WESE

WAVE ENERGY
IN SOUTHERN EUROPE

DELIVERABLE 6.5

Data Services

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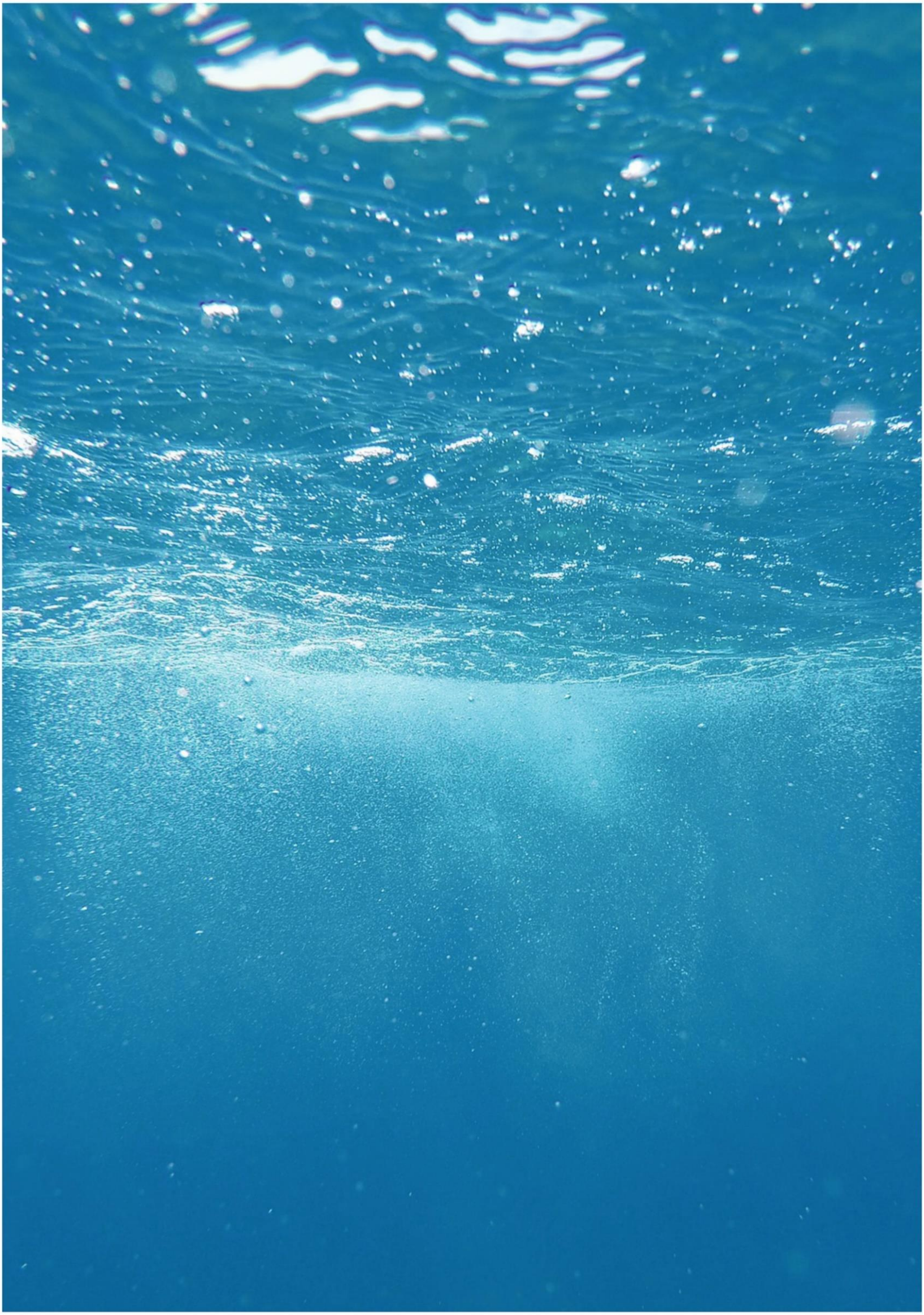

