value to a user's own data, and improves knowledge and may reduce risks. More information on the added value of using and sharing EMODnet data is available on the EMODnet Portal and the EMODnet for Business leaflet.

The EMODnet Portal features many use cases and communication resources on different sectors, e.g. business, maritime spatial planning, data ingestion, and thematic areas. Also available is the EMODnet for Society video series and tutorials.

EMODnet's Associated Partnership scheme provides a free, more flexible and transparent way for organisations to join EMODnet and actively participate in its activities. The scheme currently includes 28 members, from SMEs to larger industry. Associated Partners have access to a growing platform of public and private organisations for collaboration for networking, and exploring opportunities, with regular invitations to participate in EMODnet activities like workshops and conferences.

To become an Associated Partner, simply email EMODnet Secretariat an expression of interest (motivation letter) describing your organisation's goals and potential contributions to the network. Each application is sent to the EMODnet Steering Committee for review and approval, with the process generally taking 3-4 weeks maximum. Once approved, an EMODnet Associated Partner is visible on the EMODnet Portal, and has access to stronger dialogue with EMODnet experts and the latest information on EMODnet developments

Finally, participants were invited to attend the EMODnet Open Conference 2023, taking place on 29 to 30 November 2023 in Brussels. This would feature plenary presentations, panels and 'townhall' interactive discussions on EMODnet for the Blue Economy.

## 3.1. Breakout session 2: Data sharing challenges, barriers and opportunities

For the day two breakout sessions, the following questions were discussed:

1. What are the levels of access to data that you collect? Which types of data (parameters) could be shared with EMODnet? What are the barriers for the data that cannot be shared? Are any challenges region-specific?
2. Do you/your organisation already share marine data with EMODnet Data Ingestion?
    - If you do use Data Ingestion, do you have any comments on the experience?
    - If you don't use Data Ingestion, can you comment if this is due to lack of awareness about the Data Ingestion public service? Is it because you don't have any relevant data to share? What could motivate the coastal tourism sector to share data with EMODnet?
3. How could we improve the EMODnet Data Ingestion service?
4. Having joined this EMODnet workshop:
    - How likely are you to share marine data with EMODnet (Data Ingestion) in the future?
    - How likely are you to use the EMODnet Portal in the future for your marine data needs?

As for the first breakout session, participant feedback is summarised below from the individual breakout sessions and the reports back to plenary, including further discussions.

**Data sources**: it was noted that whilst EMODnet collects data from research, the private sector and some government institutes, the network could investigate other sources of data, e.g. from coastal tourism municipalities. Several participants said their organisations do not yet collect marine data. Participants were encouraged to explore where they were already, or could, collect marine environmental or human activities data and share these with EMODnet. It was noted that although the tourism industry contributes significantly Europe's GDP, too few data are collected on coastal tourism, and relevant actors in this sector are often difficult to reach.

A participant from a tourist office has Eurostat national statistics on arrivals and overnight stays for each coastal municipality. They recommended that such data could also be gathered locally and these should be made public similar data. The same applies to human activity data for all European coasts. An example was given that during the Covid pandemic, a tourist office launched a system that uses mobile telecoms data to detect visitor hotspots, good granular

data for some 57 to 59 areas in the system. But the office was unsure how to ingest this data into the EMODnet system. The other participant, a civil servant, said their city authority would like to use marine data for tourism, as well as climate change adaptation planning.

**Citizen Science**: people have voluntarily collected data for decades, and this is increasing. EMODnet sees 'citizen science' as a useful way to fill data gaps and to boost tourism's sustainability. Environment and human health data can be collected during watersports. An example was given from the U.S., where citizen scientists eager to protect coastal waters attach 'Smartfins' to their surfboard. These include ocean physics sensors, to gather and share data on the user's location and motion, plus wave size/shape and water temperature. It was noted that the 360-degree videos of diving routes, now used to promote scuba diving – together with citizen science initiatives where scuba divers also collect environmental data during a dive – could provide useful data for EMODnet, and for the European Atlas of the Seas, for educational purposes and ocean literacy. More could be done to harness the public's enthusiasm to participate in gathering data. Participants also want to see where they can observe their contribution to data collection. They and data users must be trained for citizen science, possibly to different levels. EMODnet can give a platform to citizen data and see the wider significance of the data provided.

