



Project: AdriaClimPlus

D.3.2.1

Improved web platform design



Document control

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1. Introduction

One of the expected results of the AdriaClimPlus project is the improvement of a web platform or geoportal, which will provide the possibility to display the project's simulation data and the collected observations, and to perform basic processing on these data. Thanks to the legacy of the AdriaClim project, within AdriaClimPlus it has been decided to start from the architecture developed by that project.

The new web platform will start from the code base developed during Adriaclim (a backend based on Python-Django framework and PostgreSQL database for local caching, a frontend based on Angular web user interface) and will try to extend its capabilities and especially to improve its usability.

This deliverable describes the plans for the development of the web platform.

2. Information System architecture

The architecture of the Information System developed in AdriaClim project (figure 1) consists of a distributed big data archive or repository, based on the Erddap software, mainly hosted by CMCC together with other partners, and a web-based [geoportal](#) specifically developed for the project under the supervision of Arpae (PP5).



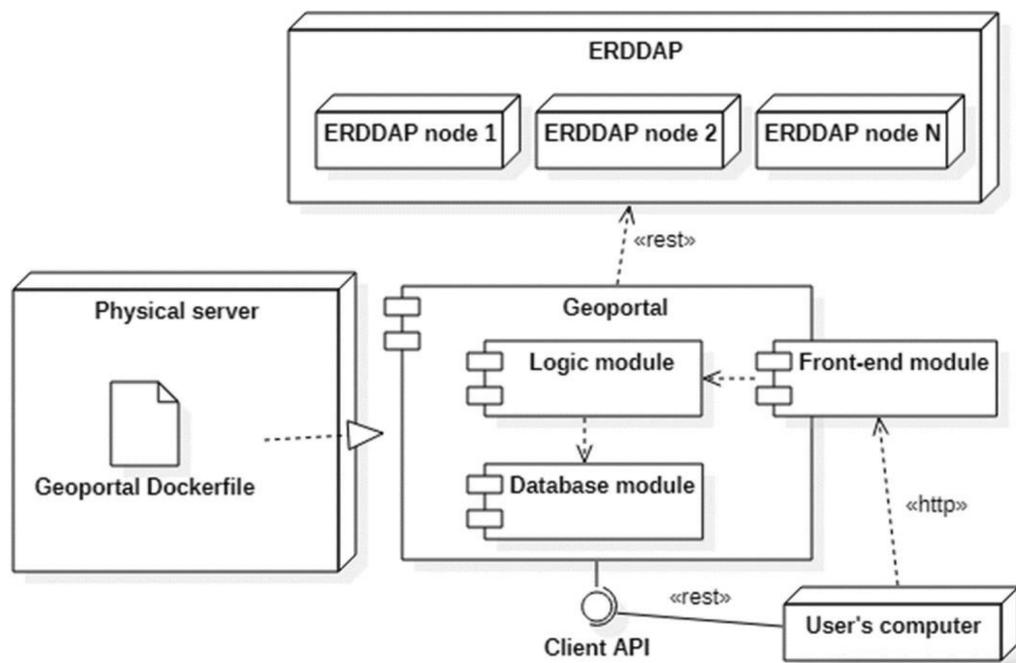


Figure 1. Structure of the information system deployed in the AdriaClim project, including the web-based geoportal.

The geoportal interacts with an ERDDAP federation by querying its master node through calls to its REST APIs. The master node in turn is a repository for all datasets present in the federated nodes, making it the single point of access to the collection.

The geoportal itself consists of:

- A logic module, written in Python using the Django framework, which contains all the server-side functionality required to drive the system: user management, proxy features to ERDDAP, serving of web content to clients and interaction with the database module.
- A database module, based on PostgreSQL, which stores all geoportal-specific data such as user information, any data from Erddap that should be locally cached for performance reasons, configuration and environment-specific settings.



- A front-end module, written in the Angular web framework, Leaflet and other web technologies. This is the actual user interface that will run on all modern browsers to display georeferenced data, time series plots and other types of data.