WP 6

Deliverable 6.5 Data Services

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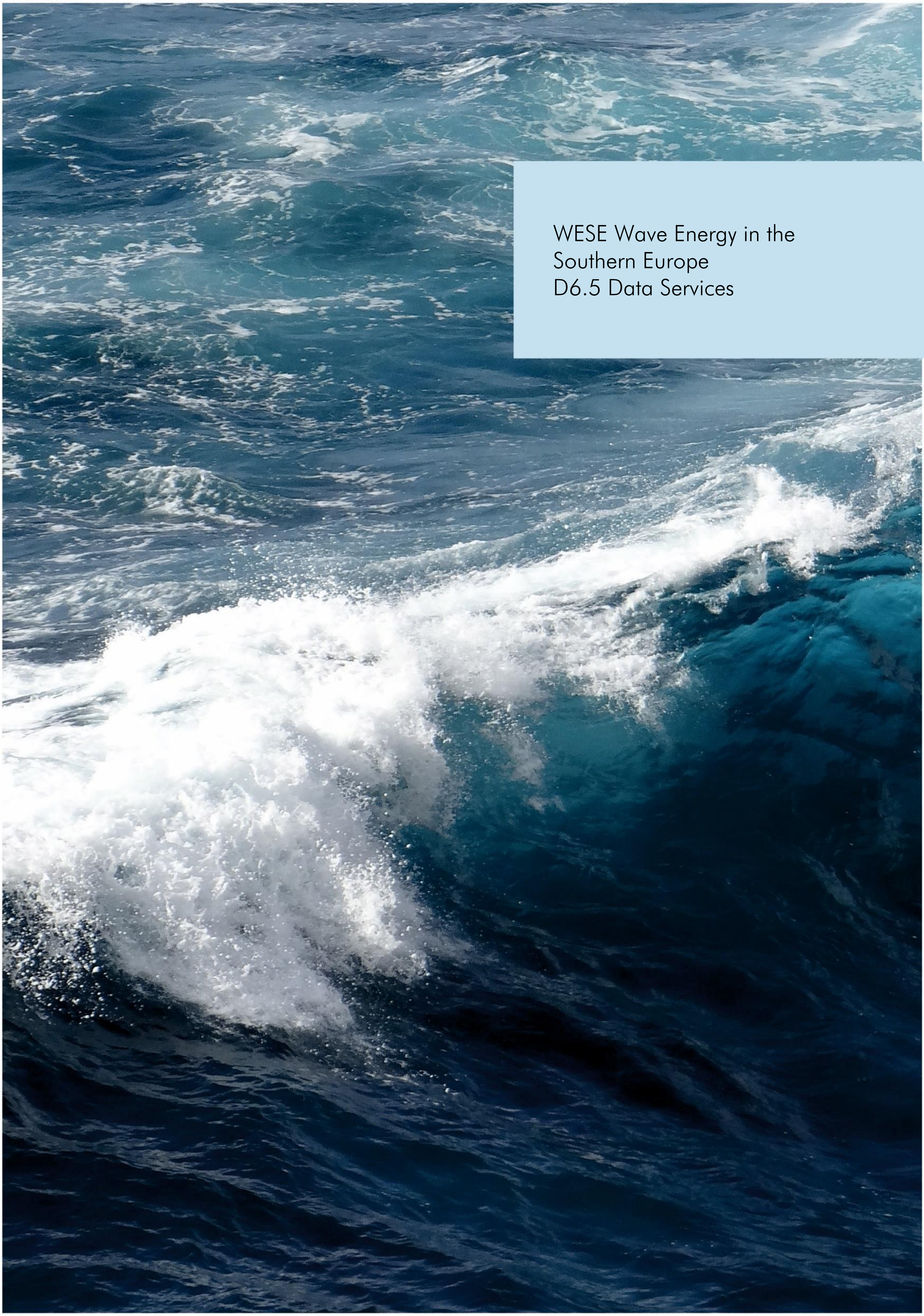

