SAFE WAVE

STREAMLIING THE ASSESSMENT OF ENVIRONMENTAL EFFECTS OF WAVE ENERGY

# DELIVERABLE 4.3
# List of new data in MARENDATA

This Project is co-funded by the European Climate, Infrastructure and Environment Executive Agency (CINEA)

**WP 4**

Deliverable 4.3 List of new data in MARENDATA

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**SUBMISSION DATE**

30| October | 2024

**DISSEMINATION LEVEL**

| | | |
|---|---|---|
| **PU** | Public | X |
| **CL** | Classified – EU classified (EU-CONF, EU-RESTR, EU-SEC) under Commission Decision No 2015/444 | |
| **CO** | Confidential, only for members of the consortium (including Commission Services) | |

**DOCUMENT HISTORY**

| Issue Date | Version | Changes Made / Reason for this Issue |
|---|---|---|
| 29/10/2024 | 1.0 | Initial Version |
| 30/10/2024 | 1.0 | Revised final version |

**CITATION**

Leitão, J.C., Santos H., Cardoso S., Pereira R. 2024. Deliverable 4.3 Data sharing platform: Prepare and upload data. Corporate deliverable of the SafeWAVE Project co-funded by the European Climate, Infrastructure and Environment Executive Agency (CINEA), Call for Proposals EMFF-2019-1.2.1.1 - Environmental monitoring of ocean energy devices. 15 pp. DOI: http://dx.doi.org/10.13140/RG.2.2.17314.34247



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# SAFE WAVE project synopsis

The European Atlantic Ocean offers a high potential for marine renewable energy (MRE), which is targeted to be at least 32% of the EU's gross final consumption by 2030 (European Commission, 2020). The European Commission is supporting the development of the ocean energy sector through an array of activities and policies: the Green Deal, the Energy Union, the Strategic Energy Technology Plan (SET-Plan) and the Sustainable Blue Economy Strategy. As part of the Green Deal, the Commission adopted the EU Offshore Renewable Energy Strategy (European Commission, 2020) which estimates to have an installed capacity of at least 60 GW of offshore wind and at least 1 GW of ocean energy by 2030, reaching 300 GW and 40 GW of installed capacity, respectively, moving the EU towards climate neutrality by 2050.

Another important policy initiative is the REPowerEU plan (European Commission, 2022) which the European Commission launched in response to Russia's invasion of Ukraine. REPowerEU plan aims to reduce the European dependence amongst Member States on Russian energy sources, substituting fossil fuels by accelerating Europe's clean energy transition to a more resilient energy system and a true Energy Union. In this context, higher renewable energy targets and additional investment, as well as introducing mechanisms to shorten and simplify the consenting processes (i.e., 'go-to' areas or suitable areas designated by a Member State for renewable energy production) will enable the EU to fully meet the REPowerEU objectives.

The nascent status of the Marine Renewable Energy (MRE) sector and Wave Energy (WE) in particular, yields many unknowns about its potential environmental pressures and impacts, some of them still far from being completely understood. Wave Energy Converters' (WECs) operation in the marine environment is still perceived by regulators and stakeholders as a risky activity, particularly for some groups of species and habitats.

The complexity of MRE licensing processes is also indicated as one of the main barriers to the sector development. The lack of clarity of procedures

(arising from the lack of specific laws for this type of projects), the varied number of authorities to be consulted and the early stage of Marine Spatial Planning (MSP) implementation are examples of the issues identified to delay projects' permitting.

Finally, there is also a need to provide more information on the sector not only to regulators, developers and other stakeholders but also to the general public. Information should be provided focusing on the ocean energy sector technical aspects, effects on the marine environment, role on local and regional socio-economic aspects and effects in a global scale as a sector producing clean energy and thus having a role in contributing to decarbonise human activities. Only with an informed society would be possible to carry out fruitful public debates on MRE implementation at the local level.