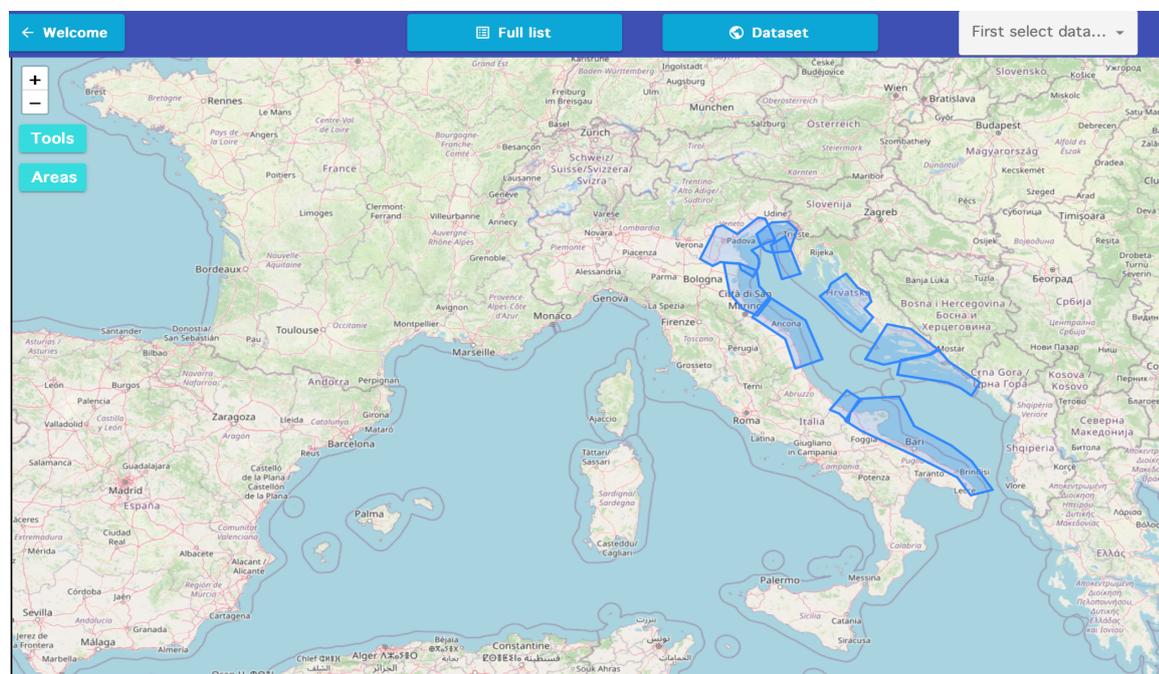
3. Geoportal features

The main features of the geoportal are described in the following section.

Main page

When entering the geoportal main page, the user immediately sees the georeferenced map with all the possible functionalities. The default view shows the pilot areas on the map, but the user can change it by hovering on the “areas” button and choosing one of the alternative views (Adriatic view, Pilot area view or Upload a Geojson).

The new AdriaClimPlus Pilot area Lika-Senj County, currently not present, will be included in the new version of the geoportal along with any other area that could be required by the Partners.



Dataset choice

In the main page the user can select the dataset of interest, either by browsing through the full list with the possibility to quickly filter datasets by their main metadata, or by choosing datasets according to some specific features defined according to project needs (e.g. model/indicator/observation, space scale, periodicity, etc.). Once the user has chosen a particular dataset, its layer will be attached to the georeferenced map; if the dataset does not have its own WMS layer, a graphical layer will be created by the Geoportal that will also create a custom legend whose values can be arbitrarily changed by the user. If, alternatively, the dataset has a WMS layer, the Geoportal will take it directly from Erddap and attach it to the map. The user can change the time level to be visualized as well as the other parameters (e.g. variable, vertical level) that the dataset can have. The user can keep a personalised list of active datasets and quickly switch between them. The method for choosing the dataset could be subject to improvement in the new geoportal version.

Tools for geographic choice

The user can make use of different tools for selecting a point or an area of interest in order to examine the selected dataset in more detail in the plotting window. In particular, it is possible to select a single point, all the points within one of predefined areas (e.g. project Pilot areas) or within a georeferenced polygon provided by the user.

