GEOSS Platform Plus

D3.5 - Version 1.0

Enhanced GEOSS Platform User Manual v2 with 2nd set of applications

Workpackage:	WP3	GEOSS Evolution design, development, integration and deployment
Task:	T3.4	
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Abstract:

This document describes the evolved GEOSS Platform, in terms of capabilities and applications offered and of instructions for using them. It regards the advanced GEOSS Portal, GEO DAB (also in terms of

APIs, and of instructions for using them), Yellow Pages, new middleware enhancements and applications that use these as from the first and second project cycle.

Document Log

Date	Author	Changes[1]	Version	Status
20/12/2023	GPP Team	***Updated Sections***: • 3.2.1 GEO DAB API • 3.2.2 GEOSS View ***Added Sections***: • 3.2.3 COMMUNITY PORTAL Self-Creation Tool • 3.2.4 Yellow Pages 2.0 • 4.2 Second Set of Applications (and all sub-paragraphs)	1.0	Issued

[1] Referred to the previous document GPP-WP3-DEL-D3.2-v1.0 "Enhanced GEOSS Platform User Manual v1 with 1st set of applications".

Executive Summary

In the context of the Global Earth Observation System of Systems (GEOSS), it has been implemented the GEOSS Platform with the aim of linking GEO users with resource providers and re-enforcing the GEO Communities involvement and contribution to GEOSS. To achieve this goal the GEOSS Platform shall play a role where Users can discover and access data, but more important where they can use these data to generate actionable information by exploiting the GEOSS Platform functionalities or contribute to the GEOSS ecosystem by providing new functionalities, applications, tools or middleware components to benefit other users and communities. With this in mind, the GPP project starts from the Applications needed by the different communities to integrate, expand and exploit all the functionalities implemented and made available through and within the platform. In particular, in this document, users can find step by step guidance regarding the functionalities implemented, interfaced and integrated within the GEOSS Platform and other GEOSS middleware components at large. In the first project cycle the following tools and applications have been enhanced:

- The GEOSS Portal,
- The GEOSS DAB and new data harvesting
- SDG 15.3.1 Land degradation application
- AfriGEO Custom GEOSS Portal creation
- Middleware components to support reproducibility, replicability and reusability.

In the second cycle of the project the following tools and applications were implemented and enhanced:

- Yellow Pages 2.0
- SDG 15.3.1 Land degradation application, have been implemented the full workflow from data to dashboard (as demonstrated during the GEOWeek 2023 in Cape Town)
- SDG 11.7: Preparatory work for the use case
- All Atlantic suggestions from Phase I
- Eiffel Discovery Cognitive Search related to CNR requests and requirements.
- Community Portal self-creation tool
- Water Cycle Pollution VLAB functionalities

The Portal is an online web map-based user interface which allows users to discover and access Earth observation data and heterogeneous collections from satellites, airplanes, drones and in-situ sensors at global, regional and local scales, from different providers from all over the world. It connects users to providers, by allowing them to discover and access to existing databases and portals, to provide reliable, up-to-date and user-friendly information – vital for the work of decision makers, and non-specialists in general managers and allow to use data by generating actionable information.

1. Introduction

1.1 Purpose and Scope

This document (D3.5 - *Enhanced GEOSS Platform User Manual v2 with 2nd set of applications*) has been generated in the context of WP3 - GEOSS Evolution design, development, integration and deployment within the GPP (short for GEOSS Platform Plus) project, Grant Agreement no. 101039118.

The objective of this document is to provide the necessary documentation for using the evolved GEOSS Platform components, instruments, and new data sources, in terms of functionalities and applications offered and of instructions for using them. It regards the enhancements at different GEOSS levels (architectural, middleware, applications) and GEOSS Platform components as the GEOSS Portal, GEO DAB (also in terms of APIs, and of instructions for using them), and new middleware enhancements driven by applications identified in the first project cycle. The new enhancements have been technically described in the [RD-2] and [RD-6], following the specification as identified and documented in the context of WP2 in the document [RD-3], Functional and Non-functional Enhancements Specification, that underpin the user needs elicited and analysed in the context of the document[RD-7], Use Cases Description and User Requirements Document.

The target audience is the wide variety of the GEOSS Portal users but also of the GEO-DAB APIs, including specific user communities, who want to reuse functionalities of the GEOSS Platform in their own portals or wish to have or trigger actionable information all in one place.

1.2 Document Organisation

The document is organised as it follows:

- Section 1: Introduction, it describes the purpose and scope of the document and its organization.
- Section 2: Rationale and Context, it contextualizes the content of this document by providing background information and details on the operational landscape encompassing the GEOSS Platform.
- Section 3: GEOSS Platform Operational Components: describes the GEOSS Platform interfaces and how to operate them.
- Section 4: GEOSS Platform Proof of Concepts: describe the first set of applications and provide a step by step guide to use them.
- Annex A: References, List the references used in the document.
- Annex B: Figures and Tables, Provides links to figures and tables in the document.
- Annex C: Terminology, explains the meaning of the acronyms and definitions used in the document.

2. Rationale and Context

2.1 Background and operational context

A central part of GEO's Mission is to build the Global Earth Observation System of Systems (GEOSS). GEOSS is a social and software ecosystem sharing independent and open Earth observation (EO) information and processing services. It connects and coordinates a large array of observing systems, data systems and processing services to strengthen monitoring of the state of the Earth. It facilitates the sharing of environmental data and information collected by countries and organizations within GEO. GEOSS ensures that these data are accessible, of identified quality and provenance, and interoperable to support the development of tools and the delivery of information services. Thus, GEOSS increases our understanding of Earth processes and enhances predictive capabilities that underpin sound decision-making: it provides access to data, information, and knowledge to a wide variety of users.

The GEOSS Platform has been created to provide the technological tool to implement GEOSS. The story of Platform began in 2008, as Clearinghouse catalogue; in 2012 the platform evolved into a Brokering infrastructure with the inclusion of the GEO Discovery and Access Broker (GEO DAB). The first user interface, the GEOSS Portal was initially created in 2010 and in 2016 has seen great enhancements in terms of user experience and enhanced discovery, access and visualization functionalities. In 2017 the platform has evolved into the currently known GEOSS Platform (see Figure 1).

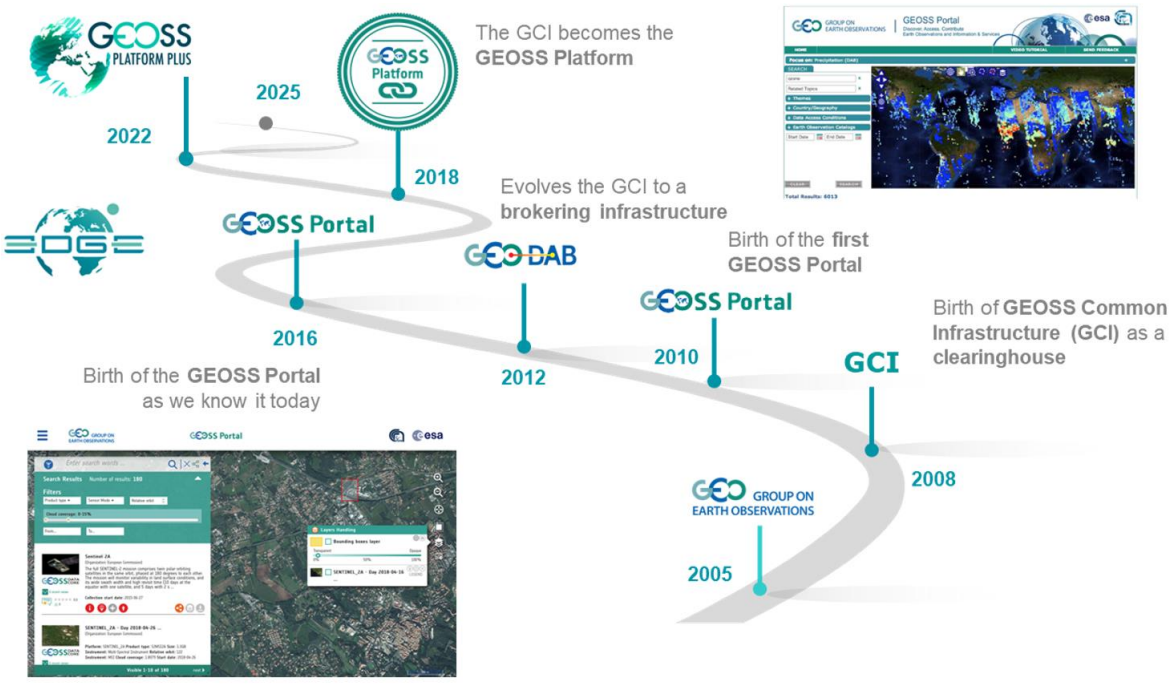


Figure 1 - The GEOSS Platform Journey

A first effort in demonstrating several proofs of concepts experimenting service execution with selection of public cloud-based analytical platforms (e.g. DIASs, AWS), navigation through linked (context) information and dedicated customisation of community portals features have been

implemented and experimented within a development platform in the framework of the EDGE (European Direction in GCI Enhancements) Project (for more details see [WR-3]).

Another EU effort in contributing to GEO is the GEOSS Platform Plus (GPP) Project with the aim to respond to the new challenges focused on the European Green Deal, implementation of the EU Strategy on adaptation to climate change and the outcomes of the Mid Term Review frameworks (see Figure 3) by developing new tools and functionalities to better address the user needs adopting an user centric approach by engaging User communities, GWP activities, initiatives and flagships and including European efforts in the Climate Change and green deal frameworks (see Figure 2 and Figure 3).

Figure 2 - GEOSS Platform Components

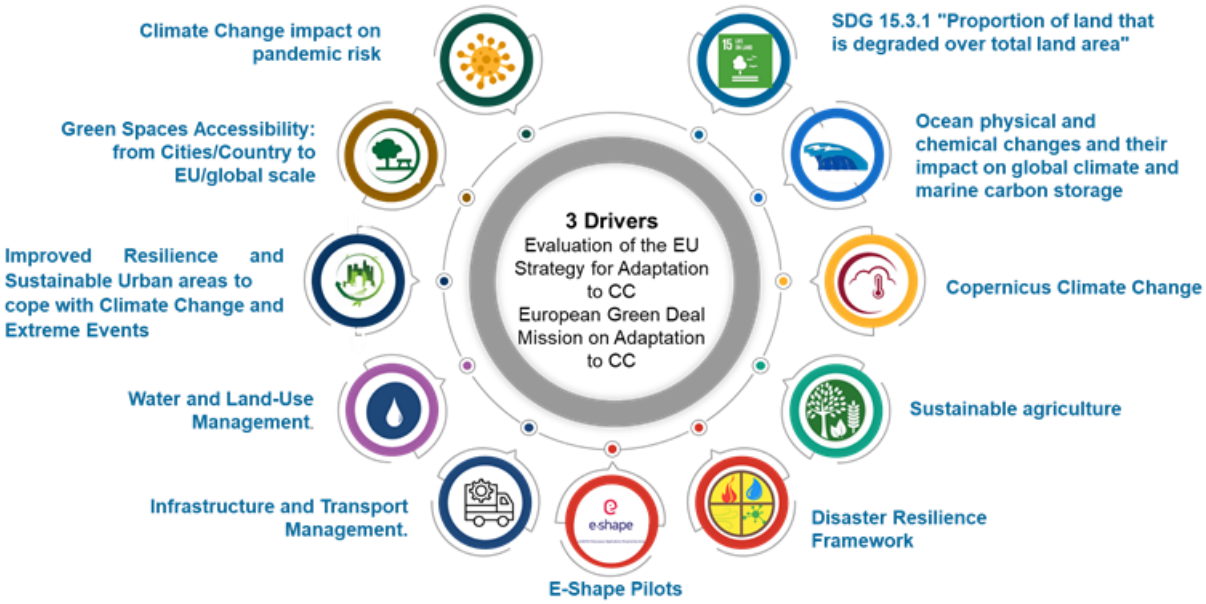


Figure 3 - The GPP Drivers and focus domains

Another objective of the GPP Project is to make the GEOSS Platform usable from a wide variety of users within the GEO communities and beyond it, that covers users coming from scientific communities to non-experts and decision makers. In Figure 4 GPP a representation of the GPP type of users involved and the functionalities they are interested in when using the GEOSS Platform.

