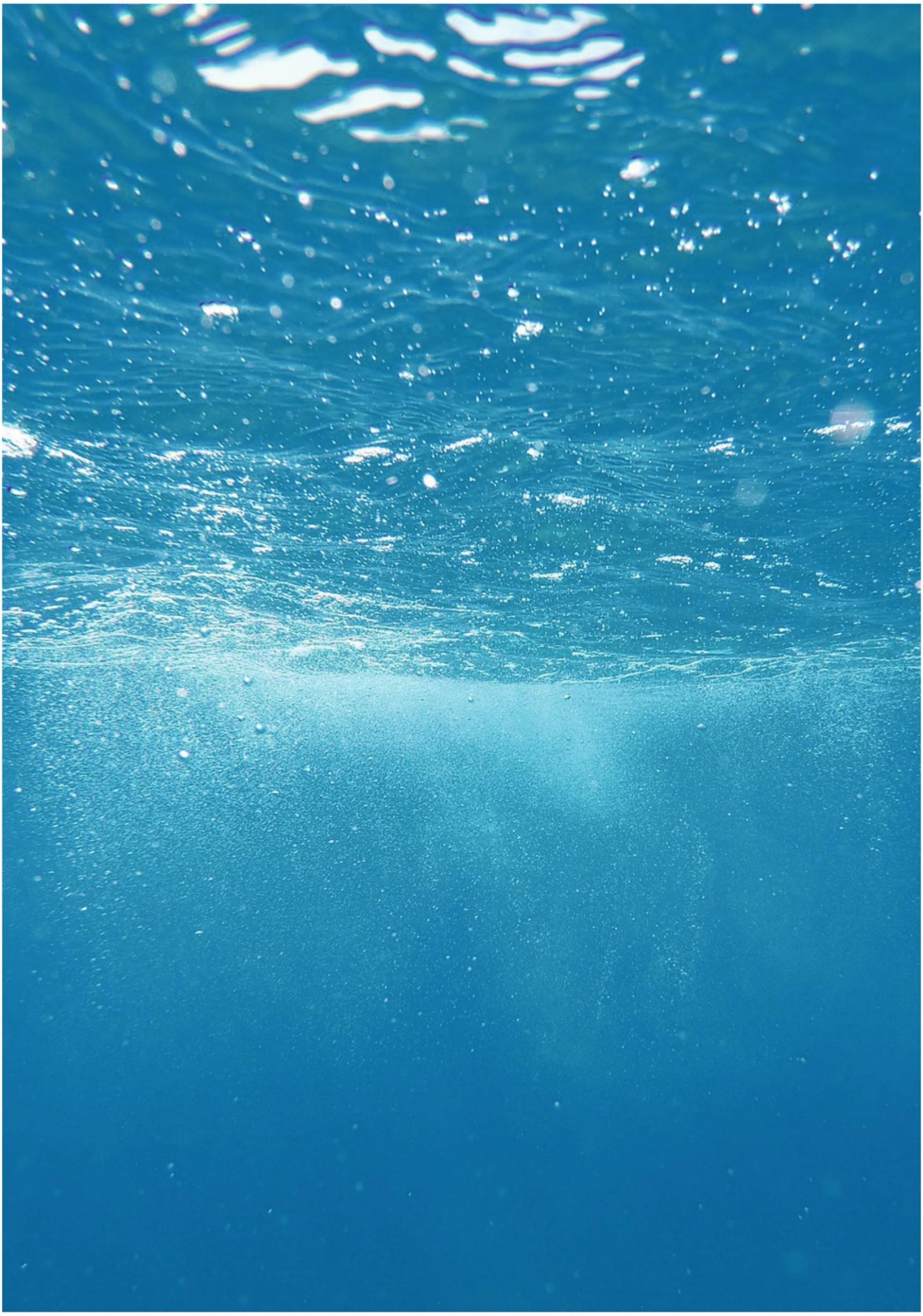
WESE

WAVE ENERGY
IN SOUTHERN EUROPE

DELIVERABLE 6.4

Design of the Data Platform

This project has been funded by the European Commission under the European Maritime and Fisheries Fund (EMFF), Call for Proposals EASME/EMFF/2017/1.2.1.1 – "Environmental monitoring of wave and tidal devices". This communication reflects only the author's view. EASME is not responsible for any use that may be made of the information it contains.