WESE Wave Energy in the Southern Europe
D6.5 Data Services

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1. WESE project synopsis

The Atlantic seaboard offers a vast marine renewable energy (MRE) resource which is still far from being exploited. These resources include offshore wind, wave and tidal. This industrial activity holds considerable potential for enhancing the diversity of energy sources, reducing greenhouse gas emissions and stimulating and diversifying the economies of coastal communities. Therefore, the ocean energy development is one of the main pillars of the EU Blue Growth strategy. While the technological development of devices is growing fast, their potential environmental effects are not well-known. In a new industry like MRE, and Wave Energy (WE) in particular, there may be interactions between devices and marine organisms or habitats that regulators or stakeholders perceive as risky. In many instances, this perception of risk is due to the high degree of uncertainty that results from a paucity of data collected in the ocean. However, the possibility of real risk to marine organisms or habitats cannot be ignored; the lack of data continues to confound our ability to differentiate between real and perceived risks. Due to the present and future demand for marine resources and space, human activities in the marine environment are expected to increase, which will produce higher pressures on marine ecosystems; as well as competition and conflicts among marine users. This context still continues to present challenges to permitting/consenting of commercial-scale development. Time-consuming procedures linked to uncertainty about project environmental impacts, the need to consult with numerous stakeholders and potential conflicts with other marine users appear to be the main obstacles to consenting WE projects. These are considered as non-technological barriers that could hinder the future development of WE in EU and Spain and Portugal in particular where, for instance, consenting approaches remain fragmented and sequential. Consequently, and in accordance with the Ocean Energy Strategic Roadmap published in November 2016[1], the main aim of the project consists on overcoming these non-technological barriers through the following specific objectives:

- Development of environmental monitoring around wave energy converters (WECs) operating at sea, to analyse, share and improve the knowledge of the positive and negative environmental pressures and impacts of these technologies and consequently a better knowledge of real risks;

[1] Ocean Energy Forum (2016). Ocean Energy Strategic Roadmap 2016, building ocean energy for Europe.

- The resulting data collection will be used to apply and improve existing modelling tools and contribute to the overall understanding of potential cumulative pressures and impacts of larger scale, and future wave energy deployments;

- Development of efficient guidance for planning and consenting procedures in Spain and Portugal for WE projects, to better inform decision-makers and managers on environmental real risks and reduce environmental consenting uncertainty of ocean WE introducing the Risk Based Approach suggested by the RiCORE, a Horizon 2020 project, which underline the difficulties for developers with an existing fragmented and sequential consenting approaches in these countries;

- Development and implementation of innovative maritime spatial planning (MSP) Decision Support Tools (DSTs) for Portugal and Spain for site selection of WE projects. The final objective of such tools will be the identification and selection of suitable areas for WE development, as well as to support decision makers and developers during the licensing process. These DSTs will consider previous findings (both environmental and legal, found in RiCORE) and the new knowledge acquired in WESE in order to support the development of the risk-based approach mentioned in iii;

- Development of a Data Sharing Platform that will serve data providers, developers and regulators. This includes the partners of the project. WESE Data Platform will be made of a number of ICT services in order to have: (i) a single web access point to relevant data (either produced within the project or by others); (ii) Generation of OGC compliant requests to access data via command line (advanced users); (iii) a dedicated cloud server to store frequently used data or data that may not fit in existing Data Portals; (iv) synchronized biological data and environmental parameters in order to feed models automatically.

2. Executive summary

MARENDATA (or WESE's Data Platform) is made of a number of ICT services in order to have:

- A single Web access point to relevant data (either produced within the project or by others);
- Generation of requests to access data via command line (advanced users);
- A dedicated cloud server to store frequently used data or data that may not fit in existing Data Portals;
- Synchronized collected data and modelled environmental parameters in order to feed EIA methodologies.

The single access point was developed according to methodologies presented in D6.4 – Design of the Data Platform. In order to reach advanced users, a functionality of data access via command line requests will be developed.

A dedicated server was implemented, based on Hidromod's AQUASAFE software. Data made available during the SOWFIA project is already available and WESE's data will be available during the timeline of the project. With this solution it is possible to synchronize biological data with environmental parameters and feed pressure and impacts assessment methodologies automatically. The server is hosted in the cloud and is accessible via Web services.

3. Single Web access point

MARENDATA platform is the single Web access point to relevant data (**Figure 1**). It was developed according to methodologies presented in D6.4 – Design of the Data Platform, and is described in detail in D6.6 – Data Platform.