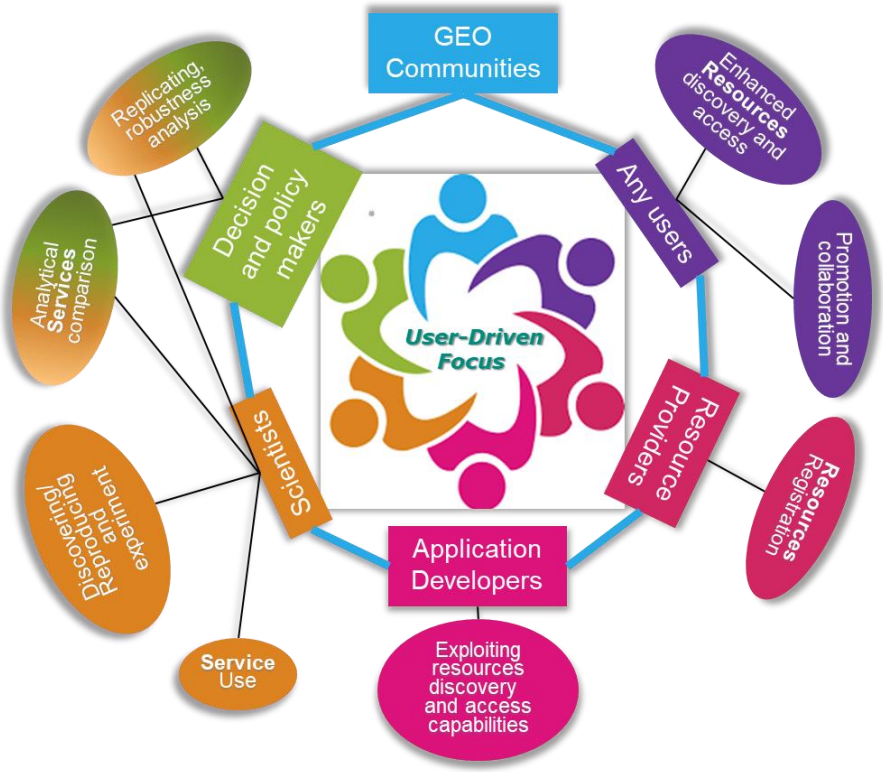


Figure 4 GPP User types and functionalities

2.2 Links with other project activities

GPP identifies five work packages as follows:

- WP1: Project management
- WP2: Use cases definition and user requirements specification
- WP3: GEOSS Evolution design, development, integration and deployment
- WP4: User validation and assessment
- WP5: Dissemination, training, exploitation and GEOSS Contribution

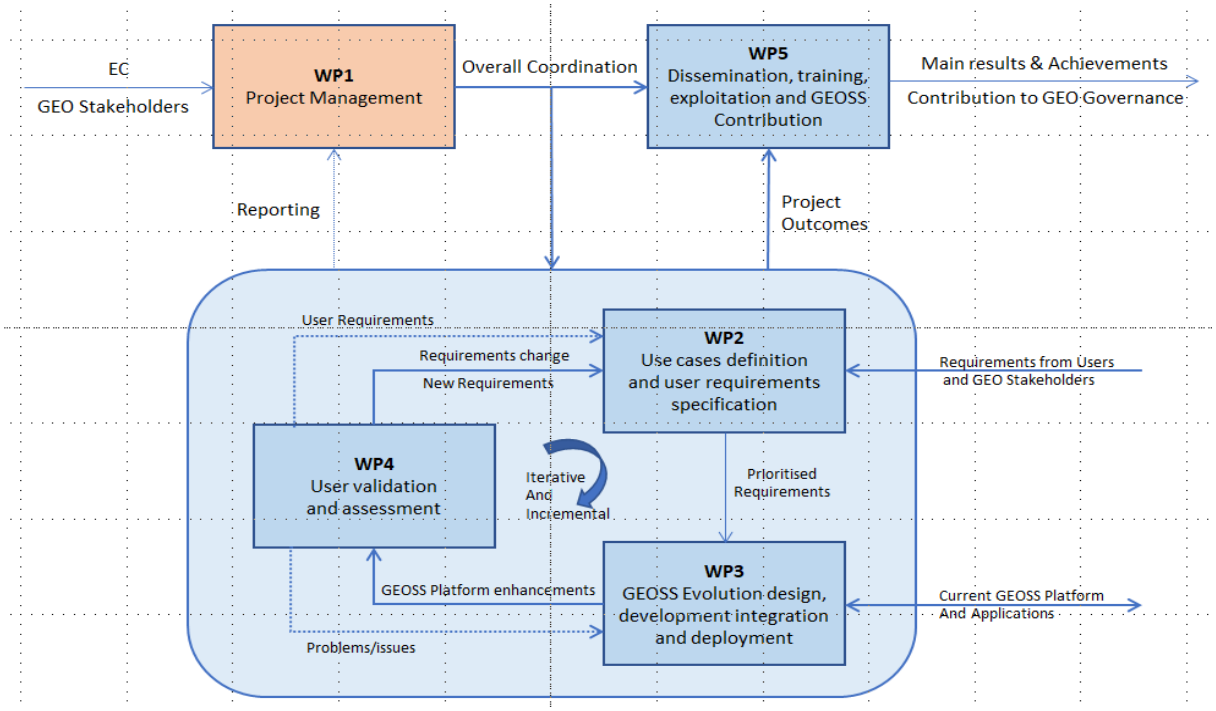


Figure 5 - GPP Workpackages and their relationships

Work-package 3 builds on prioritized GEOSS Platform requirements as input to the identification of enhancements, their implementation and definition of an integration and verification strategy. The output of WP3 is an enhanced GEOSS Platform. On top of the requirements resulting from WP2, current workpackage considers as well requirements and other inputs resulting from other (external activities).

3. GEOSS Platform Operational Components

3.1 GEOSS Portal

The GEOSS portal - available at www.geoportal.org – has the objective to provide an intuitive and user-friendly interface to allow users and GEO communities to exploit at the maximum extent the discoverability and access to data.

3.1.1 Welcome Screen

Figure 6 - The GEOSS Portal Welcome screen

At the top opening of the portal, you will see a map of the world with a search bar in the centre, a series of icons on the right and header on the top of page.

The header on the top of page includes:

1. The option or hamburger menu icon;
2. GEOSec logo – linked to the GEO Site (http://www.earthobservations.org/).
3. GEOSS Portal logo – linked to geoportal home page;
4. CNR IAA logo linked to the CNR IAA (http://www.iia.cnr.it).
5. ESA logo linked to the ESA site (http://www.esa.int).
6. The Switch language option.

The Search panel in the centre of page includes the following options:

7. Filters;
8. Search button;
9. Share search;
10. Clear search;

11. Hide/Show Search Bar;
12. Targeted/Advanced search.

Icons on the right for basic GIS (Geographical Information System) functionality include:

13. area of interest.
14. layers.

In the bottom right corner there are also:

15. An envelope icon with “Send Feedback” option.
16. The map scale.
17. And the “Tutorial mode” icon that will guide the user to the different icons and provide info on their usage.
18. Tutorial YouTube Channel

3.1.2 Option Menu

Click on the “hamburger menu” icon on the header to open the option menu. You can find the following section:

- About.
- User Support.
- Community Portals.
- Yellow Pages.
- Statistics (to use this section you must have a registered account)
- My workspace (personalized workspace and retrieve information regarding popular/ most used searches)
- Sign-in.

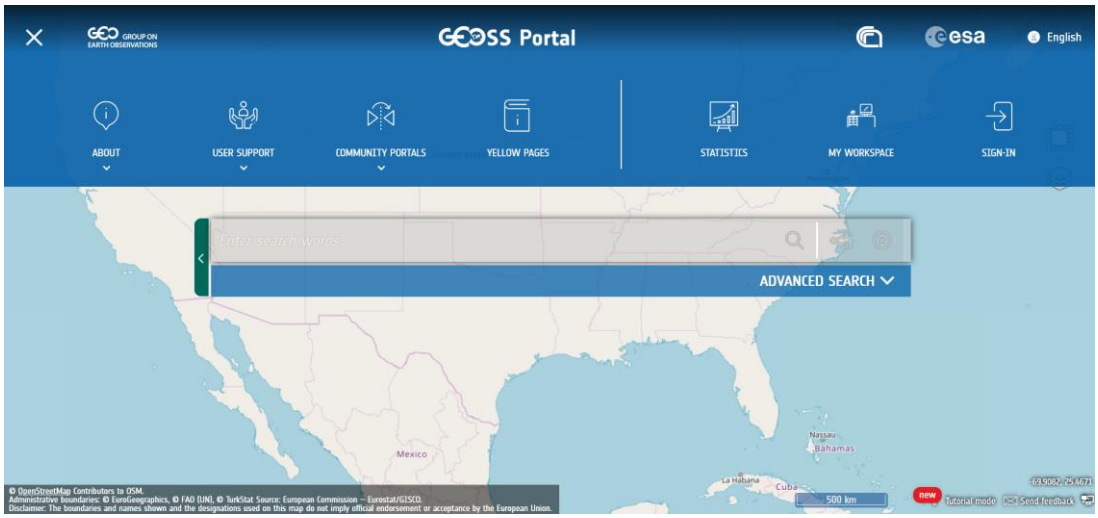


Figure 7 - The GEOSS Portal option menu

3.1.2.1 About Section

The About section contains the following 3 links:

- **General information**
- **Terms & Condition**
- **Release notes**

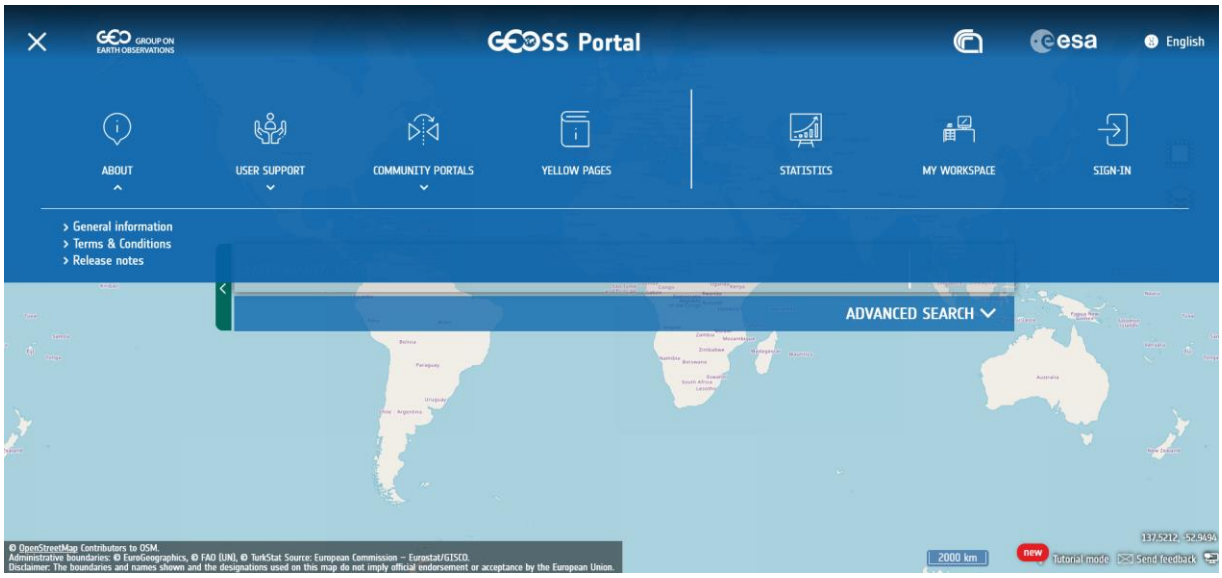


Figure 8 - About section

3.1.2.2 User support Section

The User Support section contains the following links:

- **Help Desk**: clicking on this link you can access to some services like a General information, GEOSS Portal Video tutorial, contact points, provide feedback, info for developers, FAQ.
- **Documentation**: latest updated documents.
- **Tutorials**: you can find some examples of GEOSS Platform and Video Tutorial
- **Highlighted searches**: you can find some prefilled searches

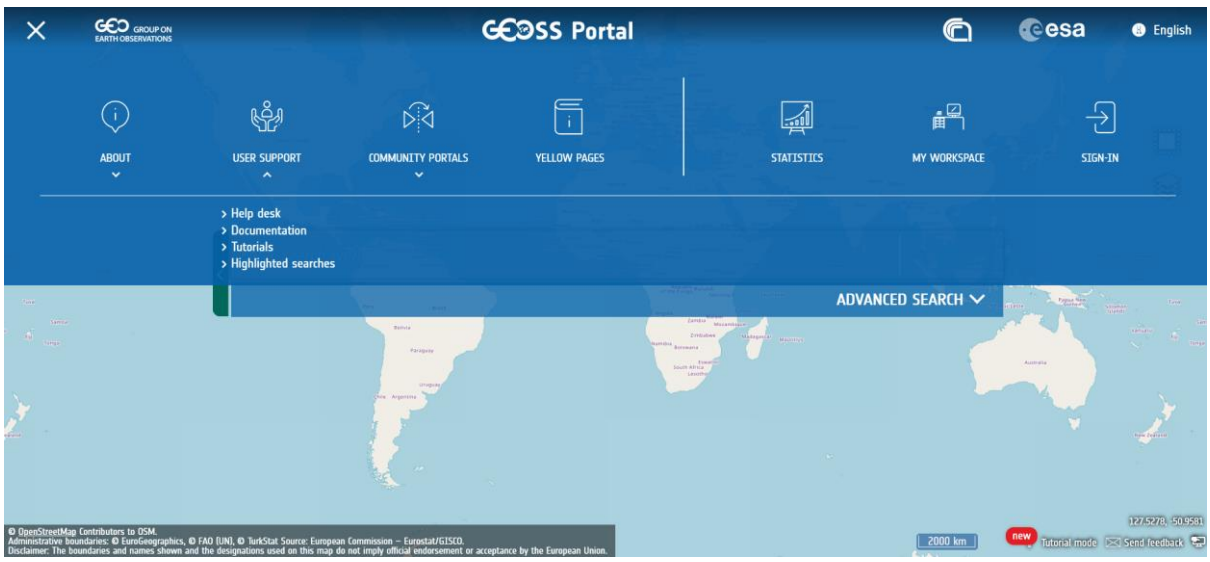


Figure 9 - User Support section

3.1.2.3 Community Portals Section

In this sub-menu you can find the existing community portals where have been implemented some customized views to manage specific data for the community purposes.