WP 6

Deliverable 6.4 Design of the Data Platform

PROJECT COORDINATOR

AZTI

TASK LEADER

Hidromod

AUTHORS

José Chambel Leitão - Hidromod

Luís Moitinho – Hidromod

Nadiia Basos – Hidromod

Hélio Santos - Hidromod

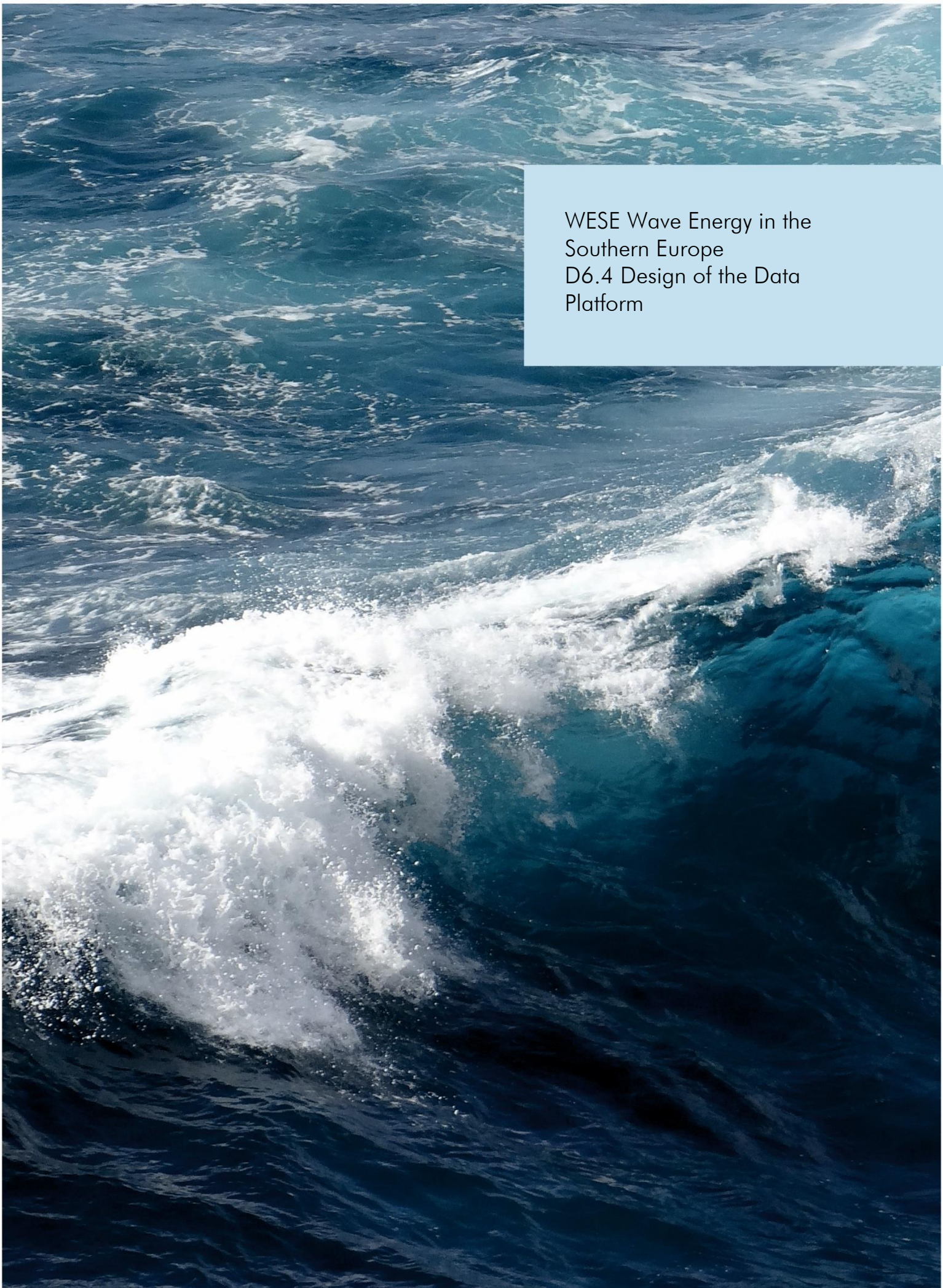
SUBMISSION DATE

31| October| 2019

CITATION

Leitão, J.C., Moitinho, L., Basos, N., Santos, H., 2019. Deliverable 6.4 Design of the Data Platform. Corporate deliverable of the WESE Project funded by the European Commission. Agreement number EASME/EMFF/2017/1.2.1.1/02/SI2.787640. 15 pp.

This project has been funded by the European Commission under the European Maritime and Fisheries Fund (EMFF), Call for Proposals EASME/EMFF/2017/1.2.1.1 – "Environmental monitoring of wave and tidal devices". This communication reflects only the author's view. EASME is not responsible for any use that may be made of the information it contains.



WESE Wave Energy in the Southern Europe D6.4 Design of the Data Platform

CONTENTS

1. WESE PROJECT SYNOPSIS 7
2. EXECUTIVE SUMMARY 9
3. INTRODUCTION 10
3.1 CONTEXT OF THE DELIVERABLE 10
3.2 TOP LEVEL REQUIREMENTS 10
3.3 CONTENT OF THE DATA PLATFORM 10
4. DESIGN OF THE DATA PLATFORM 11
4.1 ARCHITECTURE OF THE DATA PLATFORM 11
4.2 INTERFACE OF THE DATA PLATFORM 12

Table of Figures

Figure 1: Architecture of the data platform. 11

Figure 2: Authentication and Authorization 12

Figure 3: Authorization page 12

Figure 4: Frontend mock-up 13

Figure 5: Pop-ups with additional information 13

Figure 6: WMS temporal layers 14

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 were, 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 https://webgate.ec.europa.eu/maritimeforum/sites/maritimeforum/files/OceanEnergyForum_Roadmap_Online_Version_08Nov2016.pdf

- 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