These non-technological barriers that could hinder the future development of WE in EU, are being addressed by the WESE project funded by European Maritime and Fisheries Fund (EMFF) in 2018. The present project builds on the results of the WESE project and aims to move forward through the following specific objectives:

1. Development of an **Environmental Research Demonstration Strategy** based on the collection, processing, modelling, analysis and sharing of environmental data collected in WE sites from different European countries where WECs are currently operating (Mutriku power plant and BIMEP in Spain, Aguçadoura in Portugal and SEMREV in France); the SafeWAVE project aims to enhance the understanding of the negative, positive and negligible effects of WE projects. The SafeWAVE project will continue previous work, carried out under the WESE project, to increase the knowledge on priority research areas, enlarging the analysis to other types of sites, technologies and countries. This will increase information robustness to better inform decision-makers and managers on real environmental risks, broad the engagement with relevant stakeholders, related sectors and the public at large and reduce environmental uncertainties in consenting of WE deployments across Europe.

2. Development of a **Consenting and Planning Strategy** through providing guidance to ocean energy developers and to public authorities tasked with consenting and licensing of WE projects in France and Ireland; this strategy will build on country-specific licensing guidance and on the application of the MSP decision support tools (i.e. WEC-ERA[1] by Galparsoro et al., 2021[2] and VAPEM[3] tools) developed for Spain and Portugal in the framework of the WESE project; the results will complete guidance to ocean energy developers and public authorities for most of the EU countries in the Atlantic Arch.
3. Development of a **Public Education and Engagement Strategy** to work collaboratively with coastal communities in France, Ireland, Portugal and Spain, to co-develop and demonstrate a framework for education and public engagement (EPE) of MRE enhancing ocean literacy and improving the quality of public debates.

[1] https://aztidata.es/wec-era/;
[2] Galparsoro, I., M. Korta, I. Subirana, Á. Borja, I. Menchaca, O. Solaun, I. Muxika, G. Iglesias, J. Bald, 2021. A new framework and tool for ecological risk assessment of wave energy converters projects. Renewable and Sustainable Energy Reviews, 151: 111539
[3] https://aztidata.es/vapem/

# Executive summary

All monitoring and modelling data selected and collected in the project must be properly structured for effective dissemination. To this end, it is necessary to establish data structuring rules based on previous project experiences and adapted to current needs. To maximize accessibility, as much primary (raw) data as possible will be made freely available on the platform, within the constraints of size, format, and other limitations. In addition to primary data, secondary data produced by project partners—representing expert analyses of monitoring and modelling data—will broaden user reach and enhance data utility.

The present document lists the data entered on the platform https://MARENDATA.EU up to the date of this document, in the context of the SafeWAVE project.

# 1. MARENDATA Data Platform

The first data for https://MARENDATA.EU (MARENDATA) were collected during the SOWFIA project[4], which ended in 2013. Initially called the SOWFIA Data Management Platform (Leitão et al., 2013 and Magagna et al., 2012), it was later funded by the WESE and SeaWAVE projects, with MARENDATA being chosen as the new name after a poll among partners. The platform now includes data from the SafeWAVE project. It integrates data from Spanish, Portuguese, and Scottish coastal waters, representing various marine environments affected by wave energy projects.

## 1.1 Present context

Data collection around wave energy devices aims to increase knowledge about environmental impacts, including risks to marine animals from sound, changes in physical systems, effects of electromagnetic fields (EMF), seafloor integrity, and the "reef effect." Data was structured for dissemination and integration with other platforms. The platform organizes primary raw data, validated metadata, secondary data, and numerical results from wave models, ensuring the data is findable, accessible, interoperable, and reusable according to EMODnet and Columbus project recommendations.

## 1.2 Framework

MARENDATA's vision is to provide the renewable energy industry with complex environmental information via an open platform that aggregates raw and secondary data. Its mission is to establish an IT platform that links with data repositories, enable access to raw and secondary data, disseminate expert-reviewed data, ensure sustainability despite project funding constraints, and reach a broad audience in the industry.

[4] Further information on this project can be seen at https://ec.europa.eu/energy/intelligent/projects/en/projects/sowfia and https://www.plymouth.ac.uk/research/coast-engineering-research-group/sowfia-project

# 2. Data in MARENDATA Platform

In the Safewave project, new data sources in various formats were incorporated into the MARENDATA Platform, at the BIMEP, SEMREV, and Aguçadora test sites. The presentation of this data on the platform varies depending on the file format.

## 2.1 BIMEP test site

BiMEP provides an open-sea environment for testing wave and offshore wind energy devices under real operating conditions. The data sources collected in this project for this test site and available in MARENDATA Platform include acoustics, bathymetry, and benthic data (Table 1).