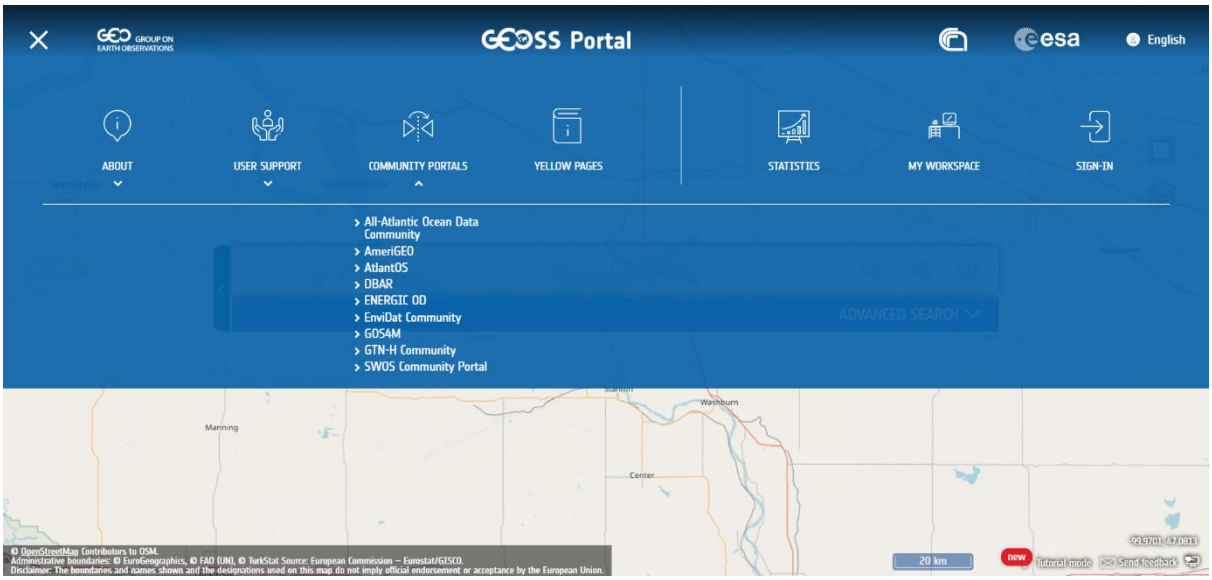


Figure 10 - Community Portals section

3.1.2.4 Yellow Pages section

The yellow pages section contains the list of registered providers for the GEOSS Portal

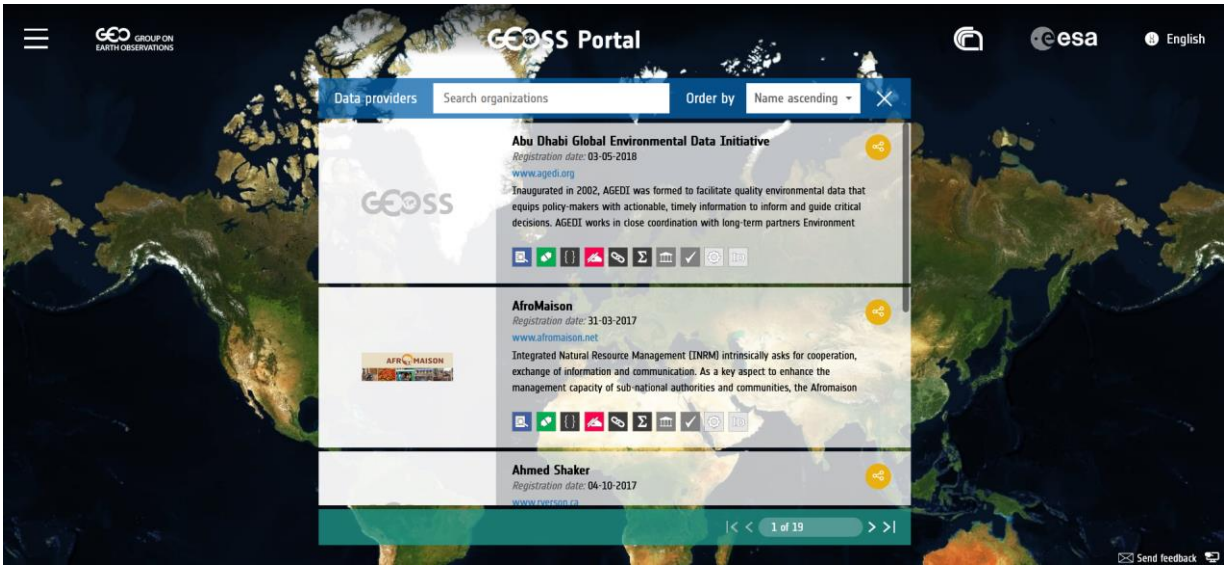


Figure 11 - Yellow pages section

3.1.2.5 Sign-in

In order to obtain credentials to log-in open the Hamburger menu on the top-left corner of the GEOSS Portal website and click on the item Sign-in.

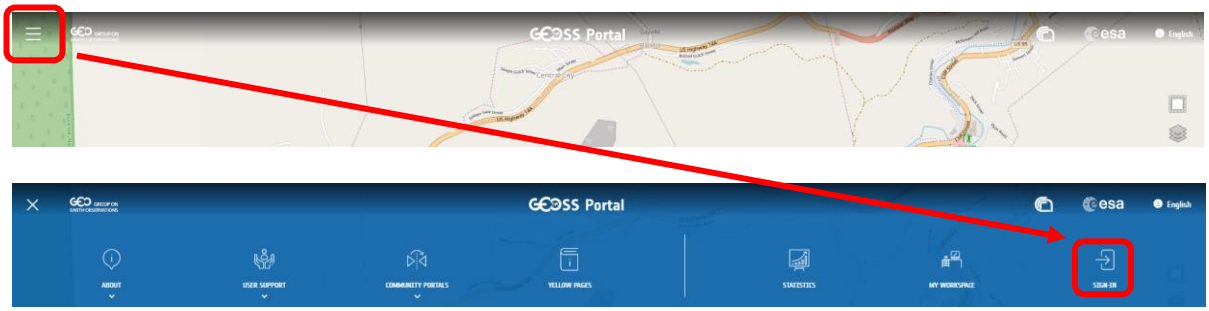


Figure 12 - The Sign-in item

3.1.2.5.1 Special features for logged users

Logged users have more options in portal e.g., can save searches, save runs, bookmark results. They can also see and save as pdf/csv statistics.

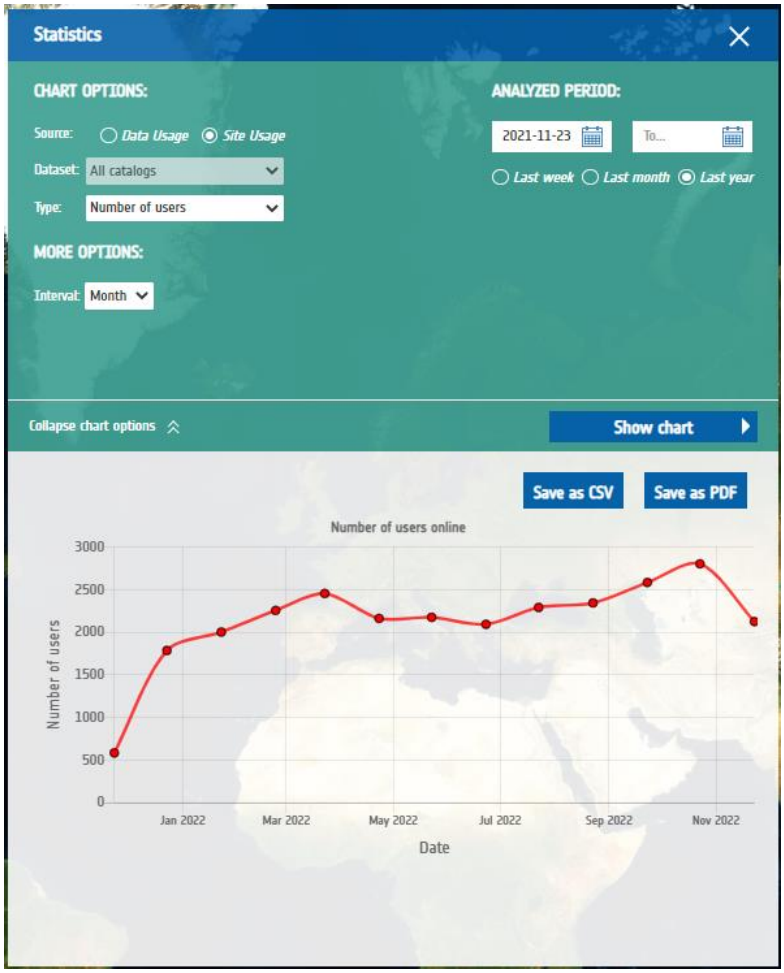


Figure 13 - GEOSS Statistics

3.1.2.5.2 Status Checker

The end-user can search for Earth Observations data and filter available services using as well the Health Status filter provided by the GEOSS Status Checker.

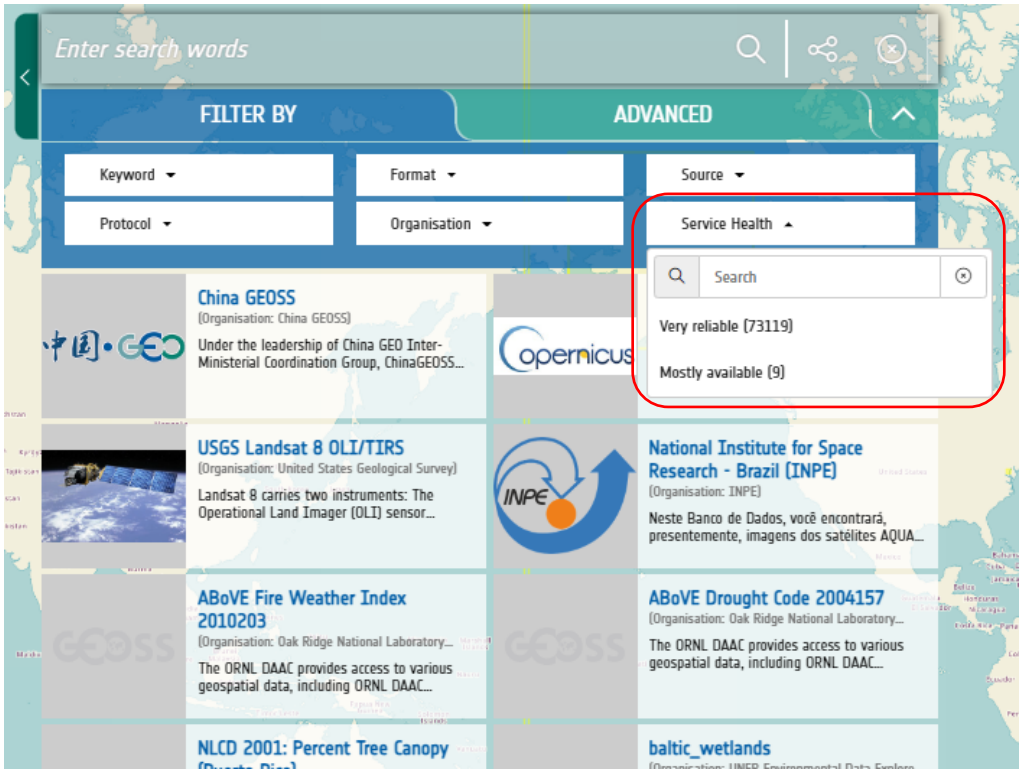


Figure 14 - the Service Health filter

3.1.3 Search for Resources - Multi-Criteria Searches

The multi-criteria search panel can be unfolded selecting the most-left icon in the keyword-based search panel.