**Data sharing**: participants noted that very few of them are collecting marine environmental data at this point in time, although some do gather human activities data, e.g. visitor numbers or hotel stays. Encouragingly, many breakout group participants said they are starting to collect marine data and want to share it with EMODnet. An NGO which encourages boating companies to develop biodiversity protection programmes and to assess their impact on the sea, pledged to discuss this EMODnet coastal tourism workshop at its next meeting. An Italian network of start-ups, SMEs, small harbour authorities, academia, etc. noted it plans to collect data soon from recreational boating activities and wants to tell colleagues about EMODnet. Recreational boating operators and coastal hotels should be encouraged to collect and share data on their environmental impact, e.g. pollution at sea. It was suggested that if large companies engage in data sharing, smaller ones will emulate them.

Participants who do not yet share data with EMODnet said they were keen to learn how the network operates and possibly to cooperate with it in future. Many people are willing to share their data, but don't know how or where to do that. A city representative said local data are available about safeguarded beaches. But should cities be responsible for contacting municipal tourism actors and motivating them to share such data? If so, how? EMODnet could look into developing a more organised campaign with local operators to access local data and data sharing opportunities, in order to fill in gaps.

**Barriers to data sharing**: various challenges were cited by participants, including:

- Tourism is a localised business, making it harder to collect the necessary high-resolution, standardised and harmonised data.
- Region-specific barriers: EMODnet confirmed that the technical process of submitting data online is really easy. But there may be region-specific challenges, e.g. poor WIFI coverage hampers data sharing.
- Lack of information on the benefits of data sharing: a local municipality noted it is unaware why it should share data and how it could use EMODnet data in policy decisions, but this could be solved by providing more information on good use cases and win-win benefits of data sharing.
- Capacity building and training: a few participants from the tourism sector were willing to collect and share their data if they had guidance, examples, and possibly industry-tailored training on how to do so.
- Restrictions in open data: some parameters, like geological and bathymetric data, can be commercially valuable, or could be seen as a security risk, e.g. seabed sediments data related to seafloor infrastructure, so companies may keep them private.
- Commercial sensitivity: as noted in previous EMODnet for Business workshops on other topics, ownership and commercial value of data for the coastal tourism sector can deter some people from sharing data. EMODnet

could highlight the options for data sharing, e.g. as open source (not full open access) and the value of sharing this data after a project is over.

**Q&A**

Breakout group moderator **Jan-Claas Dajka** commented that none of the participants collect marine data per se, but they do collect human data on arrivals and stays. They wanted to know about the barriers to gathering marine data, and where to find examples of doing so at the municipality level. What data are useful? **Megan Tijssens**, EMODnet Secretariat, replied that EMODnet has a use case database with many examples of what data have been shared and/or used.

One participant also asked about a planned project for collecting data on surfing and health benefits, etc., in terms of what aspects of these projects could be shared and what would be useful for EMODnet. **Patrick Gorringe**, EMODnet Physics, replied that EMODnet Physics is mostly interested in physical parameters, but the network is certainly interested in other kinds of data that are currently not in EMODnet. If the network wants to collect such data from municipalities, it must consider the best way to contact governmental institutes, private companies, etc. at that level.

**Alessandro Pititto**, EMODnet Human Activities, said that EMODnet does not have a 'tourism' data theme, but it does have several datasets that are directly or indirectly related to tourism. Although the network is constrained by its contract with the Commission, it is an evolving framework. As its tourism-related portfolio of data is getting bigger, it may well consider creating a specific sub-theme on tourism. EMODnet is also working on making available a new dataset on nights spent by tourists in coastal areas. Eurostat has data, but it is aggregated at the Member State level. After yesterday's workshop session, EMODnet followed this up with Eurostat and officially requested access to data on the number of nights spent by tourists in coastal areas, but disaggregated at the level of municipalities. If EMODnet is granted access to the disaggregated data, it should be relatively easy to create and make available these new datasets. This would be of great value, because they are really granular.