**Table 1.** BiMEP data sources imported to MARENDATA Platform.

| | |
|---|---|
| **ACOUSTICS** | |
| **Fixed Hydrophones** | Hydrophone 1 (23-11-2021) |
| | Hydrophone 3 (23-11-2021) |
| | Hydrophone 1 (04-12-2021) |
| | Hydrophone 3 (04-12-2021) |
| | Hydrophone 1 (26-11-2021) |
| | Hydrophone 3 (26-11-2021) |
| **BATHYMETRY** | |
| **Side-scan Sonar** | SSS - BIMEP CW1 |
| | SSS - BIMEP CW2 |
| | SSS - BIMEP CW3 |
| | SSS - BIMEP CW4 |
| | SSS - BIMEP CW5 |
| | SSS - BIMEP CW6 |
| **BENTHOS** | |
| **Video Transects/ROV** | Penguin cable and SPL |
| | Penguin CW1 mooring |
| | Penguin CW2 mooring |
| | Penguin CW3 mooring |
| | Penguin CW4 mooring |
| | Penguin CW5 mooring |
| | Penguin CW6 mooring |

To access this dataset, open the platform marendata.eu and log in to view these information sources. The search bar can be used for a more effective search (Figure 1).

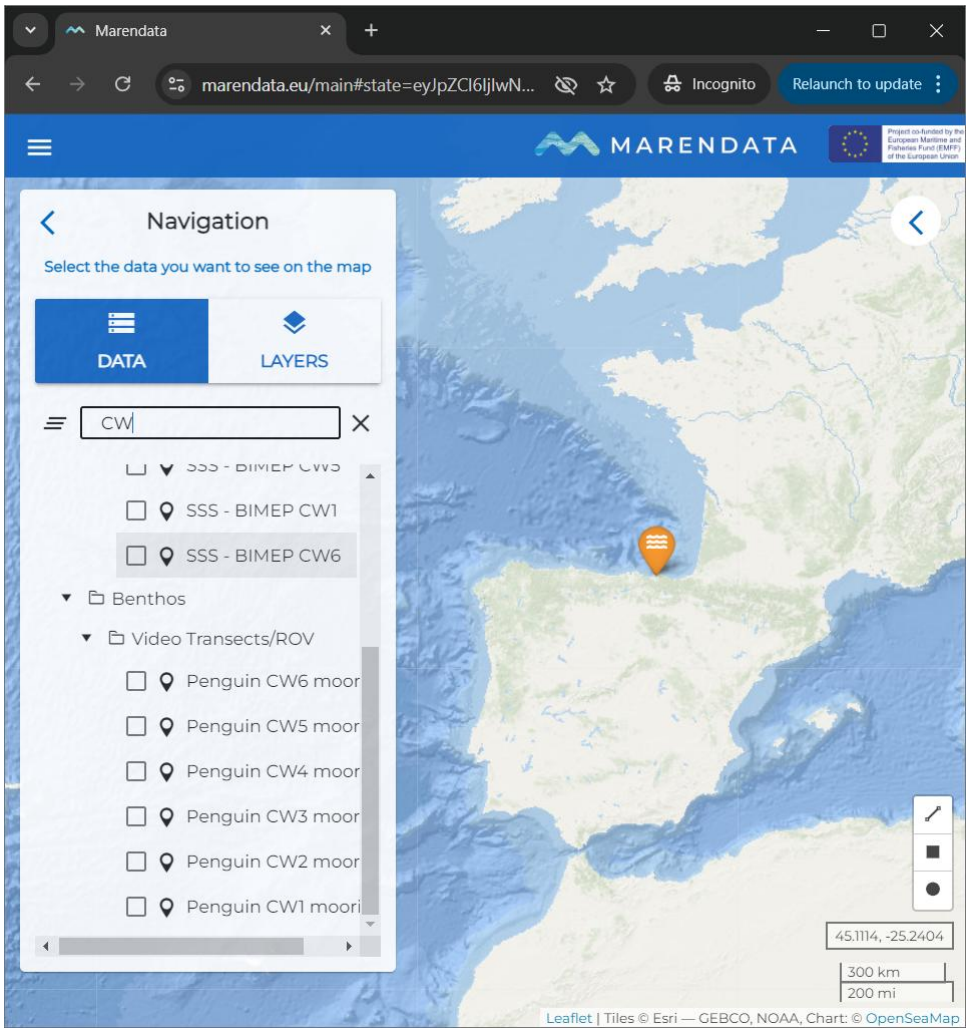


**Figure 1.** BiMEP Data sources in MARENDATA Platform.

## 2.2 SEM-REV test site

SEM-REV is a marine energy test site located off the coast of Le Croisic, France. It serves as a multidisciplinary open-sea platform for testing and validating wave energy converters and other marine renewable energy technologies