



European Research Area
for Climate Services



European advances on CLimate Services for Coasts and SEAs

Infrastructure for coastal climate service

Work Package 5 - Deliverable 5.A

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Glossary

API: Application Programming Interface
INSPIRE: Infrastructure for Spatial Information in the European
Metocean: Meteo-oceanographic
OGC: Open Geospatial Consortium
WCS: Web Coverage Service
WMS: Web Map Service

1. Introduction

This report is the deliverable 5.A (D5.A) of the ECLISEA project and contains the design and architecture of the infrastructure for a coastal climate service prototype. ECLISEA is a project that aims to advance coastal and marine climate science and associated services through developing innovative research of sea surface dynamics.

Climate services translate climate data into information and products that are tailored towards the specific needs of a diverse range of end users. ECLISEA focuses on full-fill the current gap in terms of the implementation of Coastal Climate Services. In this sense, we believe that a more focused and thematic Climate Service, in this case dealing with the coastal zone and its sensitivities, could lead to a better co-production of tailored information products.

This report describes the ECLISEA infrastructure in three sections: the architecture is described in Section 2, the Application Programming Interface (API) developed and additional libraries are described in Section 3, and Section 4 provides a description about the geospatial technologies implemented.

2. Architecture of the ECLISEA climate service

Knowledge brokers (scientists, software developers, etc.) require a robust infrastructure to query, access and generate value through tailored information solutions for different coastal zone stakeholders (end users).

The ECLISEA architecture is based on the implementation of interoperability nodes that store climate information into a catalogue that provides interoperability accesses according with the Open Geospatial Consortium (OGC) and INSPIRE Directive ([http](http://www.opengeospatial.org/inspire), Web Map Service, Web Coverage Service, OpenDap, among others), see Figure 1.1.

Metocean outputs obtained from WP2, the climate data, and WP4, the indicators, are stored in a THREEEDs catalogue of standardized NetCDF files according with Climate and Forecast conventions.

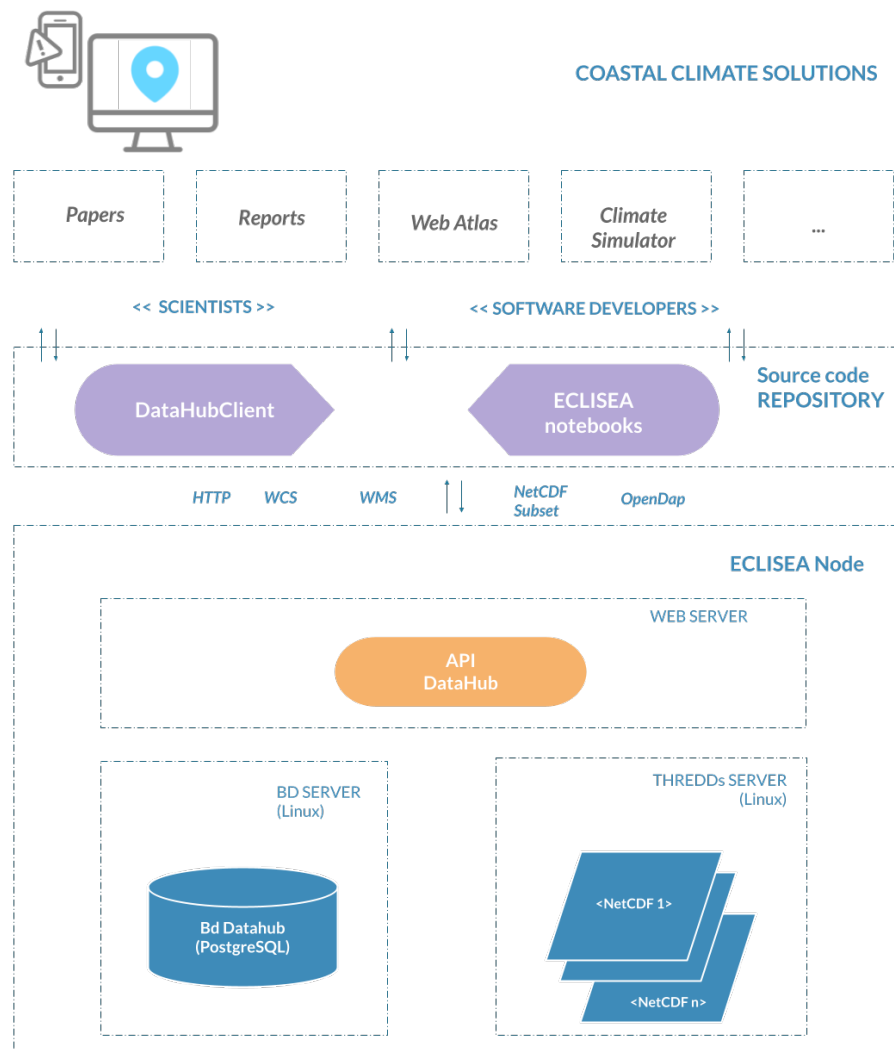


Figure 1.1: Architecture of the ECLISEA infrastructure for coastal climate services

Data discoverability is achieved through the use of an Application Programming Interface specifically designed, API DataHub, which allows to point out the data and metadata stored at any node’s data catalogue. Therefore, the climate information could be stored and distributed at different coastal climate nodes.