Data made available during the SOWFIA project are already available there and WESE's data will be added during the timeline of the project. There are already new WESE's datasets available on the platform.

The MARENDATA platform is where project generated primary raw data is organized along with validated metadata information and secondary data (post-processed primary data).

In addition, numerical results from wave hindcast models are also included in the platform as well as secondary data which follows the technical specifications for wave energy resource assessment provided by the International Electrotechnical Commission.

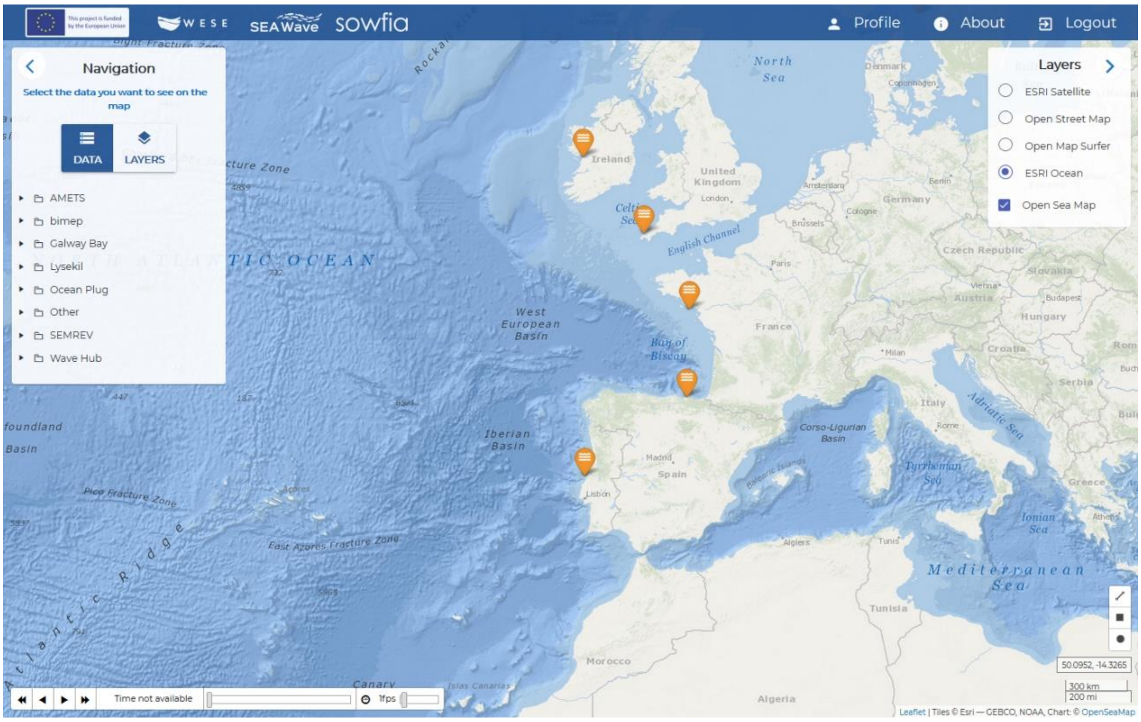

Figure 1. MARENDATA platform.

4. Generation of command line requests

In order to serve advanced users, an interface for generation of requests to access data via command line will be developed during the second year of the project.

Access to the platform data will be allowed using a personal token through an API. Users will be able to save their tokens while being logged into the platform for future authentication with the API.

5. Dedicated cloud server

A dedicated server was implemented, based on Hidromod's AQUASAFE software. The server is hosted in the cloud and is accessible via Web services.

It is possible to add new data to the server by uploading via FTP client, along with importing its INSPIRE-compliant metadata directly to the server via GeoNetwork application installed on the server. GeoNetwork is an open-source catalogue application for managing spatially referenced resources. It allows to upload an INSPIRE-compliant XML file or to create a new metadata file and validate it (**Figure 2**).