under real environmental conditions. The data sources collected for this test site in this project and available on the MARENDATA Platform include acoustics data (fixed hydrophones), present in Table 2 and Figure 2.

**Table 2.** SEM-REV data sources imported to MARENDATA Platform.

| ACOUSTICS | |
|---|---|
| **Fixed Hydrophones** | Hydrophone 2 (16-08-2021) |
| | Hydrophone 3 (16-08-2021) |
| | Hydrophone 2 (17-08-2021) |
| | Hydrophone 3 (17-08-2021) |
| | Audio of removals of anchors under the SEMREV test site (14-05-2023) |
| | Audio with acoustic data coming from the installation of anchors in SEMREV test site (18-05-2023) |
| | Acoustic data of the connection of the WEC at SEMREV test site (21-05-2023) |

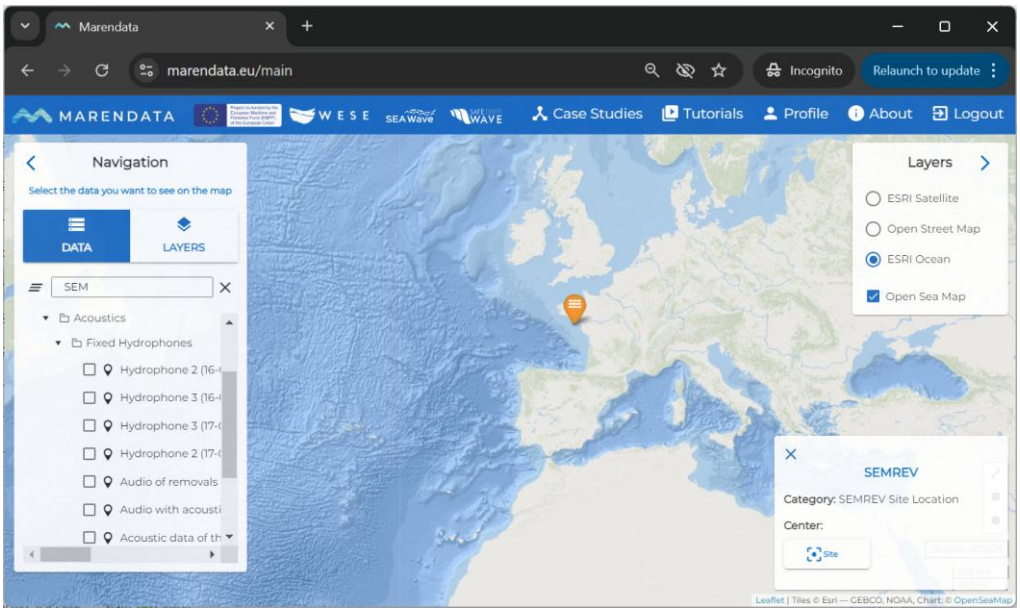


**Figure 2.** SEM-REV Data sources in MARENDATA Platform.

## 2.3 Aguçadoura test site

The Aguçadoura test site is located off the northern coast of Portugal and is one of Europe's pioneering facilities for testing wave energy technologies in open-sea conditions. The data sources collected for this test site in this project and available on the MARENDATA Platform include acoustic data (fixed hydrophones) and electromagnetic field data (Table 3 and Figure 3).