In conclusion, the ECLISEA infrastructure could be implemented to create a network of coastal climate data repositories, which can be capitalized by knowledge brokers to create custom user experiences and tailored information solutions for coastal climate services.

3. Application Programming Interface - API

Application Programming Interfaces, commonly known by its acronym “APIs”, are software elements that act as an abstraction layer, with a set of rules and specifications, which can be used by other software, independently of its programming language.

3.1 The API DataHub

The API DataHub has been designed to facilitate the search and access to metadata of ECLISEA products, the following link provides access to the interface of the DataHub.

<http://datahub.ihcantabria.com/swagger/index.html>

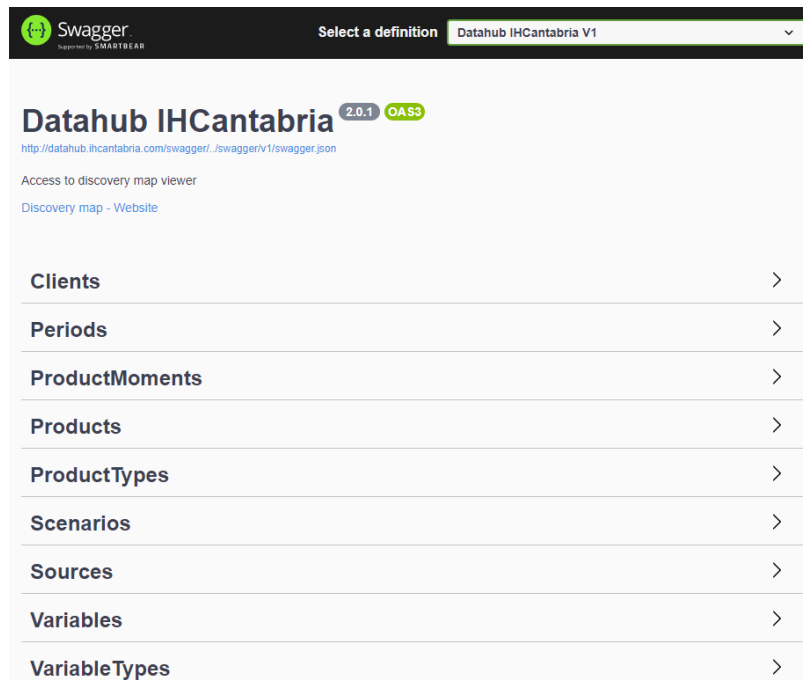


Figure 3.1: API DataHub User interface

The DataHub provides several methods to “GET” information about the ECLISEA products, variables, data sources and the interoperability access to access the data.

3.2 The DataHub.Client library

To facilitate scientists and software developers the interaction with the API, the *datahub.client* library has been designed and it is openly available from the following source code repository:

<https://github.com/IHCantabria/datahub.client>

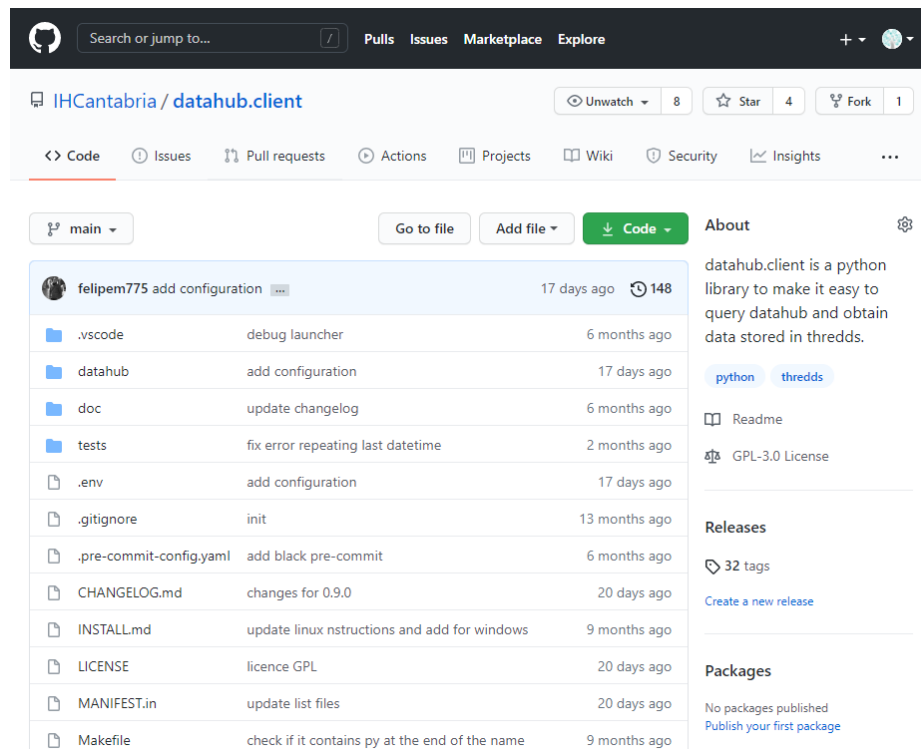


Figure 3.2: DataHub client library (open access)

