



# jUMP: Construction of a oceanic sound propagation modelling portal for research

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## jUMP project

The jUMP Project aims to support the activities to manage Descriptor 11, related to underwater noise, defined by the Marine Strategy Framework Directive (MSFD) (Directive 2008/56/EC), which establishes a framework for community action in the field of marine environmental policy for Europe to achieve a Good Environmental Status (GES).

The JUMP project aims to:

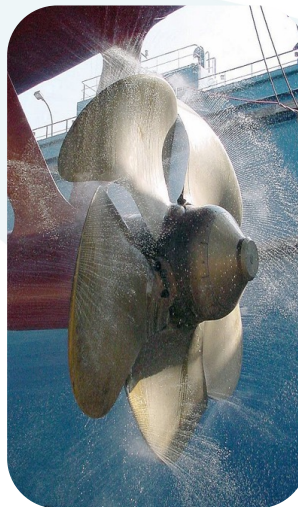
- i. implement stepping-stone actions to promote the discussion about underwater noise and its impact on the marine environment
- ii. develop tools to support the application of the Marine Strategy Framework Directive, specifically Descriptor 11



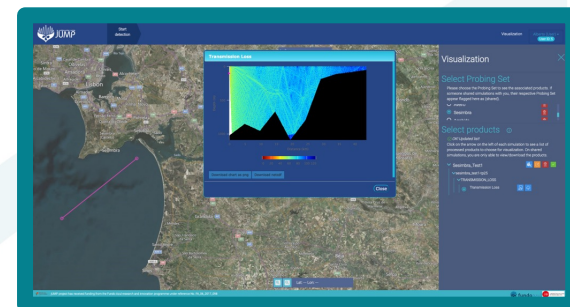
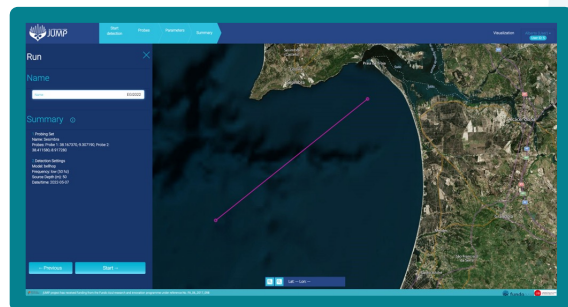
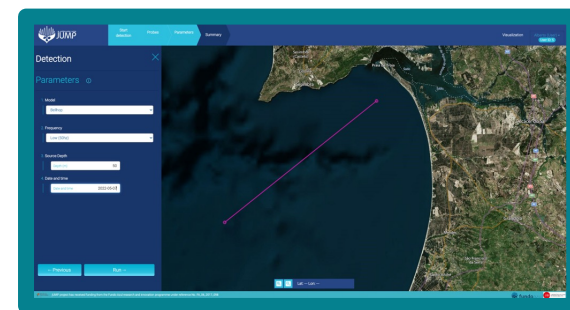
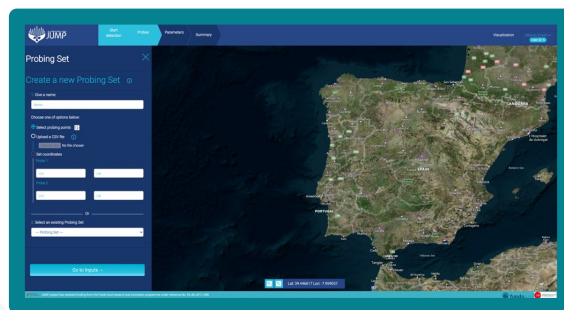
## jUMP project

LNEC developed a sound propagation modelling portal to support the research community in the study of the:

- a) type and distribution of noise-producing human activities
- b) specificities of Portuguese marine waters, and
- c) distribution of acoustically sensitive species.