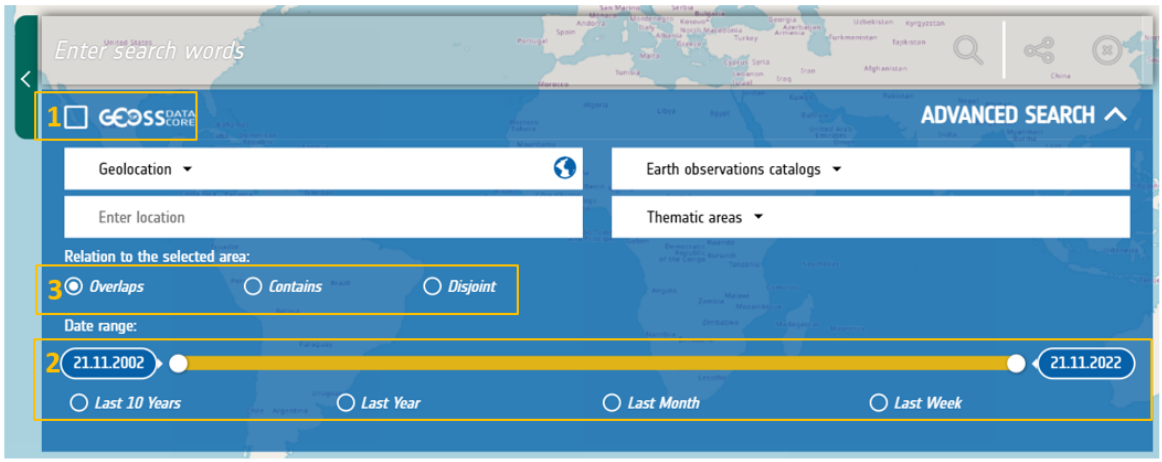


Figure 15 - The multi-criteria search panel

As part of a multi-criteria search, a user can:

1. restrict search results to the freely and openly accessible ones only, so-called GEOSS Data CORE resources (see Figure 9 box 1);
2. Define a timeframe of interest (see Figure 9 box 2)
3. Relations with selected areas allow users to display on the map geographic features that Overlaps, Contains or Disjoint the Area of interest (see Figure 9 box 3)

Other main filtering options are explained below:

- restrict the search to a limited set of Earth observation catalogues of interest to the user;

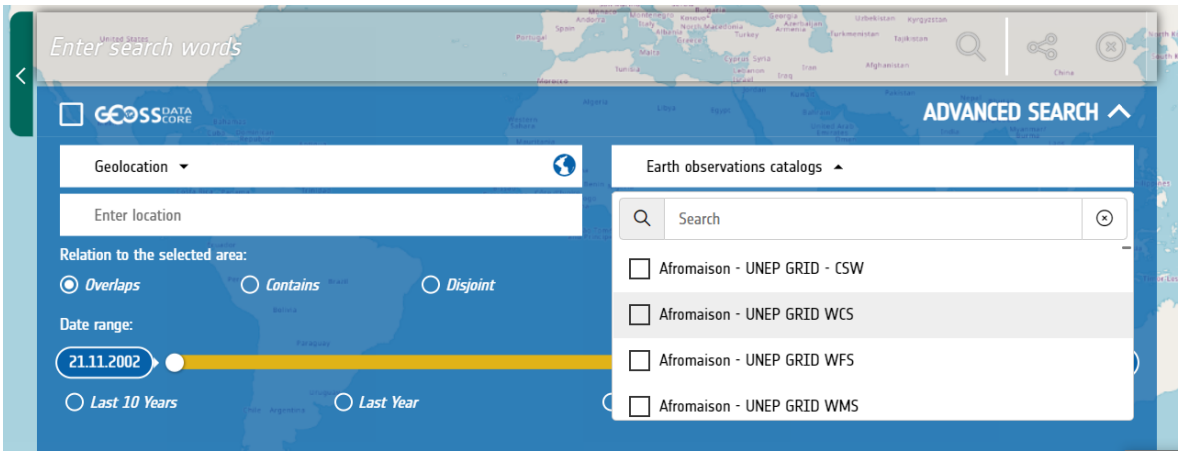
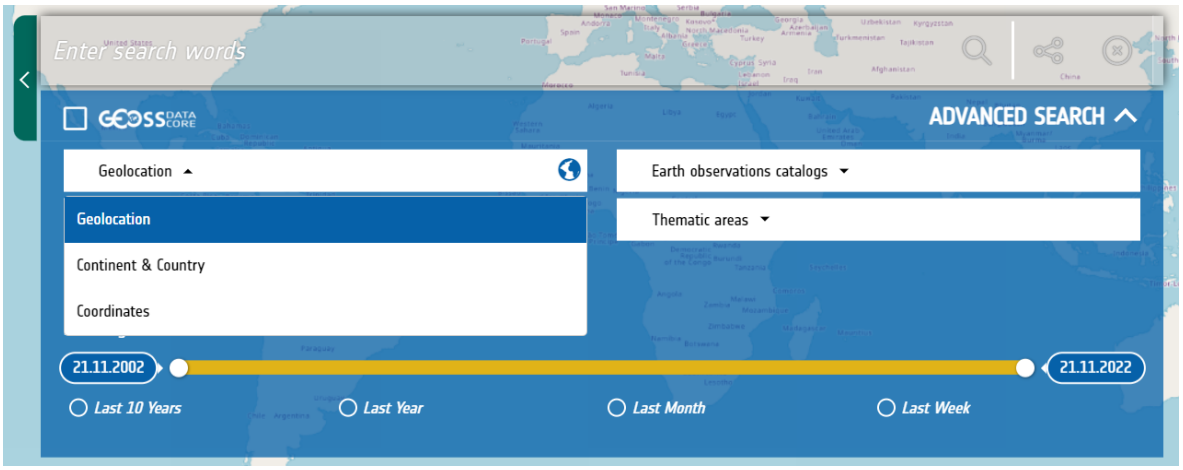


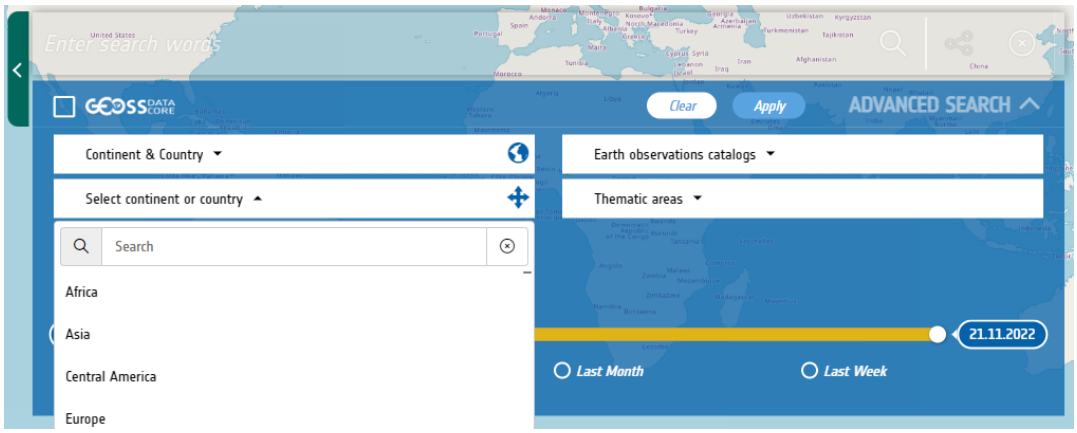
Figure 16 - the Earth Observation Catalogues filter

- define the **Geolocation** of interest using one of these options:
  a. Geolocation (Figure 17 a)
  b. Coordinates (Figure 17 b)
  c. Continent & Country (Figure 17)



a)

b)



c)

Figure 17 - How to specify a location on Earth a), coordinates b) and countries c) filters

- Direct the search towards a specific **Thematic Area** applying predefined views on the data;

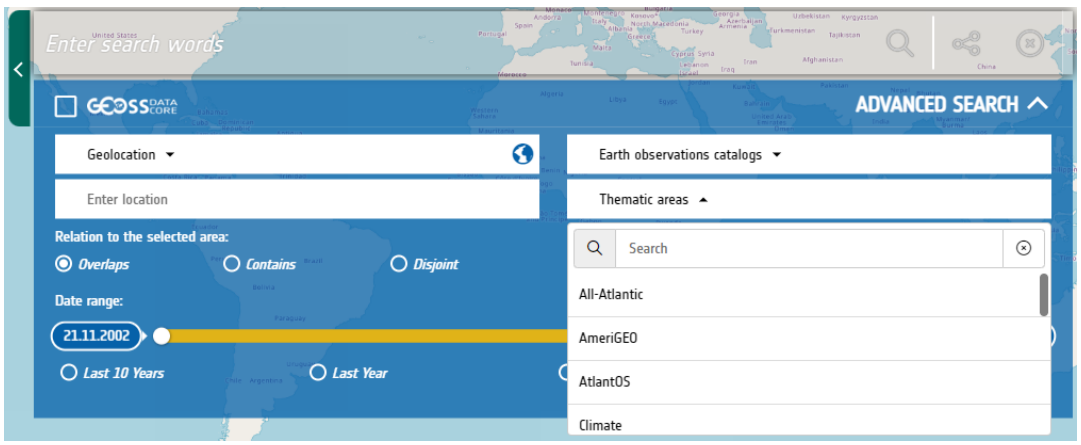


Figure 18 - The thematic areas filters

3.1.4 Results Inspection

After having specified search criteria, you can click on the search button. Results (if any) will appear in the result window.

Figure 19 - The result window

The first page of results is displayed (12 results, by default); users can easily access the next (or previous) page of results by clicking the next (or prev) arrow at the bottom of the panel.

Each result item shows a title, a brief description, a browse image (if available), the GEOSS Data CORE flag (which means that the data is freely and openly accessible, according to the GEOSS Data CORE principles), and a series of icons corresponding to applicable functions.

More precisely, the following functions may be available:

Icon	Description
0 0.0	GEOSS Like (assign stars) and watch option the result.
See more	Allow the user to read and know more about the dataset
	Localization of the data on the map either as bounding box or as a placeholder.
	Collaboration and sharing of resources.
	Add a layer to the map in case layers are available from the Data Provider.
	Download the data in formats made available by the Data Provider.

Table 1 - Interface operational icons Description

3.1.5 Filtering

The GEOSS portal provides the possibility to narrow down the search results to a smaller set by applying filters. The type of filters depends on the actual search and results.

3.1.5.1 Default Filters

Default filters are available for most search results and include filtering on keywords, format, source, protocol and organisation. Filtering is progressive, implementing an 'AND' operation and not an 'OR'. For each filter, only one value can be selected.

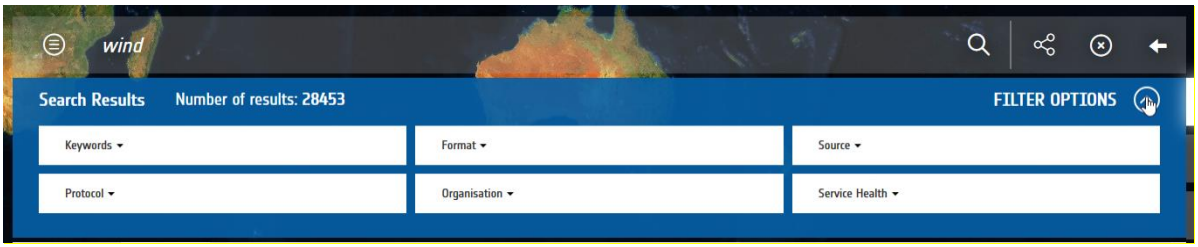


Figure 20 - Default faceted filters

3.1.5.2 Smart Filters

Smart filters and visualisation specificities are implemented for some of the result types. For example, a smart filter considering a combination of cloud coverage, product type, sensor mode and relative orbit has been implemented for data from the Sentinel 2 and the Landsat imagery, and a smart filter considering product type, sensor polarisation, sensor mode, sensor swath and relative orbit has been implemented for Sentinel 1 data.

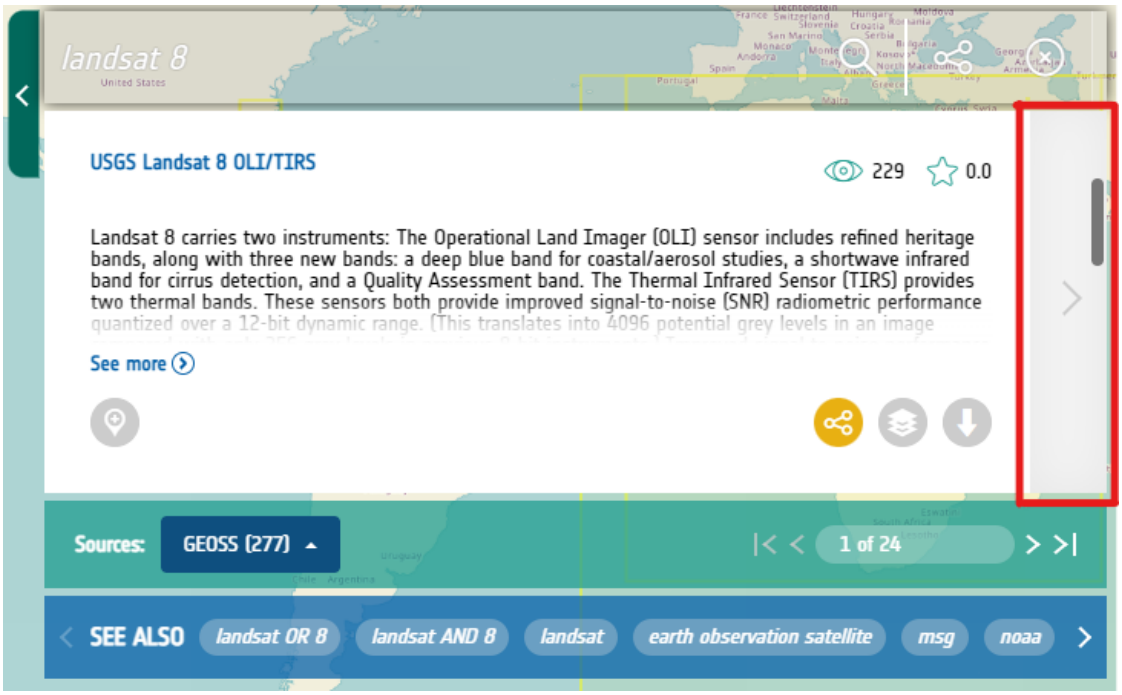


Figure 21 - How to open a collection of homogenous results

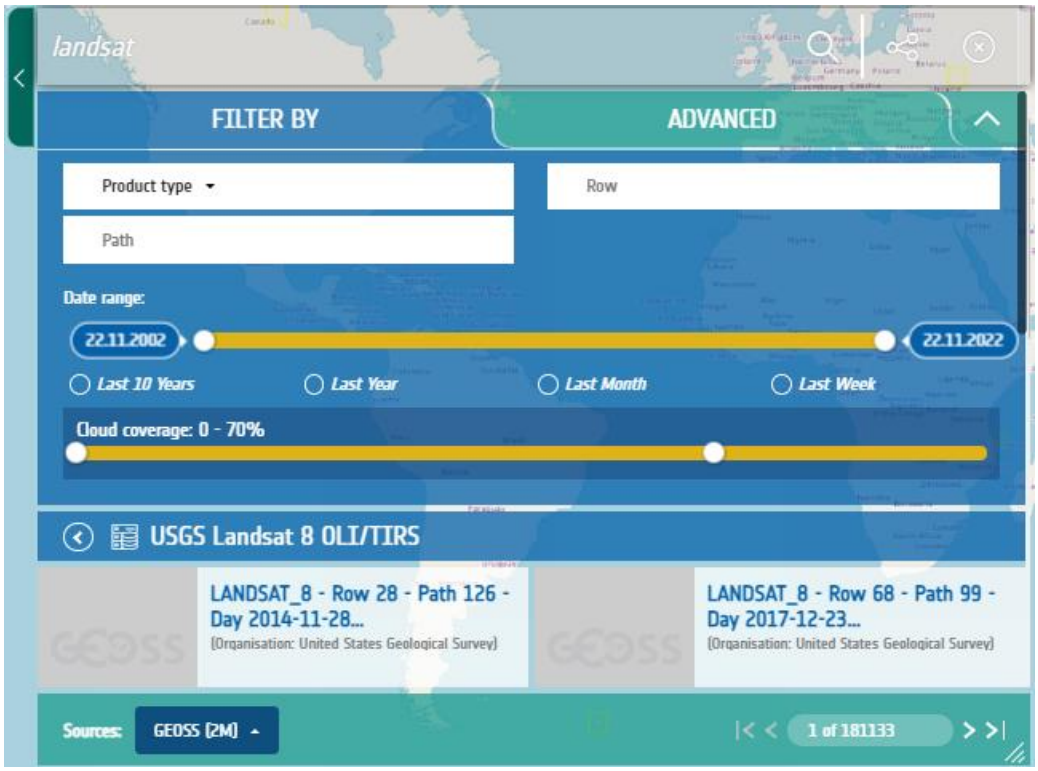


Figure 22 - Smart faceted filters

Other smart filters and specific visualisations are available for earthquake events.