As a part of the Data Platform development it is crucial to define the design of the platform and how the user will interact with the platform. This document presents a description of the design and a mock-up which was made available to partners in order to get their opinions on the Design.

3. Introduction

3.1 Context of the deliverable

This deliverable describes the main concepts that frame the need for a Data Platform, the IT architecture proposed for it and its functionalities, including a user interface mock-up.

The Design of the Data Platform was developed to ensure that the WESE services would comply with the information needs of the end-users. The usage scenarios and the list of functionalities were based on the existing platform Sowfia. The necessary functionalities and the interface of the Data Platform were discussed and agreed on WESE project meetings.

3.2 Top level requirements

The renewable energy industry requires complex environmental information in order to overcome the challenges of harnessing energy from the marine environment. This will be delivered through an established open platform aggregating multiple sources of raw and secondary data to ensure access to meaningful information for the user.

The platform will:

- Establish an adequate IT platform that links with existing and new data repositories;
- Enable access to raw and secondary data;
- Disseminate data and knowledge previously reviewed by experts;
- Survive individual projects' financing constraints;
- Reach a significant audience in the industry.

3.3 Content of the Data Platform

The Data Platform is where project generated primary raw data will be 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.

4. Design of the data platform

WESE Data Platform is made of a number of ICT services in order to have a single Web access point to relevant data.

4.1 Architecture of the data platform

The platform has three main components (Figure 1).