# jUMP modeling portal



## Global Ocean Data Providers



Copernicus  
Europe's eyes on Earth



Copernicus  
Marine Service



EMODnet

GEOLOGY

Discover Europe's seabed geology



EMODnet

BATHYMETRY

Understanding the topography of the European seas

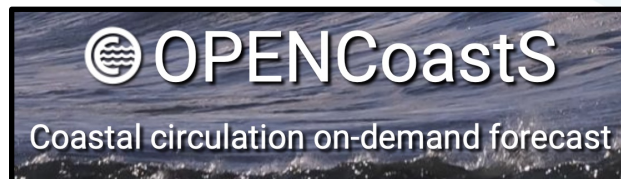




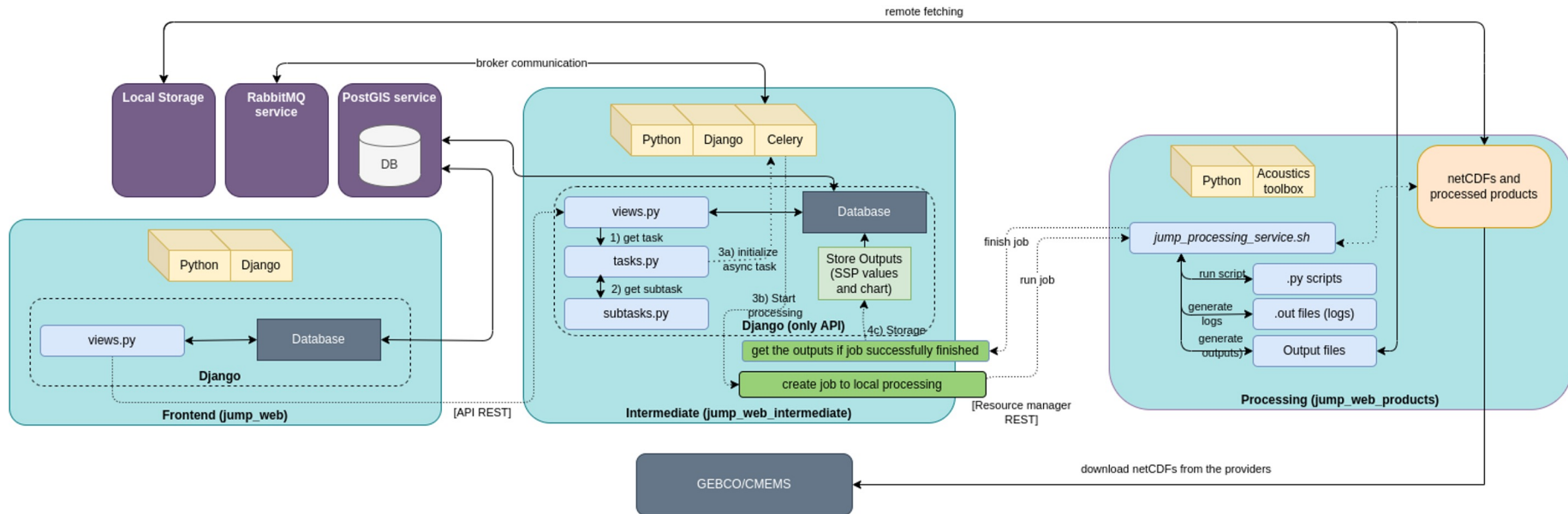


## jUMP modeling portal

- The modelling portal enables the user to perform **on-demand sound propagation simulations** for a specific date and local.
- **Researchers can**, for example, **estimate the sound propagation levels** emitted from transportation vessels or offshore wind generators and their influence on animal and human activities.
- **The modelling portal is mainly targeted to researchers and engineers** (oceanographers, biologists, geologists, and geophysicists) who study the ocean's sound propagation and its interaction with sound-sensitivity species and the environment.
- Presently, two models are implemented (**BELLHOP** and **KRAKEN**). Nevertheless, more features and models can be integrated to fulfil the researchers' needs.
- The jUMP modeling portal, along with **OPENCoastS** and **WORSICA**, is part of **LNEC's vision** of coastal services to support the development of **Digital Twins infrastructures**.