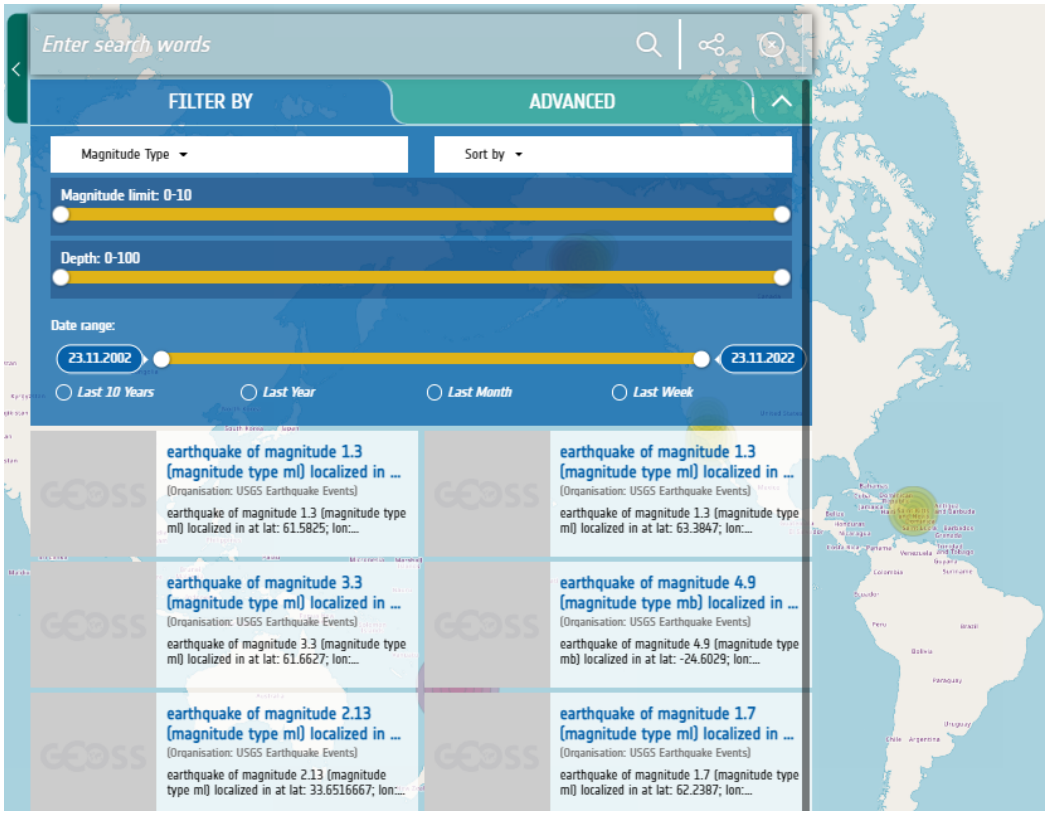


Figure 23 - Smart faceted filters for earthquake events

3.1.6 Take a tour

New users can click on the dedicated icon in the bottom right corner of the screen to enable the tutorial on how portal works. Clicking on the green lamp, it will open a pop up explaining what the button does.

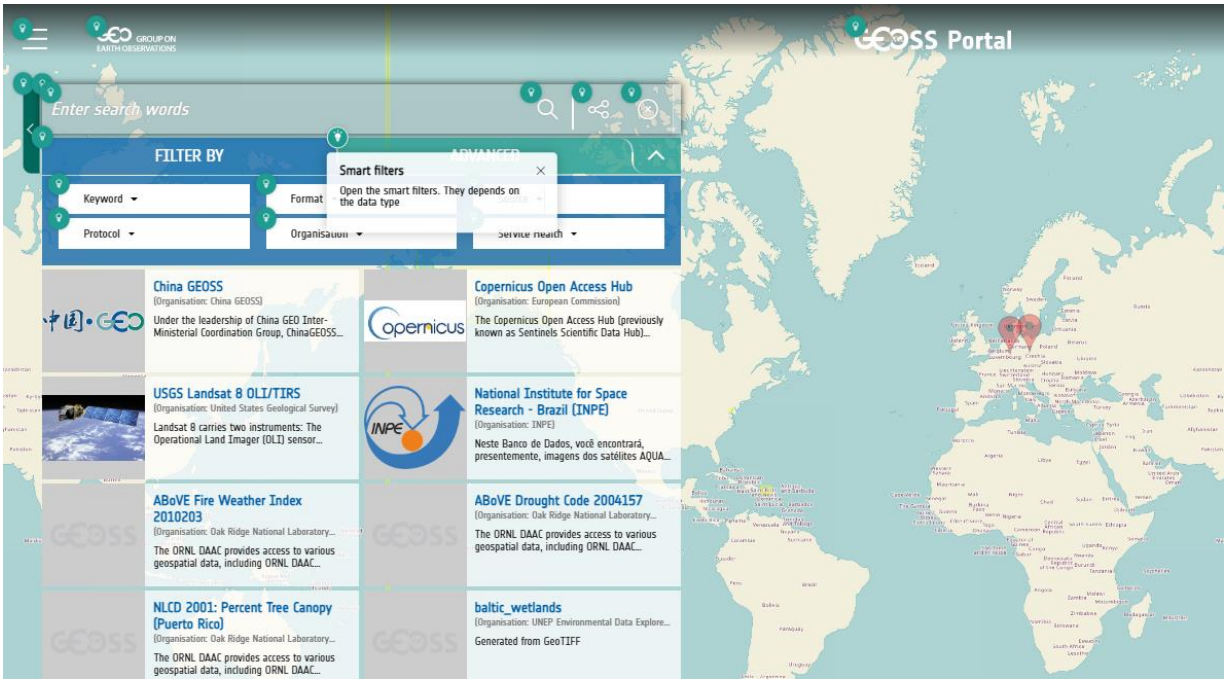


Figure 24 - "Take a Tour" help on-line

3.1.7 Languages

The Portal interface elements are available for English, Polish, Spanish and Chinese languages speakers.

Figure 25 - The language bar

3.1.8 GEOSS Instant Feedback

Users willing to participate in portal improvement can take part in quick survey to share general impression about portal.

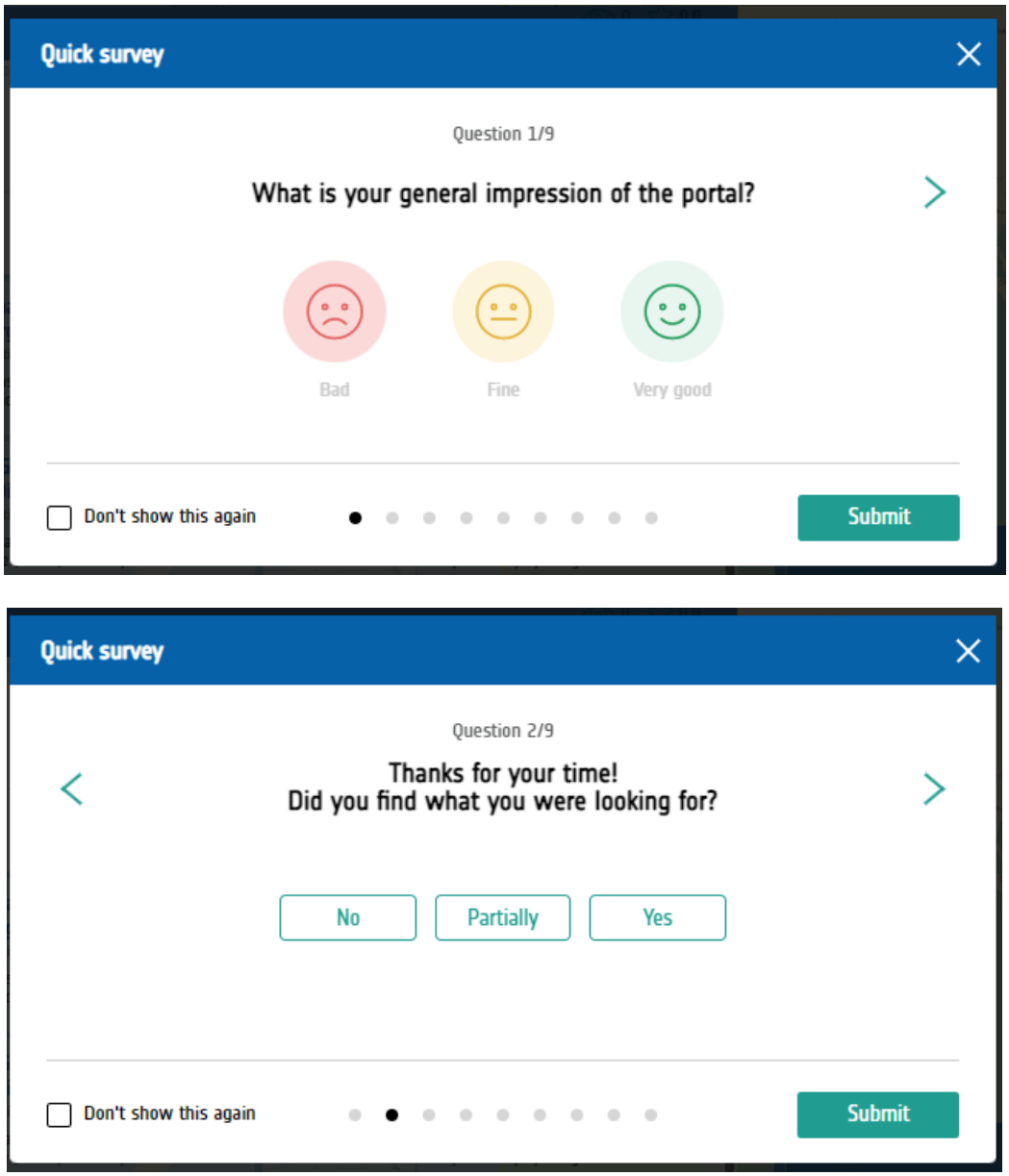


Figure 26 - The instant feedback and survey

3.2 The GEOSS Platform Re-usable Components

3.2.1 GEO DAB API

The GEO DAB is a middleware component which is in charge of interconnecting the heterogeneous and distributed capacities contributing to GEOSS; it provides three main functionalities:

1. **Data/Metadata Harmonization**: provides harmonized discovery and access to heterogeneous data systems. The heterogeneity of data sources is hidden, resources appear as a single data source.
2. **Data Access**: provides data discovery and access functionalities to heterogeneous data systems.
1. **Data Transformation**: enriches access functionalities by allowing users to customize their downloads (e.g. change format and/or CRS).

Since it is a middleware component, GEO DAB users are typically software agents, such as web- based or desktop client applications. These can exploit the GEO DAB functionalities implementing the client-side of one (or more) of the protocols published by the GEO DAB for the above functionalities. The available protocols include:

- OGC Catalog Service for the Web (CSW)
- OpenSearch with geo, time and semantic extensions
- Open Archive Initiative (OAI) PMH
- OGC Web Processing Service
- etc

In order to simplify the development of applications and clients making use of the DAB, the following APIs have been developed:

GEO DAB APIs	Geospatial Expert	Web Dev. Expert
Standard Web Services (OGC Web Services, OAI-PMH, CKAN, etc.)	X	
OpenSearch (Extended)	X	
GEO DAB API JS		X
GEO DAB API REST		X

Table 2 - GEO DAB APIs

GEO DAB API REST and JS are documented at [WR-1]

A set of APIs was developed for the VLab feature too. VLab APIs are documented at [WR-2]

A specific extension of GEO DAB APIs was developed for the use of EIFFEL cognitive search. In particular, it is possible to use a specific parameter which enables the different kind of searches (described in D3.4):

- Text Search
- Cognitive Search
- Cognitive Sorting

3.2.2 GEOSS VIEW

A GEOSS View is a subset of the whole GEOSS resources brokered through the GEO DAB. A GEOSS View can be used to provide to the community access only to a subset of specifically defined resources using temporal, thematic and spatial criteria, to be included in their community Portal.