EMODnet is developing closer dialogues with citizen science, said **Angelika Karampourouni**, EMODnet Communication and Partnership Relations Officer. This includes more awareness raising on protocols to collect and share data with EMODnet, with quality assurance. New and emerging contributions, together with diverse data, will be discussed at the EMODnet Open Conference on 29 to 30 November 2023. The network wants to create a harmonised way of reaching out to individuals or SMEs doing citizen science and collecting data locally.

In response to a question on why some EU countries are more used to data sharing, EMODnet Physics Coordinator **Patrick Gorringe** said this is typically due to certain countries or institutes having connections to military or national meteorological institutes, which collect data that flows through the military. This complicates governmental decisions over whether or not to share such data.

A participant wondered whether EMODnet will include data at ecosystem level, e.g. for water, soil, or population at local levels. An EMODnet representative replied that this could very useful, as the network becomes more open to developing tourism data and because of its work on the Digital Twin of the Ocean.

## 3.4 Closing words from EMODnet and DG MARE

On behalf of the EMODnet Secretariat, **Megan Tijssens** thanked all the participants and organisers for their active and concrete contributions to this EMODnet for Business workshop on coastal tourism. A thank you was also given to the EMODnet experts for demonstrating the EMODnet service offer and answering questions, as well as DG MARE and MCI for supporting marine knowledge services and activities and for funding this workshop.

It became clear during the event that coastal tourism is an important and growing sector, one where marine data and knowledge have huge potential but in which certain data gaps and needs must still be addressed. EMODnet could be

a key data service for the *in situ* data needs, whether for marine environmental data or human activities data, or a combination of both.

There are many ways for the private and public sector to get involved in EMODnet, including the Associated Partnership scheme. Anyone interested in doing so should contact the Secretariat and subscribe to the free monthly newsletter. EMODnet is also keen to hear concrete examples of the use of EMODnet and how the network can enhance your organisation's visibility on the EMODnet Portal. EMODnet Data Ingestion services can provide guidance on providing data to the network. EMODnet is constantly evolving to meet user needs and welcomes suggestions on how to improve EMODnet services, through a website feedback form.

**Rémy Denos**, Deputy Head of Unit, DG MARE Unit A1, noted that this EMODnet for Business workshop was organised because coastal tourism is probably the blue economy's most important sector, especially for Mediterranean countries like Spain, France, Portugal, Greece, and Italy. However, the sector's use cases highlight many challenges, e.g. Marine Protected Areas and fisheries, and various environmental concerns. These challenges must be addressed, because coastal tourism offers further huge economic potential. It exerts strong pressure on coastal zones and is politically important, hence the need to combine this economic activity with a green transition.

EMODnet offers many different types of information, e.g. the Vessel Density Map, which can guide coastal tourism planners. Its partner Copernicus Marine Service provides other types of data that also essential for the coastal zone, derived from satellites, modelling, etc. However, the workshop underlined to DG MARE that some marine data are missing, and more details and socioeconomic data applicable to tourism should be added. Vessel Density Maps and data products should include vessel speed. Participants also called for a capacity index or pressure index, currently beyond EMODnet's mandate, and data on underwater noise – something EMODnet is now working on. The Mediterranean Sea basin still lacks data to support coastal tourism, notably because of the presence of more than 20 non-EU countries.

Rémy emphasised the importance of sharing marine data, which can positively influence evidence-based policy for the marine environment. He also encouraged participants to make every effort to share their data with EMODnet, to capitalise on the investment costs of gathering data and to create new economic opportunities. After more than 10 years of collection and giving access to data, EMODnet's datasets have become more and more complete. This underpins increasing use of the data for applications and for tourism. He noted that EMODnet works proactively to find ways to fill today's data gaps and welcomes suggestions on that topic or any others of relevance.

The meeting was closed.