## Modeling portal architecture



The **modeling portal** was mainly built with Python, and its architecture was developed considering **three docker containers** to ensure portability, scalability, and robustness:

1. The **Frontend** manages the interaction with the user through a web portal
2. The **Intermediate** is responsible for handling the requests from the frontend and submitting the jobs for the processing infrastructure
3. The **Processing** deals with the modeling tools, processing scripts for data collection, and pre- and post-processing data



## Technical Description: Planned Services

### Authentication:

**EGI Check-In:** federated authentication to have access to the available EOSC services and resources.

### Workload Managers:

**ArcCE with SLURM:** This will allow efficient management of the available GRID resources for HPC in order to speed up the processing jobs.

### Ansible and IM:

**IM:** for deployment of the infrastructure required for job processing, repositories and microservices.

**SLURM** and **Kubernetes** clusters will be deployed over IaaS service and the remaining services will be installed from Docker images. Configurations for SLURM and Kubernetes are set up by ansible playbooks.

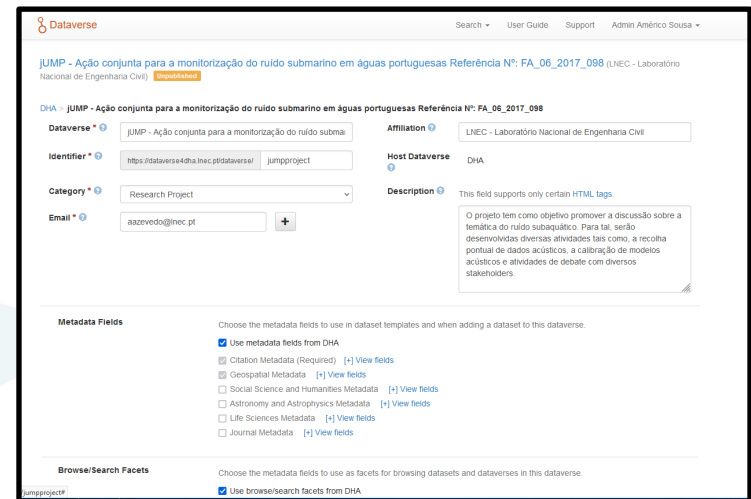
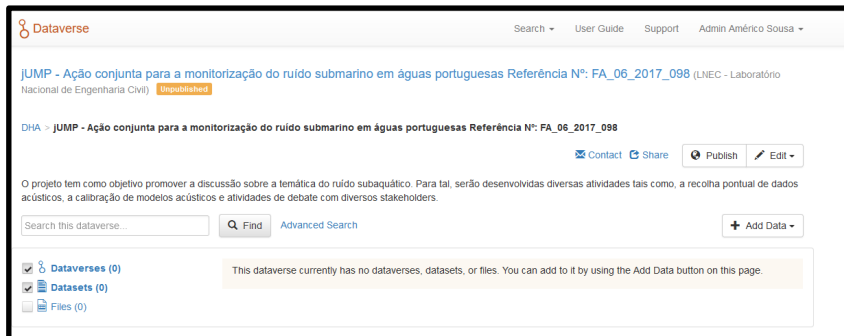


## Technical Description: Planned Services

Data Manager:

**Nextcloud:** to store processed job submission data input/outputs.

**Dataverse:** to register processed job submission metadata information for data FAIR compliance (**already implemented**).



CI/CD for the automatization of the service integration in EOSC infrastructure:

**Jenkins** pipelines and unitary/functional tests will also be developed to be compliant with the **SQAaaS** methodologies developed in **EOSC-Synergy** project.







## Planned Actions

- **Integration in *EOSC thematic services*** for European application of the modelling portal
- Application to the ***EOSC Platform Early Adopter Programme*** to implement federated IT services from EOSC and EGI, to improve service resilience, robustness and scalability such as federated authentication, workload managers and FAIR compliance data repository technologies.

**Thank you!!!**

Cofinanciado por:



# underwater noise JUMP

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