A GEOSS View is defined by applying a set of clauses:

- Discovery clauses (e.g., spatial envelope, keywords, sources, etc.)
- Access clauses (e.g., data format, access protocol, CRS, etc.) [implementation of this functionality is on-going]
- View clauses, i.e., nested view: allowing defining a view as a sub-view of an existing one. All the clauses from the parent view are inherited by the sub-view, which combines them with its own clauses in an "and" relation. Multiple sub-views can be defined from the same parent view.

Presently, a GEOSS View is created by the GEO DAB operator according to the requests of the specific community.

GEO DAB APIs were enhanced to allow the automatic creation of GEOSS Views.

These new APIs are now in test phase for their use in the self-creation tool.

3.2.3 COMMUNITY PORTAL Self-Creation Tool

Each community can decide to build its own Community Portal, with the same layout of the GEOSS Portal and customize it for their needs.

In the second set of application it has been implemented a single instance in order to be tested the Community Portal self-creation tool and tailored with the desired pages and details.

It has also been provided a document (Community Portal - Administration Guide, see [RD-5]) with all information to build and administrate the Community portal .

3.2.3.1 COMMUNITY PORTAL Self-Creation Tool feature not implemented

In the next phase the user will be able to find the request Community portal button and to download the full package with a wizard to guide the user for simple customisation of the community portal and the full package of the portal allowing community developers to implement and have full control of the Community portal.

3.2.4 Yellow Pages 2.0

The Yellow Pages is a system designed to streamline the process of registering as a GEO data provider. The system features a two-step approval proves, application and registration process history, user, and registration form management.

The above is achieved through three user roles:

1. Owner (also referred to as Administrator)

2. Operator (also referred to as GEO Body)
3. Data provider

Owner role is responsible for system administration, which includes user management and updating the registration form. In addition to administration duties, users with the owner role are responsible for first approval (pre-acceptance) in the two-step approval process.

Operator's role responsibility is the final acceptance in the two-step approval process.

Data providers are the users responsible for maintaining their organization's data provider details. Only one account can be registered per data provider.

End users are freely able to register as data providers through the registration form available from the login page. To register as a data provider, the user, representing an organization providing the data, has to submit a filled in registration form containing details about the provider.

For details on creation of owner and operator accounts, see section 4.1 ("User management") of this document.

3.2.4.1 Registration form

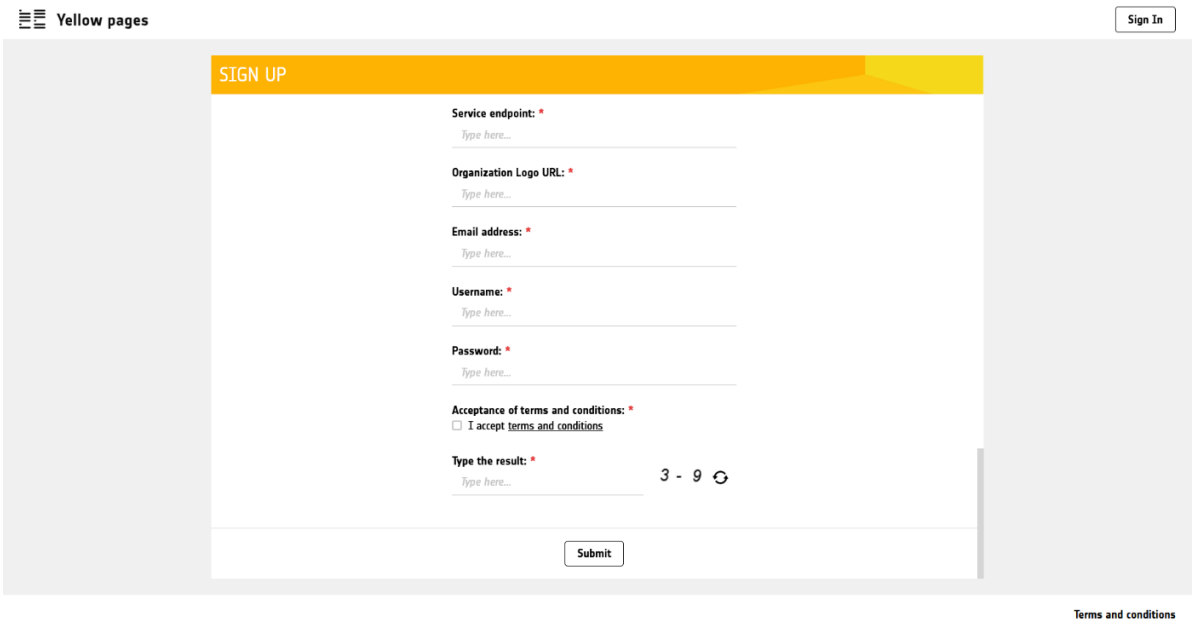


Figure 27 - Registration form with account details fields (email, username, password) and captcha visible

The form consists of fields describing the data provider and data they are providing, account details (username, email, password), and a captcha. All fields are validated on the fly – if any issues are detected, the relevant field will be highlighted, and a short description of the issue will be shown. Forms containing errors cannot be submitted.

To apply, fill all the fields marked as required, solve the dynamically generated captcha, and submit the form.

Successfully submitting the form will generate a confirmation email, which will contain an activation link, leading to a page where the registration process can be confirmed. If the registration process is not confirmed, it will be **automatically discarded after 24 hours**. All data associated with the discarded application is deleted.

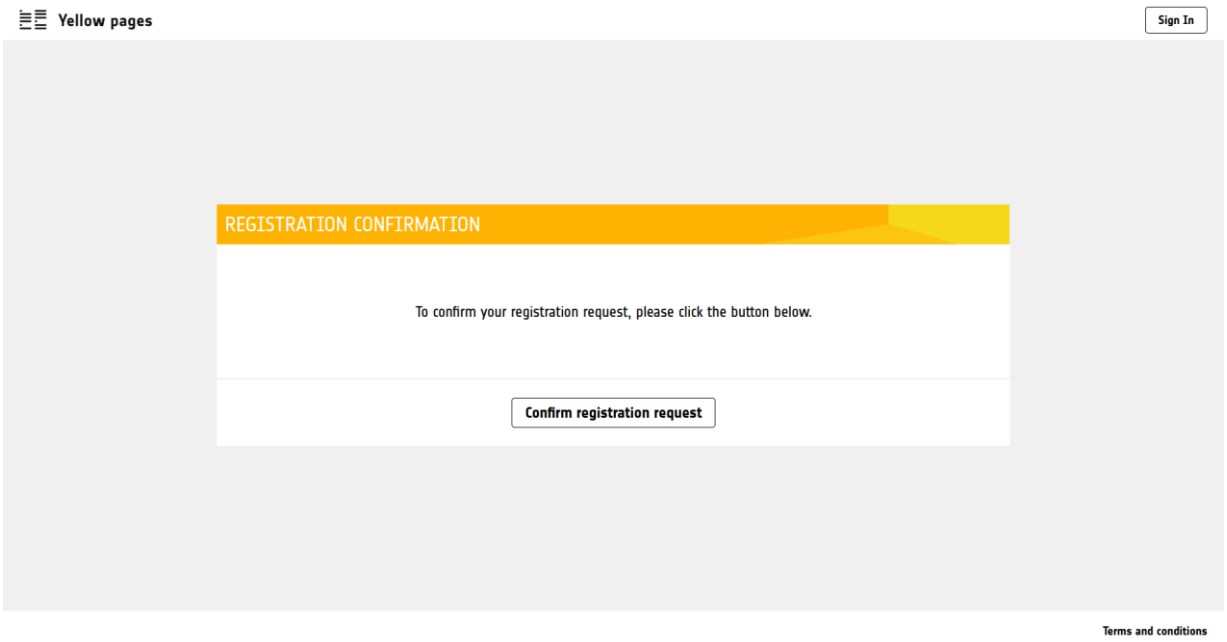


Figure 28 - Registration confirmation page

Afterwards, the application will be sent for approval.

3.2.4.2 Registration approval

Once the application is submitted and confirmed, it will be sent for approval – first to the site owners, then to the operators. The data provider won't be able to log into their account until the full approval has been granted, but they can check the current status of their application, by using the link provided in the registration request completion message (sent after the application has been confirmed).

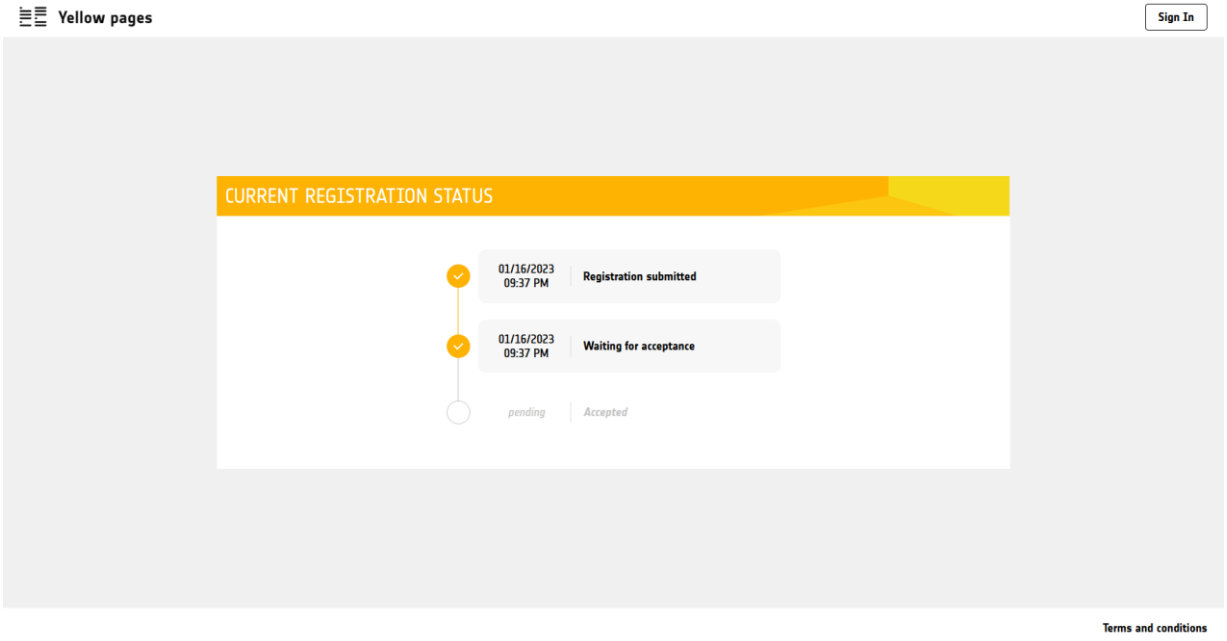


Figure 29 - Registration status page

During this step the application can be accepted or rejected. If it is rejected, all data submitted during the registration will be deleted.

Email notification is generated and sent to the provider once the application status is updated – whether due to rejection or acceptance (in the latter case, notification is sent only the application has been submitted in both steps of the process).

Upon acceptance, the system creates and enables the data provider's account based on the details given during the registration.

3.2.4.3 Editing submitted information

Once the application has been approved, the registering user will be able to log into their account using the details they have provided during the registration. This allows them to review the accepted form, edit their account details, and send updated data provider details.

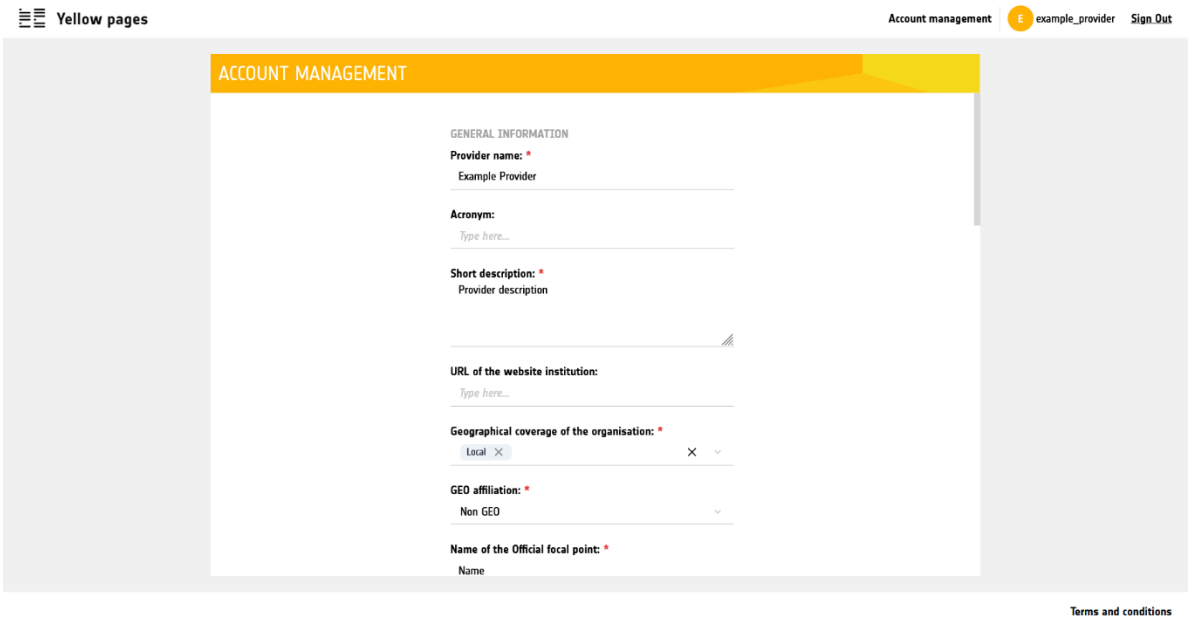


Figure 30 - Account management page with data provider form visible

All of the above is done through the "Account Management" tab, which is the only tab available to data providers.