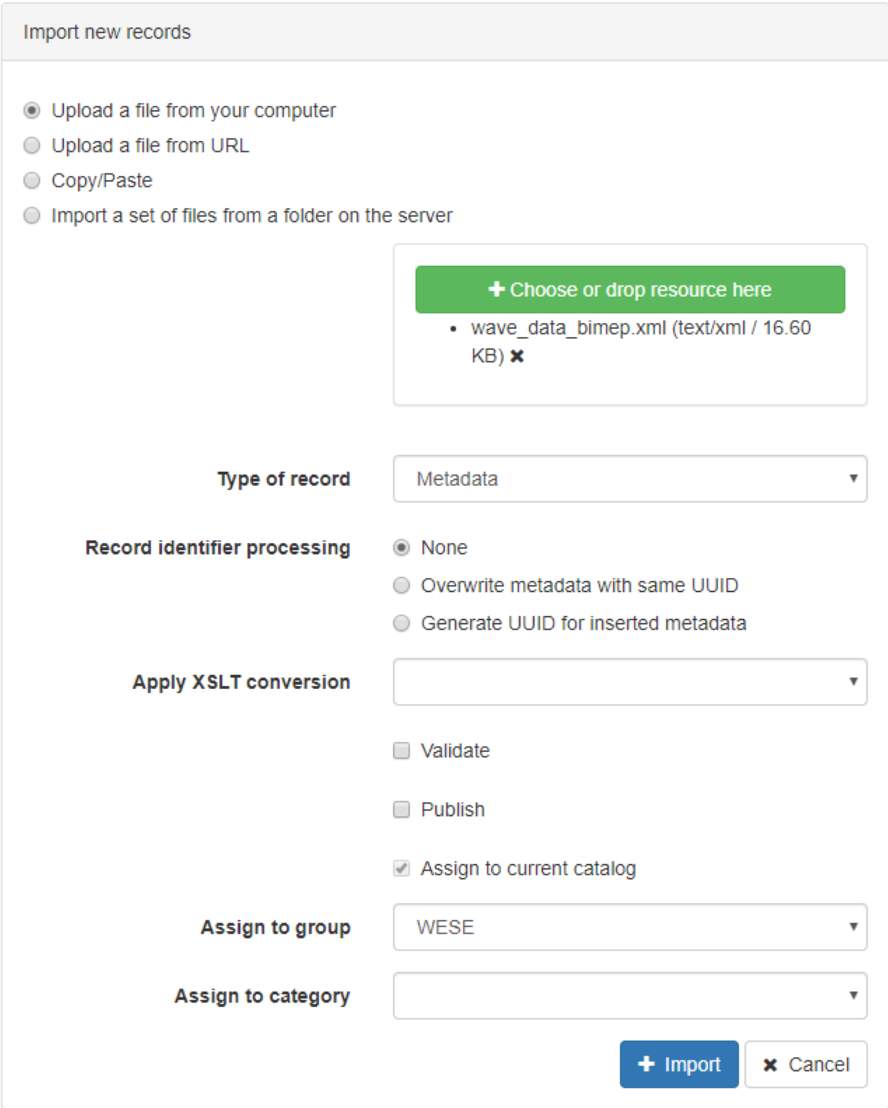

Figure 2. Metadata upload to the server via GeoNetwork.

6. Synchronized collected data and modelled environmental parameters

The MARENDATA platform allows to synchronize biological field data and other collected data with environmental modelling databases.

It is possible to select a field data layer and to download a report which will read the temporal extent of the measured dataset, automatically match it with historical NOAA Wave Watch hindcast dataset, and download the corresponding data table. This workflow is described in the Annex 1. Other modelling datasets can be added in the future in order to increase the number of synchronized parameters and the temporal extent.