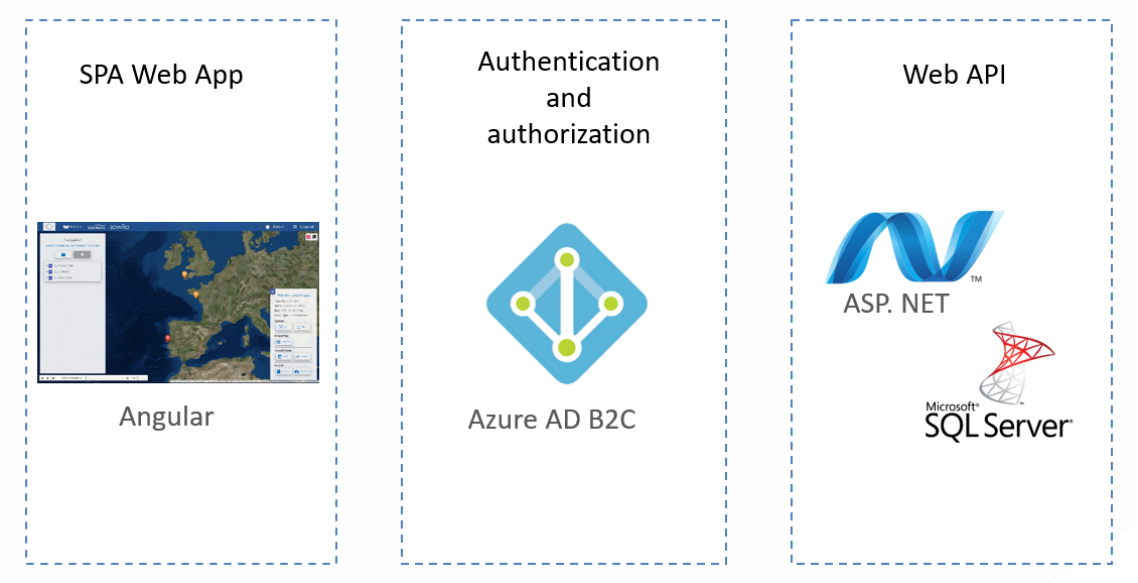


Figure 1. Architecture of the data platform.

Authentication and authorization process (Figure 2):

1. The client application starts the flow by redirecting the user agent to the Azure AD authorization endpoint. The user authenticates and consents, if consent is required.

2. The Azure AD authorization endpoint redirects the user agent back to the client application with an authorization code. The user agent returns authorization code to the client application's redirect URI.

3. The client application requests an access token from the Azure AD token issuance endpoint. It presents the authorization code to prove that the user has consented.

4. The Azure AD token issuance endpoint returns an access token and a refresh token. The refresh token can be used to request additional access tokens.