Data providers wishing to edit the provided provider details, need to edit relevant fields in the form and submit it. Once submitted, the form cannot be edited or viewed until it has been approved or rejected in the process identical to the initial registration.

Account password and email can be edited without re-submitting the provider data for approval. To do so, edit email and/or password fields without editing any general information fields, and submit the form.

All entered changes can be discarded without saving or submitting them. Either by reloading the page, or with the "Undo changes" button at the bottom of the form.

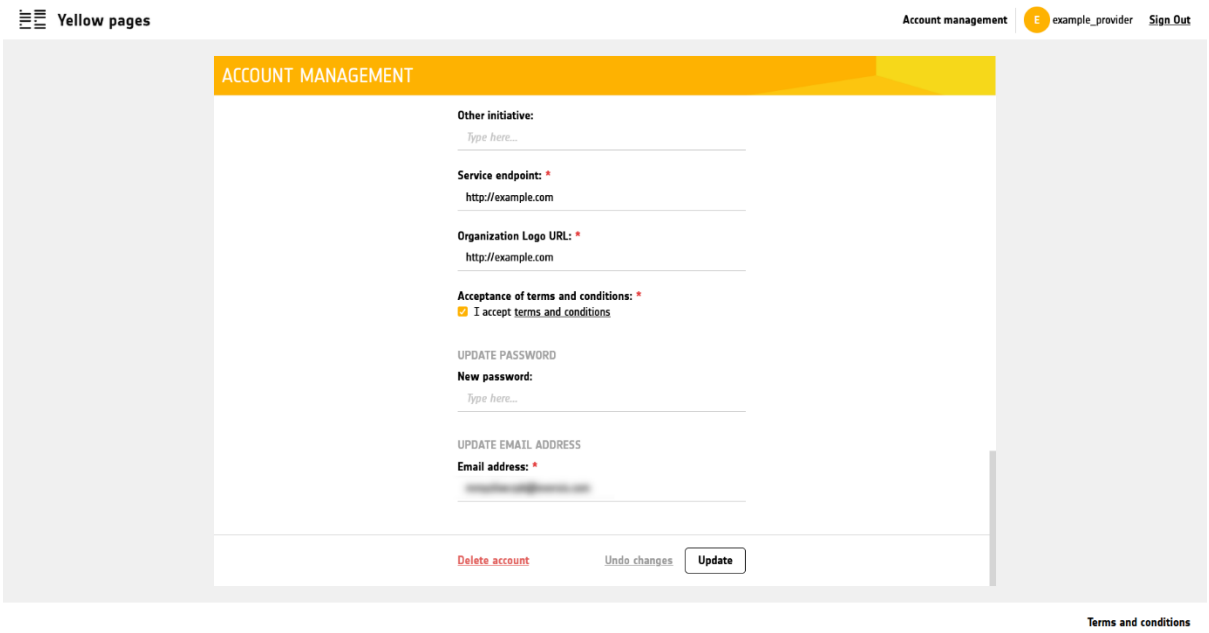


Figure 31 - Account management page with the account information section visible

3.2.4.4 Deleting accounts

All users, regardless of their role, can delete their account at any point. This option is available at the bottom of the form in the "Account management" tab (see Figure 31). User will be asked to confirm their decision to delete their account.

Once deletion has been initiated, neither the initiating user, nor administrators will be able to stop or undo it – **this action is destructive and irreversible**. All data associated with the account (submitted registration forms, account details, email address) will be deleted in the process.

Note that registration status of previously submitted applications is kept for one week by default in anonymized form in the registration history tab. This data is automatically deleted after one week.

Administrator can delete user accounts without involving users in the process (described in section 4.1 of this document).

3.2.4.5 Data provider registration – operator's and owner's perspective

Site owners and operators can see the pending applications in "Registration status" tab. This tab contains a table displaying all applications sent for approval to the user's role.

Applications which have not yet been approved by the owner will not show up for operators. Likewise, if an application has already been approved by an owner, it will not be shown to that user, or any other user with the owner role.

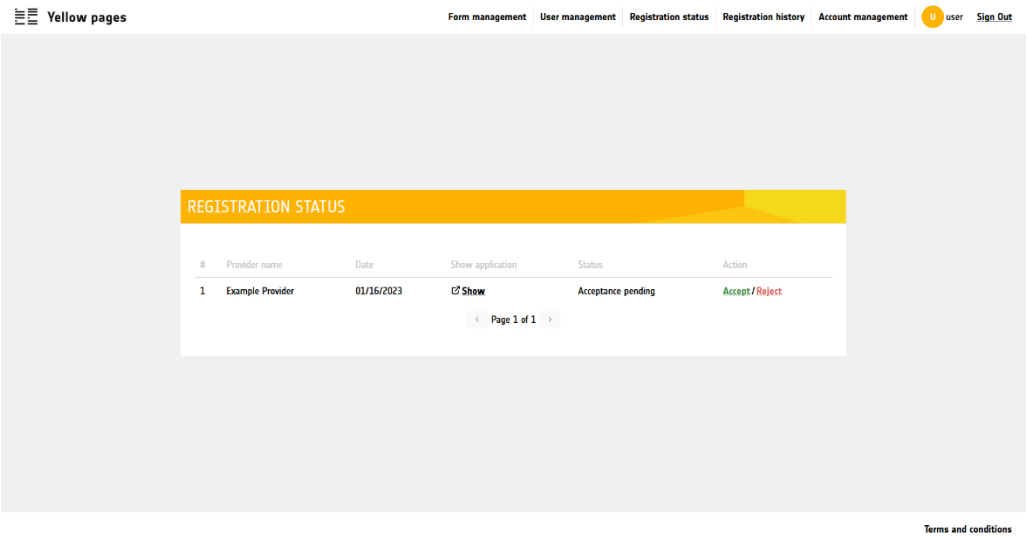


Figure 32 - Registration status page (owner's and operator's perspective)

This table allows the approver to inspect sent applications ("Show" button), accept, or reject them.

Both owners and operators are notified through an email message of new applications as they enter the role's approval queue.

All pending applications, regardless of the role they are assigned to, can be viewed in the registration history tab, which contains a similar table to the one from registration status.

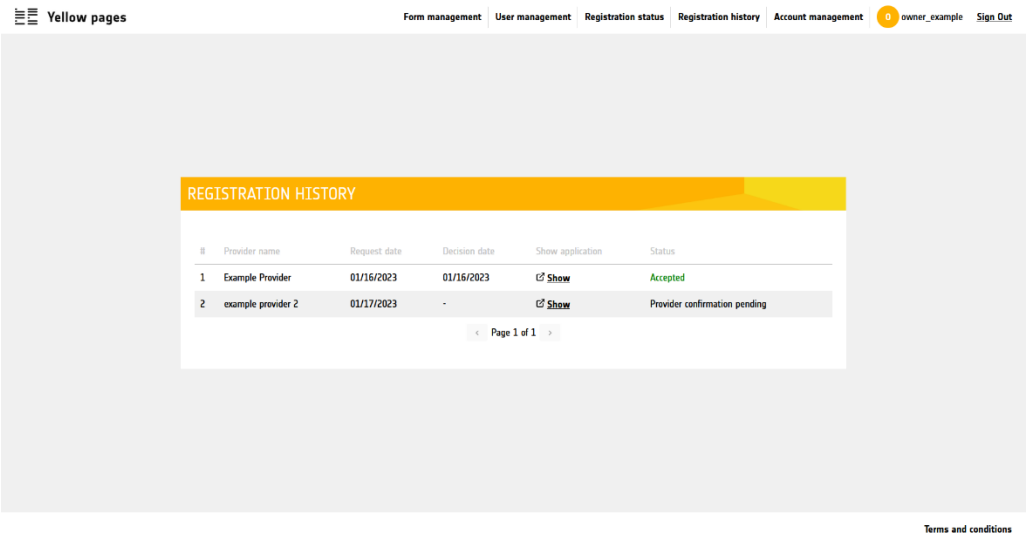


Figure 33 - Registration history page with one accepted and one pending application

3.2.4.6 System administration

All administration options are available to users with the owner role through the tabs at the top of the page. These tabs are:

- Form management
- User management
- Registration status
- Registration history
- Account management

Registration status and history are used for application management and have been described in previous section.

Account management allows the user to edit their account details – this screen is almost identical to the one available to data providers. The one difference is that data provider form is not included for operators and owners. Otherwise, the page functions in the same way as it does for data providers, including account deletion.

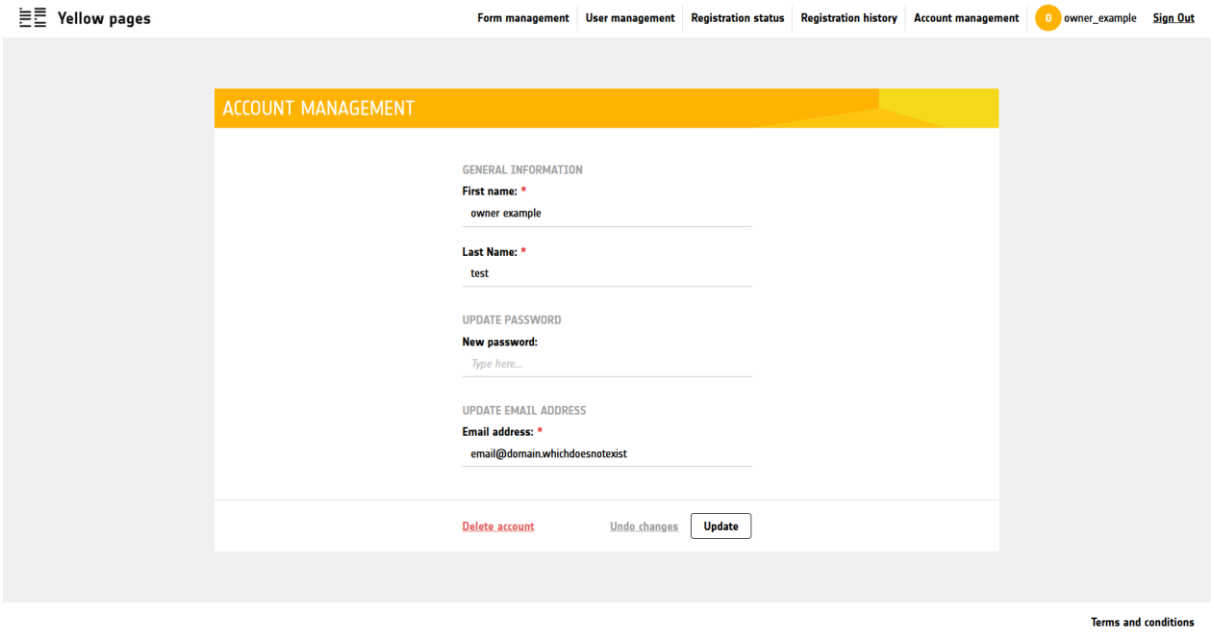


Figure 34 - Account management page (operator's/owner's perspective)

3.2.4.7 User management

By default, the system is populated with only an admin account – site owner is responsible for creating accounts for other administrators and accepting body representatives.

To **create a new account**, open the user management tab, click the "create account" button at the bottom of the page, and fill in the opened form.

It is recommended, when creating new accounts, to set a random password and have the user create password for their account themselves, using the password reset function, available on the login screen (button named "forgot password").

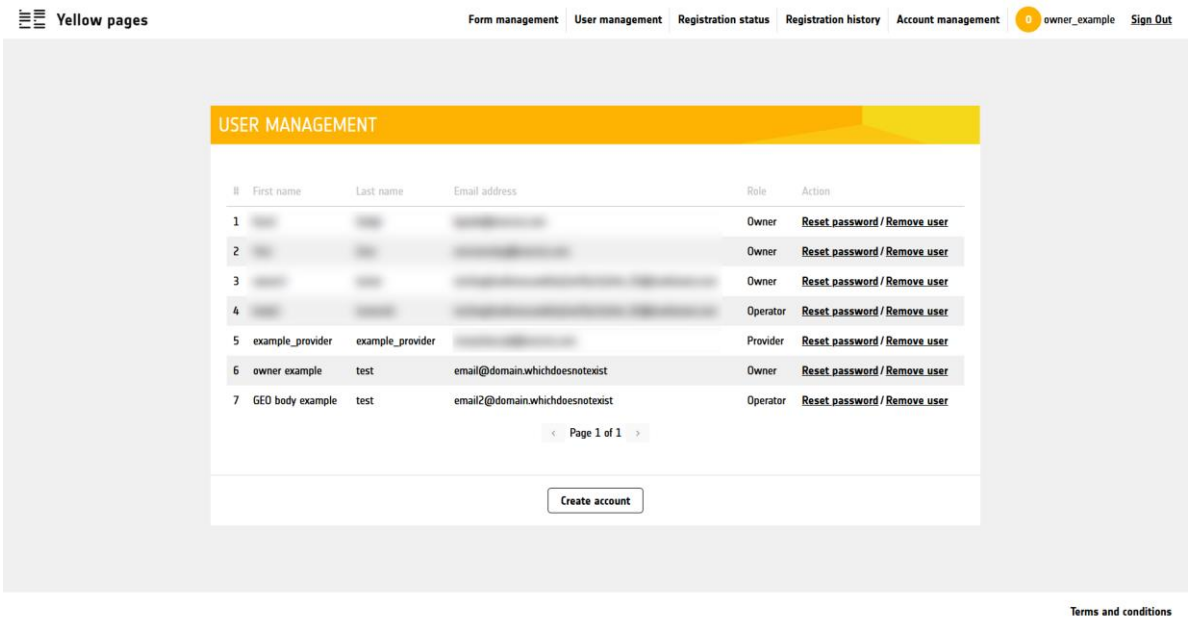


Figure 35 - User management page. Personal information has been blurred out

The table itself lists currently registered users and allows the admin to reset their passwords or delete the accounts entirely.