**Table 3.** Aguçadoura data sources imported to MARENDATA Platform

| | |
|---|---|
| **ACOUSTICS** | |
| **Fixed Hydrophones** | OFF status acoustic data coming from Aguçadoura (01-10-2023) |
| | ON status acoustic data from Aguçadoura (28-09-2023) |
| **ELECTROMAGNETIC FIELD** | |
| | Electromagnetic fields modelling in Aguçadoura |

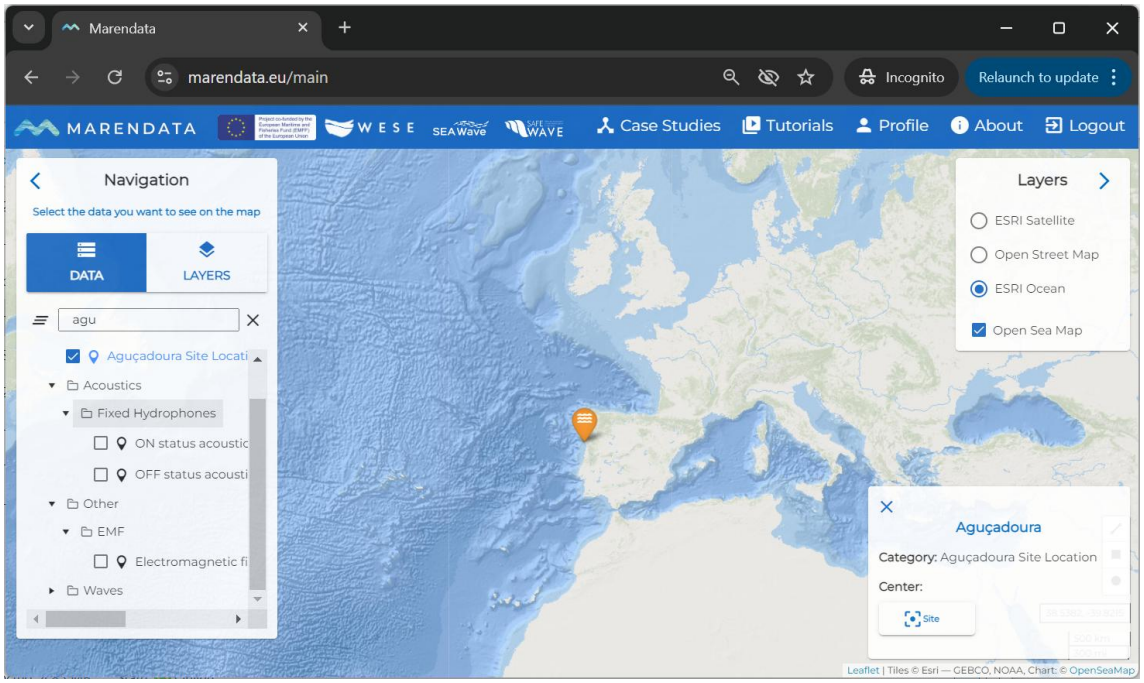


**Figure 3.** Aguçadoura Data sources in MARENDATA Platform.

# 3. Modelling data

The modelled data are described and presented in the project deliverables. Due to the need to contextualize and describe the model, as well as its configurations, implementations, and validations, this data requires support for proper presentation. Therefore, deliverables are the privileged way to access modelling outputs.

This information is accessible by clicking on the SafeWAVE project logo (Figure 4). This links to SafeWAVE web page where deliverables are stored. After the project end, pdf files of the deliverables will be migrated to MARENDATA, similarly to what was done for the remaining three projects (WESE, SeaWAVE and SOWFIA).


**Figure 4.** Access to SafeWAVE Deliverables

# 4. ERA5[5] data source

ERA5 data is periodically updated on the MARENDATA platform (Figure 5). This update is carried out to make the data available in reports, which can be generated for any location worldwide, as well as to display them in layer overlays. An example can be seen in Figure 6.