Plotting window

Once a specific point or area has been chosen, the plotting window will appear above the map showing a time series of the selected data; using the dropdown menu, it is possible to choose between the different types of graphs, including the full time series or the annual cycle; when an ensemble of points is chosen (e.g. a pilot area). it is also possible to show the statistical characteristics of the chosen set, such as average, minimum, maximum, percentiles. It is also possible to download a CSV file where all the data shown on the graph can be viewed and processed by the user. The plotting features available in the plotting window could be expanded according to new requests by project Partners.



4. Status of the tender for the improvement of the AdriaClimPlus web platform

During 2024 a contractor for the development of the web platform has been selected. The Contractor, FOS S.P.A. (<https://www.gruppofos.it/>) has been contacted, it has been introduced to the task and made a development proposal, which was partly incorporated in the following technical specifications of the tender. One of the FOS developers who will work on the web platform had previously work on the frontend during the AdriaClim project, accelerating the process.

Currently (February 2025) the tender is in the final phase, and in a few days the work could start.

5. Plans for the web platform development

The development of the web platform in the tender specifications has been divided into four phases.

- Phase 1, due to end of June 2025

The initial phase will start with a clean-up of the git software repository and the definition of clear software development and continuous integration practices. During this phase the developers will review, clean up and document the backend code to optimise it and make its development more sustainable both during the current project and in the subsequent phase. This phase will also include preliminary cosmetic improvements to the web interface to adapt it to the AdriaClimPlus project logo and requirements.

- Phase 2, due to end of October 2025

The second phase will include the first modifications to the web interface to make it clearer and more user friendly, possibly with an extension of the dataset search menu. These aspects were not satisfactorily dealt with at the end of the AdriaClim project due to lack of time, and they can be significantly improved with a relatively limited amount



of work. The software package will also be complemented with unit tests for the main functionalities and a Continuous Integration system and a technical user documentation.

- Phase 3, due to end of January 2026

This phase involves optimising access to the datasets on the Erddap platform in order to speed up the access to small spatio-temporal subsets of large gridded datasets, for improving the user experience. This will be done in collaboration with CMCC, managing the Erddap platform. Possible solutions may include experimenting the use of more efficient data exchange formats between repository and geoportal and making use of more advanced features of the Erddap archive.

A review of the available datasets in the repository and how they are displayed in the geoportal will be carried out, to identify modifications to both the Erddap repository and the geoportal, which can ensure a better user experience. This activity will involve CMCC as the manager of the big data repository, the partners producing datasets for the platform and potential end-users of the web platform. Depending on dataset peculiarities, additional metadata may need to be added to datasets from the archive side.

- Phase 4, due to end of June 2026

This phase will continue the review of the new datasets that will gradually be included in the platform and will include the implementation of new user features, e.g. new data subsetting tools, new statistical processing of data and new type of time series plots. During this phase, an exhaustive documentation of the platform features, oriented to will be produced. Depending on the resources available, new features that are needed but not specifically foreseen in advance (e.g. an authentication method or a more advanced graphical representation of the data) could also be implemented. This phase will mainly involve the participation of the potential end-users of the web platform to collect further requirements, although contributions from all the partners will also be accepted.



The software of the platform is and will be open source and available in a public repository, which will be constantly updated during the development phase. The online version of the platform will also follow the development and is expected to be available in a stable version and a test version at the same time.

6. Next steps

Once the appointed contractor has started working on the task, several project meetings will be organised to steer the development of the web platform.

An indicative programme could be as follows:

- Meeting between Arpae and CMCC for checking the status of the Erddap platform (March 2025).
- Meeting among Arpae, CMCC, FOS for analysing possible paths for improving the performance of data access (June 2025).
- Meeting among Arpae, CMCC and the partners producing various types of datasets, to verify the current appearance of the datasets on Erddap and on the geoportal and to identify the expected peculiarities of future datasets (September 2025, March 2026)
- Meeting among Arpae, FOS and the partners representing end-users of the platform, to identify deficiencies in the current visualisation of the data and to collect further requirements for development of the user interface (June 2025, February 2026).

Before the end of the project, a plenary presentation of the platform with a demonstration will be organised, accompanied by a written user guide.