5. The client application uses the access token to authenticate to the Web API.

6. After authenticating the client application, the web API returns the requested data.

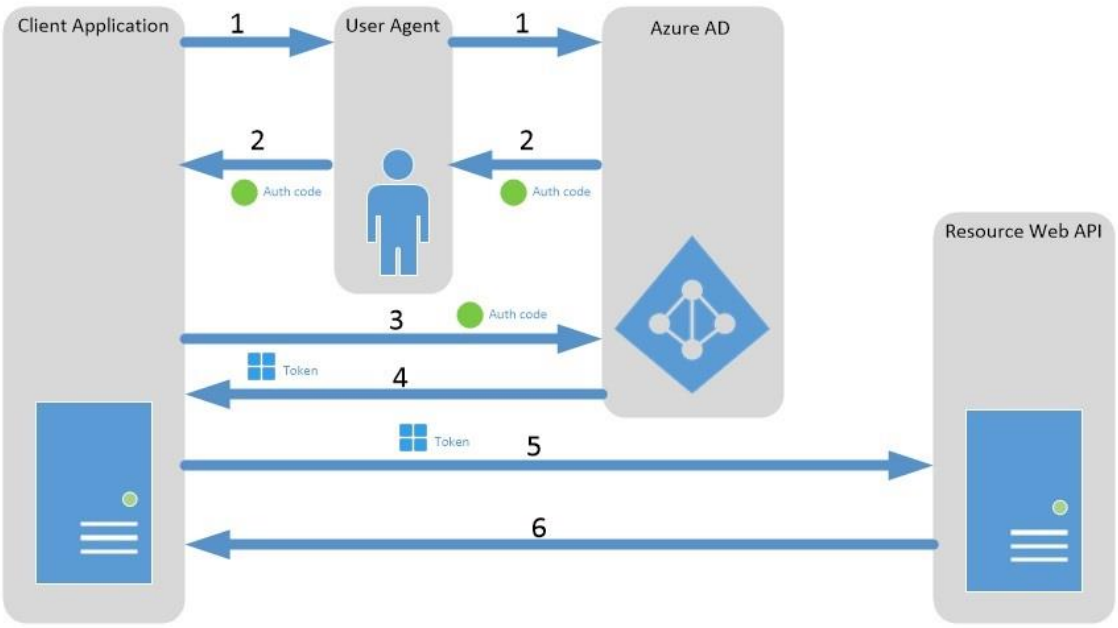


Figure 2. Authentication and Authorization

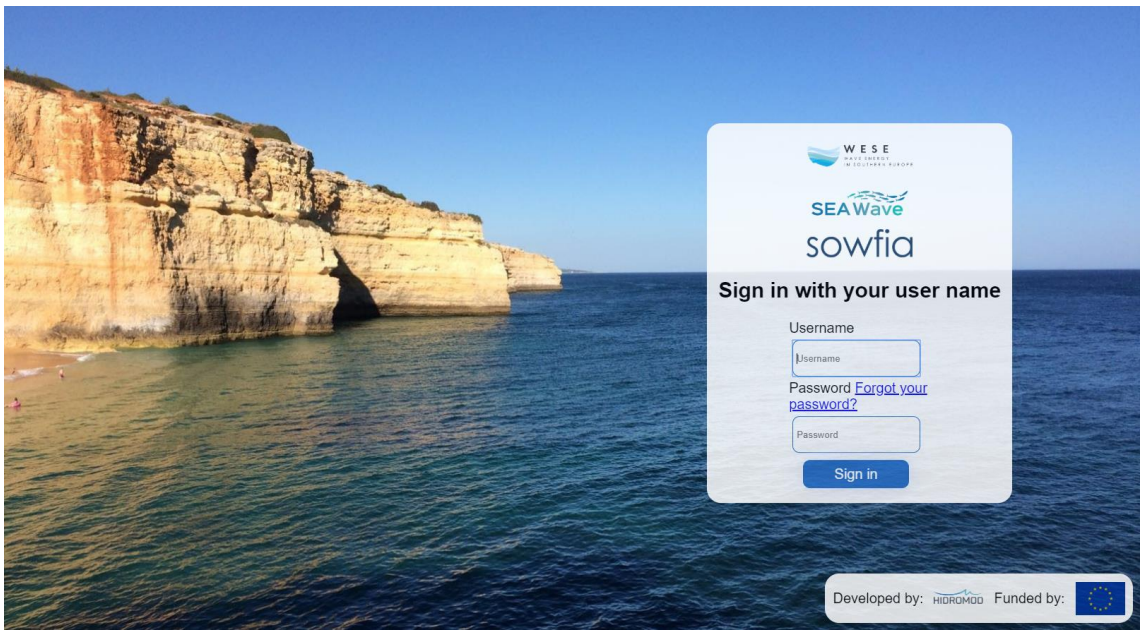


Figure 3. Authorization page

4.2 Interface of the data platform

The data platform interface is presented in Figure 4. The left panel shows the data available in the folder tree. The right panel allows to zoom to the data, displays the data information (Figure 5), provides access to the charts and options for secondary data download.