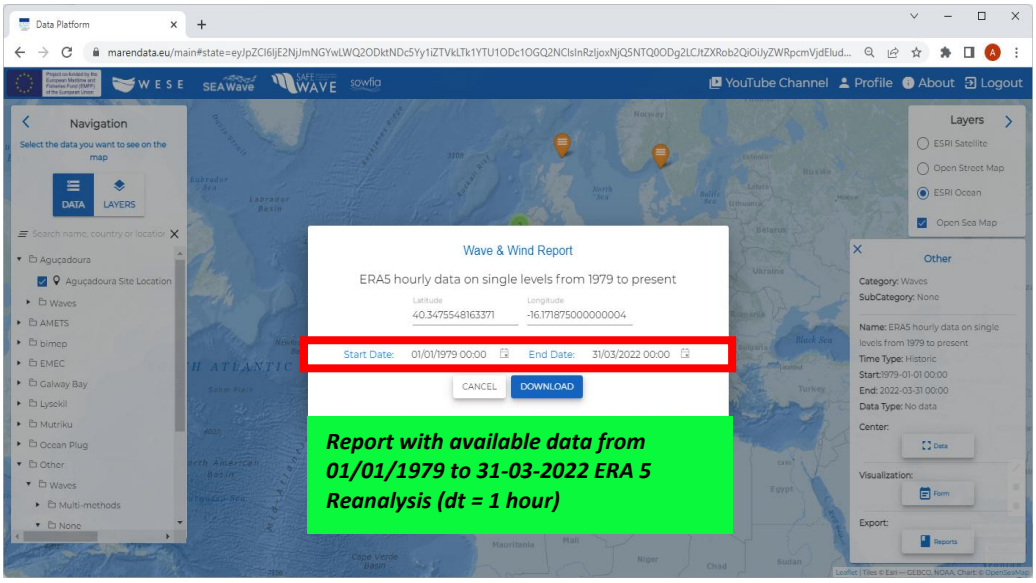


**Figure 5.** Wave and wind report using ERA5 hourly data

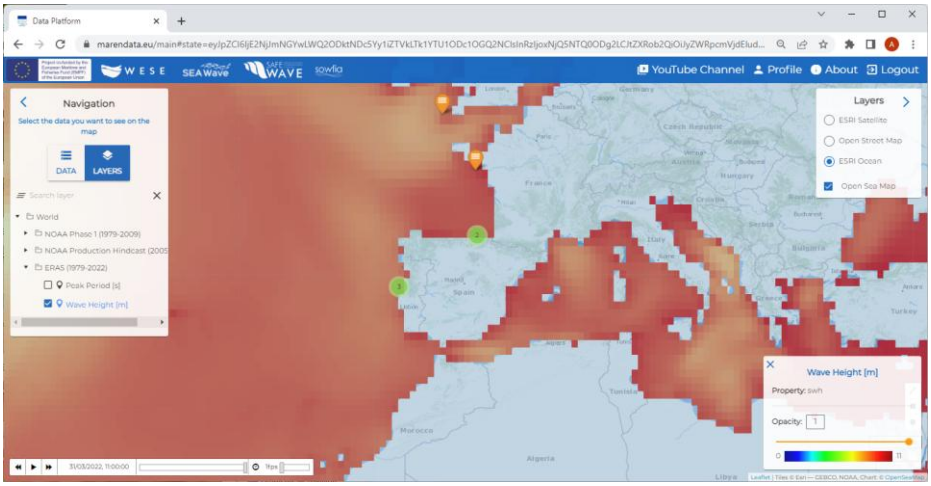

**Figure 6.** Significant wave height layer from ERA5 hourly data

[5] ERA5 is the fifth generation European Centre for Medium-Range Weather Forecasts (ECMWF) atmospheric reanalysis of the global climate covering the period from January 1940 to present. ERA5 is produced by the Copernicus Climate Change Service (C3S) at ECMWF: https://www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5

# 5. References

Leitão, J.C., Aires, E., Magagna, D., Conley, D., Greaves, D., Simas, T., Witt, M., Embling, C., Godley, B.J., Saulnier, J.B., O'Hagan, A.M., O'Callaghan, J., Holmes, B., Sundberg, J., Torre-Enciso, Y., 2013, Data Management Platform for wave energy tests centres within the SOWFIA Project, Proc. of EWTEC 2013, Aalborg, Denmark.

Magagna, D., Greaves, D., Conley, D., Leitão, J.C., Aires, Embling, C., E., Godley, B.J., Witt, M., Simas, T., Saulnier, J.B., Mouslim, H., O'Callaghan, J., O'Hagan, A.M., Holmes, B., Torre-Enciso, Y., Sundberg, J., 2012, Development of a Data Management Platform for the integration of European Wave Energy Impact Assessment datasets, Proc. of ICOE 2012, Dublin, Ireland.