7. Annex 1. Downloading synchronized report

1. Select any data layer on the left card

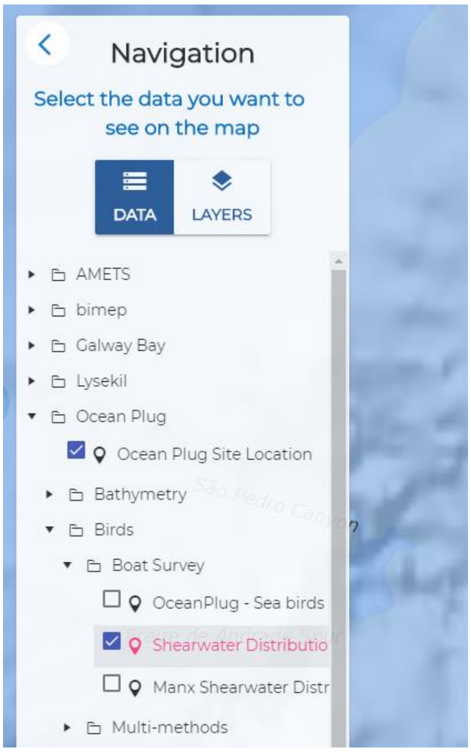

Figure 3: Data navigation card.

2. Zoom to its location using the Center buttons on the properties card

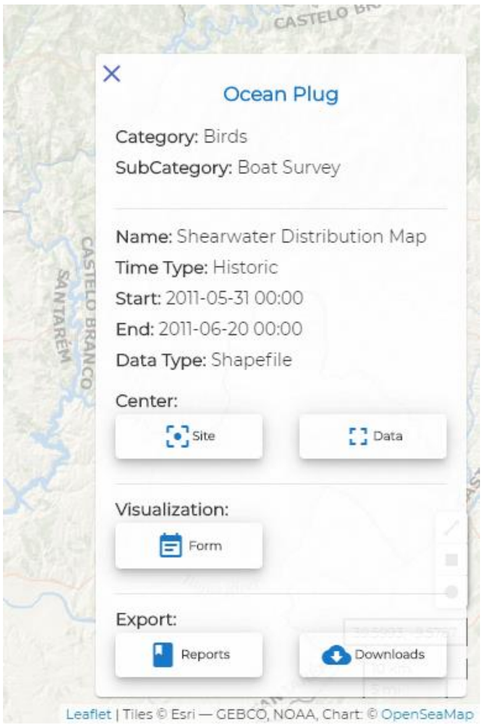

Figure 4: Data properties card.

3. Choose to export the Reports on the same right card. A green marker will appear on the map. Place it on the correct data location and click OK.

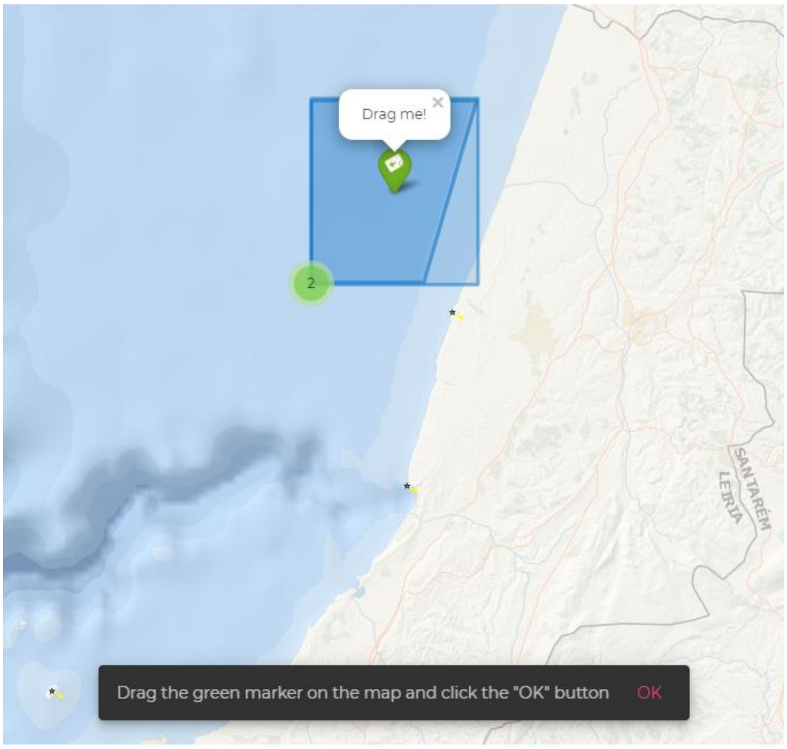

Figure 5: Choosing the report.