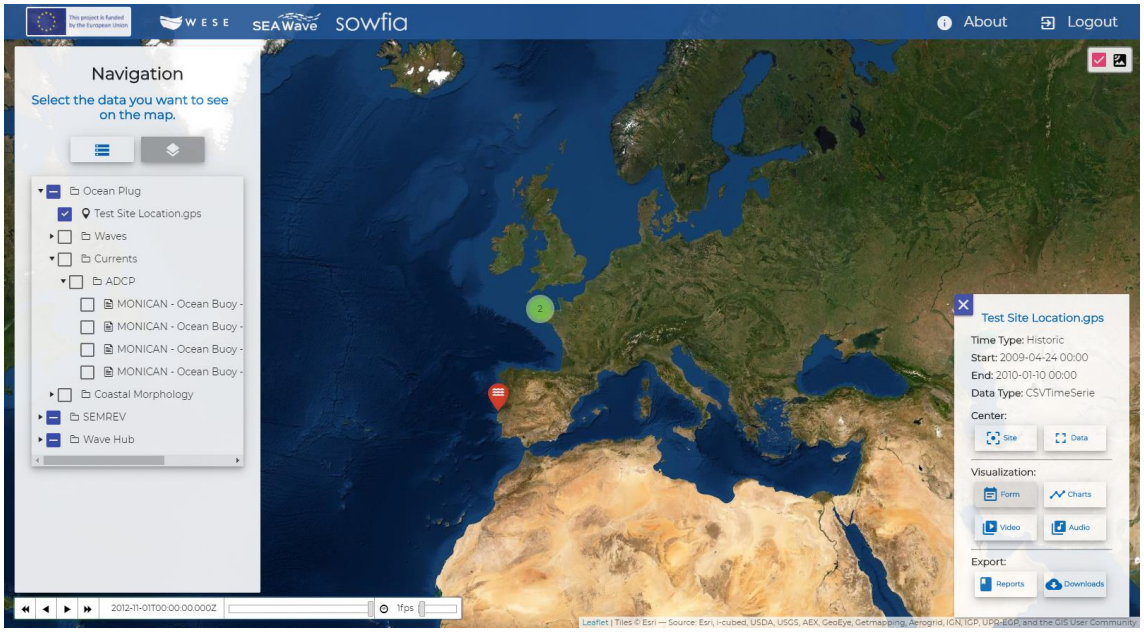


Figure 4. Frontend mock-up

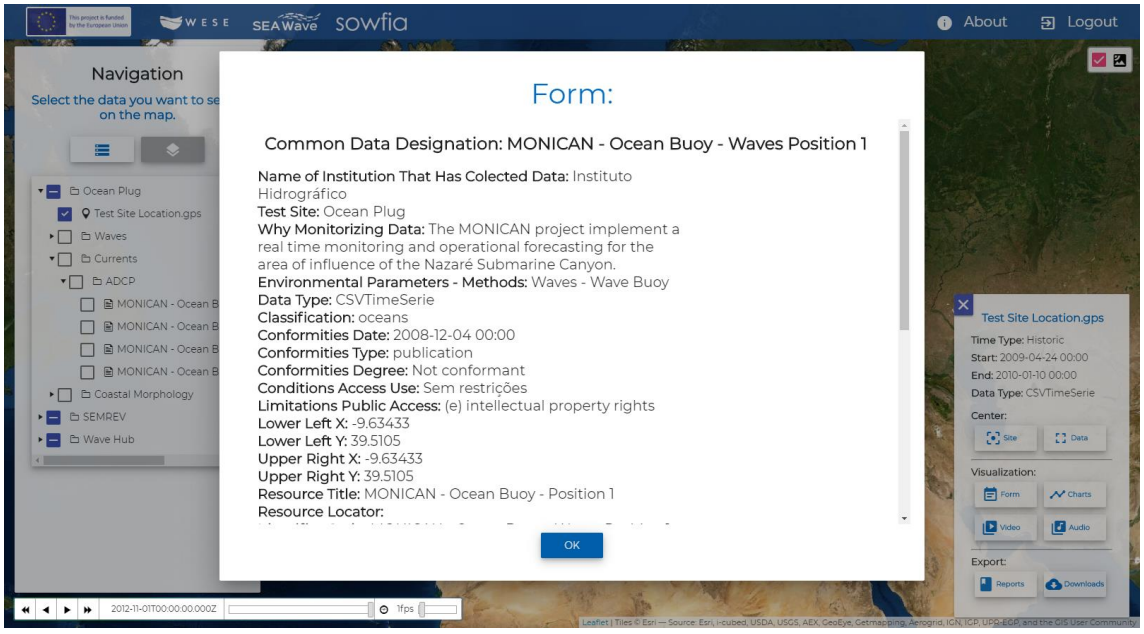


Figure 5. Pop-ups with additional information

On the left panel the user can switch between data and raster layers (Figure 6). The layers are WMS with temporal dimension available via the bottom panel.

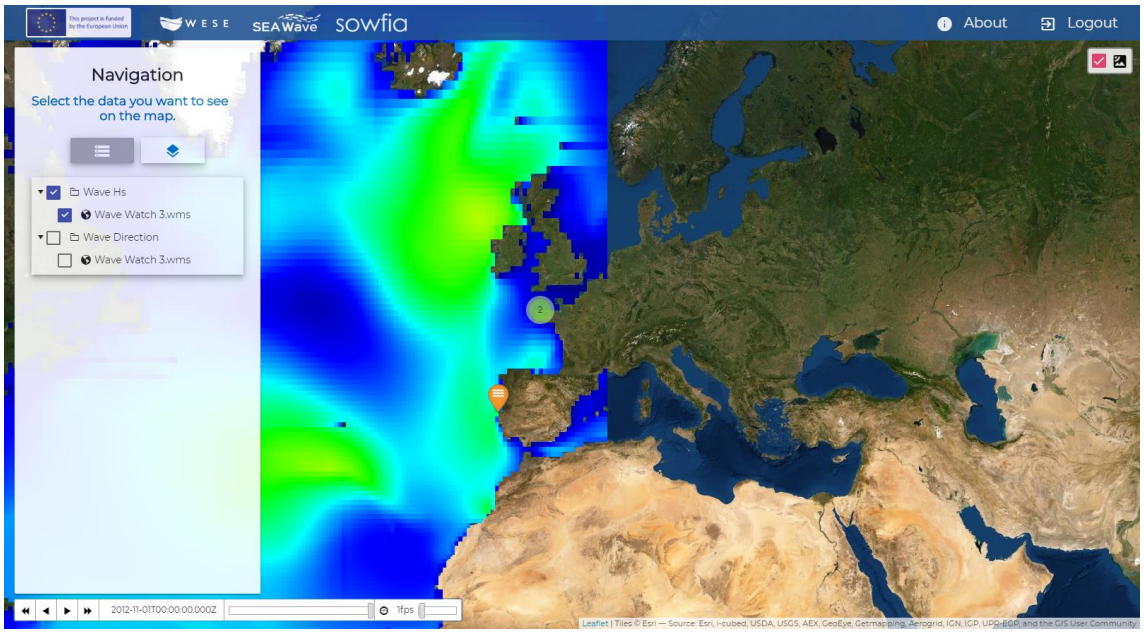


Figure 6. WMS temporal layers.

The mock-up was made available online, on June 17, 2019, during a meeting of the project in Lisbon, via the following link:

https://wavedata.z6.web.core.windows.net

user: weseproject pass: WESE_oP13+

This project has been funded by the European Commission under the European Maritime and Fisheries Fund (EMFF), Call for Proposals EASME/EMFF/2017/1.2.1.1 – "Environmental monitoring of wave and tidal devices". This communication reflects only the author's view. EASME is not responsible for any use that may be made of the information it contains.