3.3 Jupyter notebooks

A set of jupyter notebooks have been designed to easily introduce to scientists and developers the type of queries to access the ECLISEA products. Notebooks are openly available from the following source code repository:

<https://github.com/IHCantabria/datahub.client.ECLISEA>

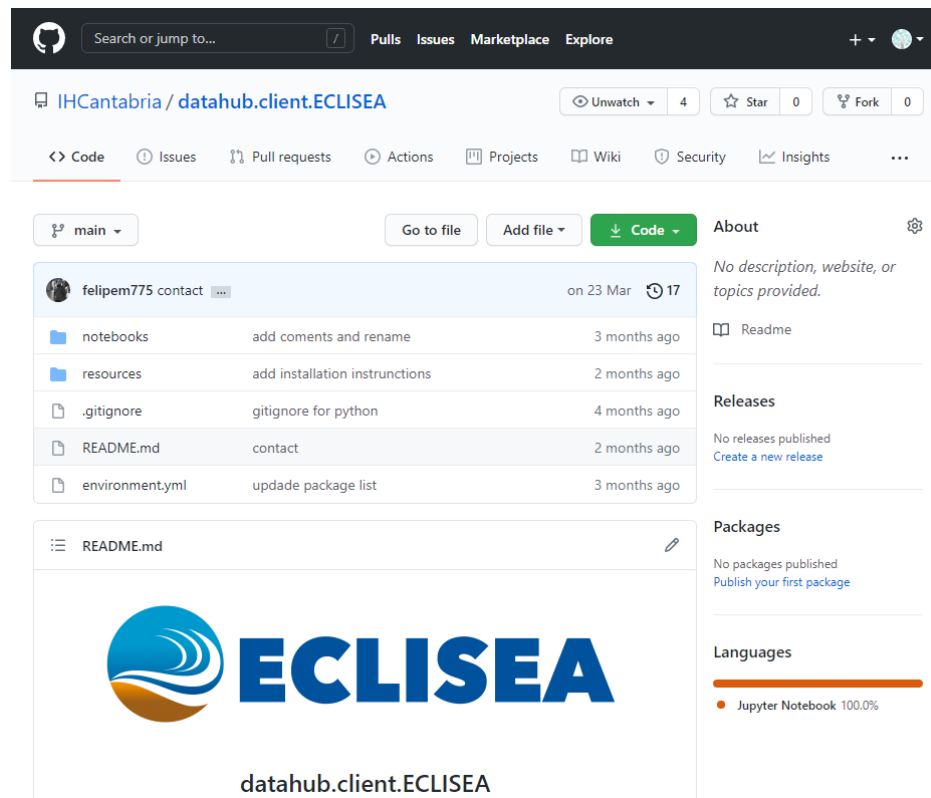


Figure 3.3: Jupyter notebooks for the DataHub client library (open access)

4. Geospatial Technologies of the Service

The development of the infrastructure for coastal climate service is based on mature open source geospatial technologies, capitalizing the current breeding ground of high quality geospatial open source projects and initiatives.

The main technologies used for the infrastructure for coastal climate service are listed:

- NetCDF (<https://www.unidata.ucar.edu/software/netcdf/>) is a Java library and self-describing, machine-independent data formats that support the creation, access, and sharing of array-oriented scientific data.
- PostgreSQL (<https://www.postgresql.org/>) is an open source relational database management system.
- Python (<https://www.python.org/>) is an interpreted, high-level, general-purpose programming language.
- Siphon (<https://unidata.github.io/siphon/latest/index.html>) is a collection of Python utilities for downloading data from remote data services. Much of Siphon's current functionality focuses on access to data hosted on a THREDDS Data Server. It also provides clients to a variety of simple web services.
- THREDDS Data Server (<https://www.unidata.ucar.edu/software/thredds/current/tds/>) is a web server

that provides metadata and data access for scientific datasets, using a variety of remote data access protocols.

- .NET Core (<https://github.com/dotnet/core>) is a free and open-source, managed computer software framework primarily developed by Microsoft.
- Swagger (<https://swagger.io/>) is an open-source software framework backed by a large ecosystem of tools that helps developers design, build, document, and consume RESTful web services.

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