4. Verify the dates and click the button Download. Wait a few minutes and the download will start in the browser.

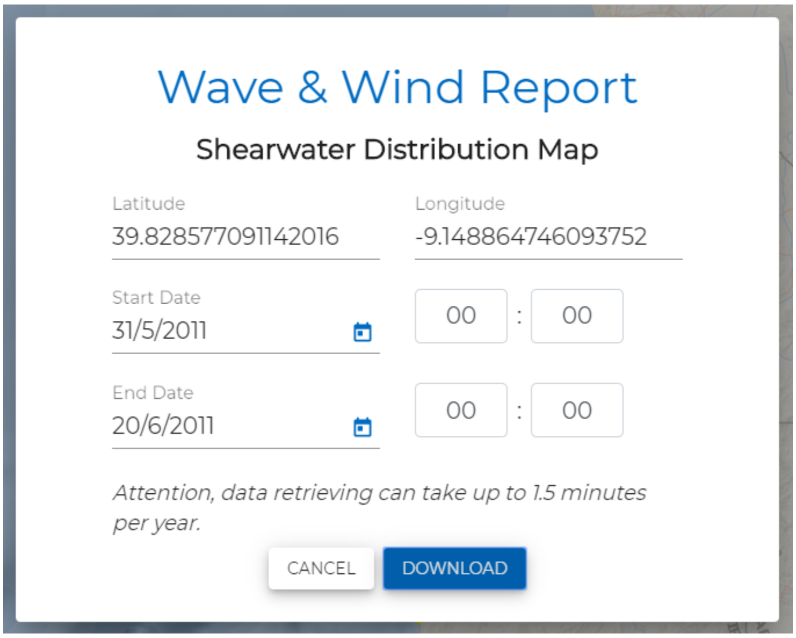

Figure 6: Downloading data report.

5. Open the downloaded Excel file and on the second Historic tab consult the extracted waves and wind data.

37						
38				Waves&Wind Extracted Data		
39						
40	Demanded					
41	Longitude:	-9.148864746				
42	Latitude:	39.82857709				
43	Start:	30/05/2011 23:00				
44	End:	19/06/2011 23:00				
45						
46		NOAA WaveWatch III - Hindc				
47	Start:	30/05/2011 23:00				
48	End:	19/06/2011 23:00				
49						
50		Wave Height Wave Watch 3	Peak Period Wave Watch 3	Peak Direction Wave Watch 3	Wind Direction Wave Watch 3	Wind Intensity Wave Watch 3
51	31/05/2011	2.630000114	6.320000172	338.9899902	356.5175476	12.18249607
52	31/05/2011 03:00	2.869999886	6.820000172	340.6499939	358.9108582	13.15237522
53	31/05/2011 06:00	2.99000001	7.059999943	341.7399902	356.8144531	11.15723991
54	31/05/2011 09:00	2.950000048	7.539999962	338.1700134	7.089050293	9.885570526
55	31/05/2011 12:00	2.940000057	10.56999969	332.9899902	353.7750549	11.52797031
56	31/05/2011 15:00	3.00999999	10.05000019	327.5299988	359.4620361	10.65046883
57	31/05/2011 18:00	3.059999943	9.859999657	327.1000061	354.1508179	10.69568634
58	31/05/2011 21:00	3.180000067	9.760000229	327.1799927	2.223937988	11.33854008
59	01/06/2011	3.25999999	9.720000267	327.1900024	359.8852844	9.990019798
60	01/06/2011 03:00	3.160000086	9.819999695	326.8599854	36.45092773	6.564175606
61	01/06/2011 06:00	2.940000057	10.11999989	326.6499939	57.87637329	8.218180656
62	01/06/2011 09:00	2.730000019	10.90999985	324.8900146	53.99621582	7.144816399
63	01/06/2011 12:00	2.559999943	11.03999996	324.4200134	34.75588989	7.156870842
64	01/06/2011 15:00	2.430000067	11.01000023	324.2099915	19.88983154	7.348339558
65	01/06/2011 18:00	2.309999943	10.93000031	324.1600037	21.94021606	8.430593491

Data | Historic

Figure 7: Data report in Excel.

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