Resetting the password blocks the selected users from logging in until they set a new password. Instructions on setting a new password are sent in an email message.

Removing a user deletes that user's account and all associated data entirely.

3.2.4.8 Form management

The registration form used to gather information from registering data providers can be edited by the admin from the "form management" tab.

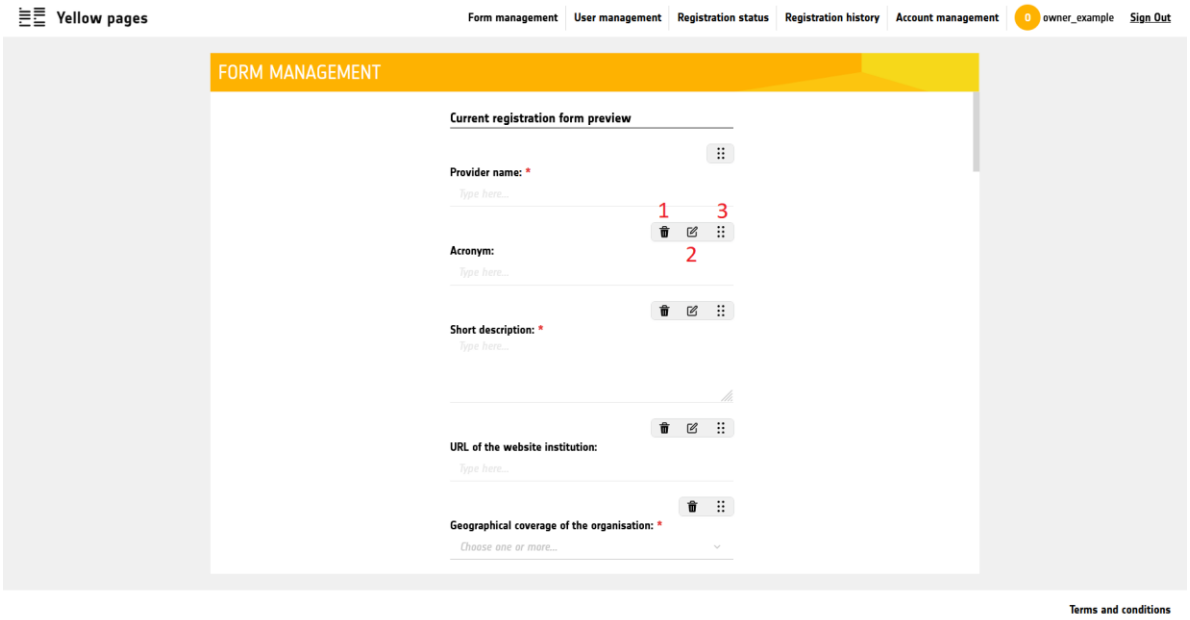


Figure 36 - Form management page. Three buttons are highlighted - 1: delete button, 2: edit button, 3: handle button used for moving fields

All of the **fields can be rearranged** by dragging it by the handle button and dropping in the desired position (button 3 on Figure 36).

The page and pen button (marked as number 2 on Figure 36) can be used to **edit the selected field**.

The bin button (number one Figure 36) can be used to delete the selected field.

The manager allows for adding new fields, editing, and deleting existing fields, with some exceptions.

The following fields are static and are required for account creation – they cannot be edited or deleted:

- 'Provider name'
- 'Email address'
- 'Username'
- 'Password'

The following special fields are also restricted due to the required behavior – they can only be edited once the dependent fields have also been removed:

- 'Names of countries and/or regions of geographical coverage'
    - field dependent on 'Geographical coverage of the organisation', appears only when the 'Geographical coverage of the organisation' field value is 'Global' and/or 'National', field 'Names of countries and/or regions of geographical coverage' will be automatically deleted when field 'Geographical coverage of the organisation' is deleted
- 'Other geographical coverage of the organisation'
    - field dependent on the value of the 'Geographical coverage of the organisation', appears only when the 'Geographical coverage of the organisation' field value is 'Other', field 'Other geographical coverage of the organisation' will be automatically deleted when field 'Geographical coverage of the organisation' is deleted
- 'Other GEOSS Data Core'
    - field dependent on the value of the 'GEOSS Data Core', appears only when the 'GEOSS Data Core' field value is 'Other', field 'Other GEOSS Data Core' will be automatically deleted when field 'GEOSS Data Core' is deleted
- 'Type of knowledge body'
    - field dependent on the value of the 'Type of online resource', appears only when value is 'Knowledge Body'

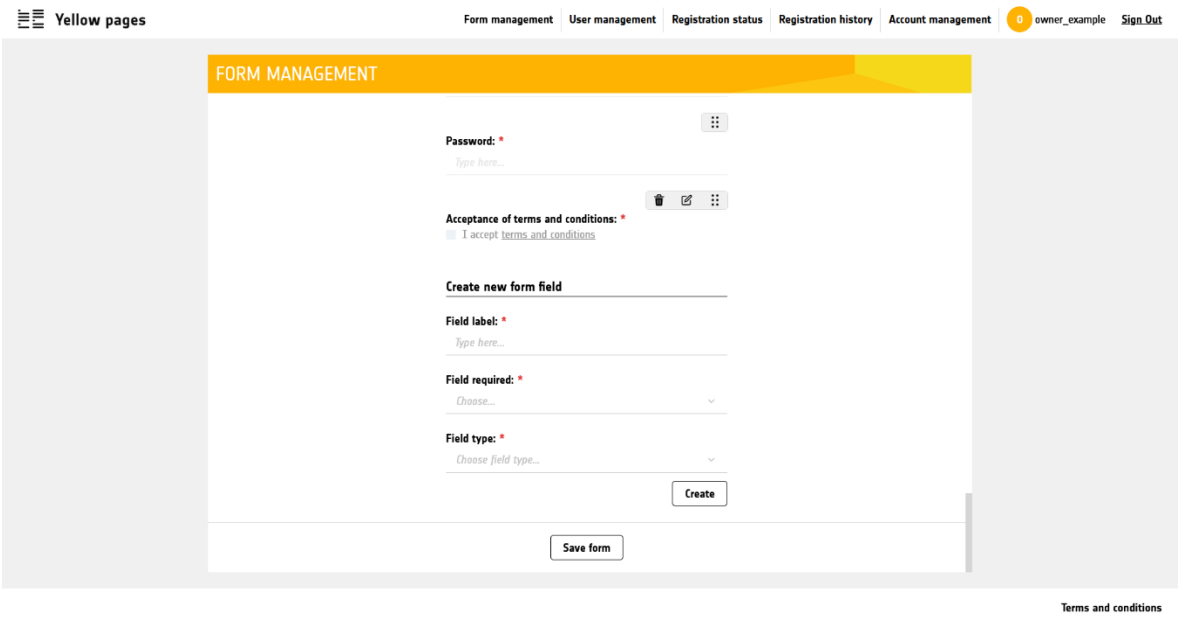


Figure 37 - Form management page with the new field creation form visible

To **add a new field**, scroll down to the bottom of the form, to the "create a new form field" section, fill in all the fields describing its behavior, and click the "create" button"

The following field types are available:

- Input (short text)
  - Subtype: Text
  - Subtype: Email
- Textarea (mullti-line text)
- Select
  - Subtype: Single choice
  - Subtype: multiple choice
- Checkbox

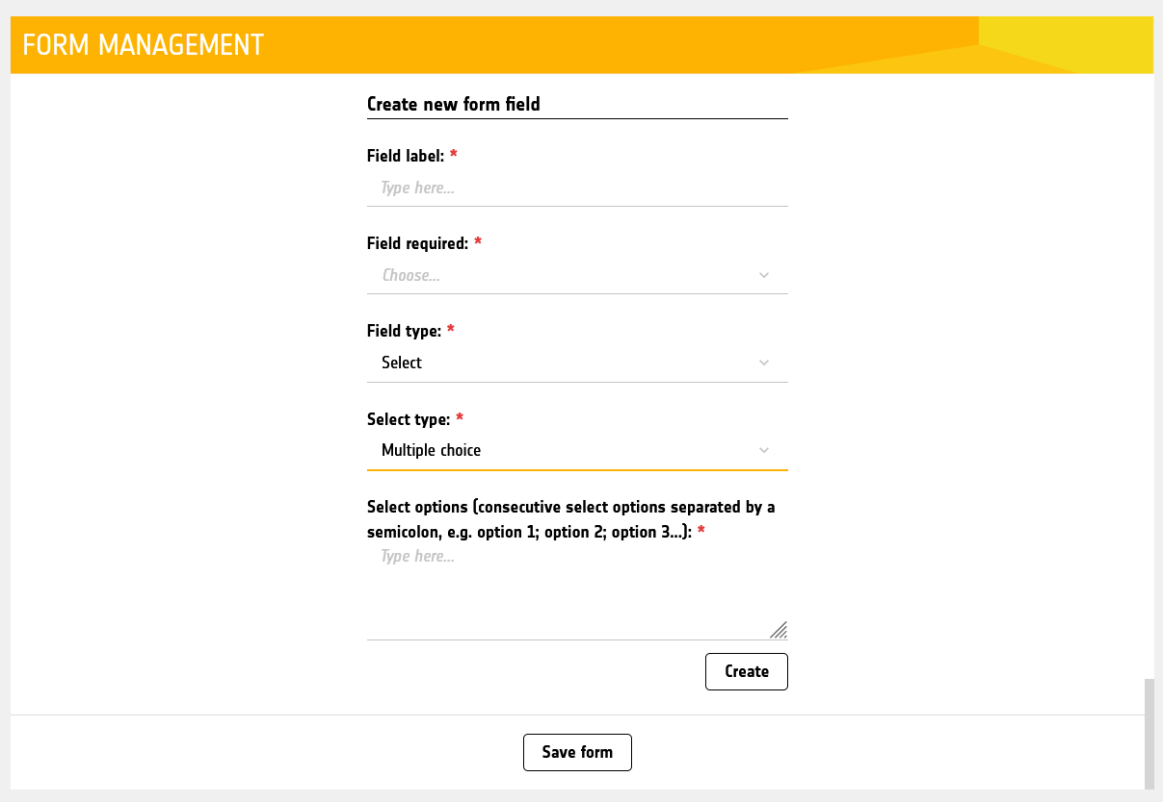


Figure 38 - Example of a multi-choice select field

If the keyword "terms and conditions" is included anywhere in the description text of any of the fields, it will be **automatically transformed** into a hyperlink linking to the site's terms and conditions page. Similarly, URLs and email addresses will be made into hyperlinks.

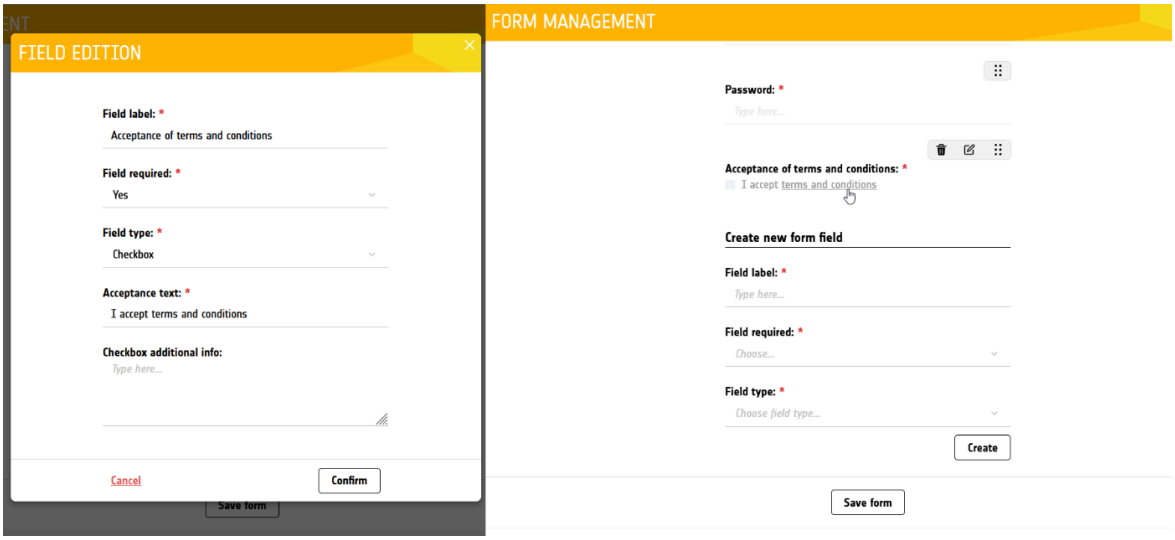


Figure 39 -Example use of the 'terms and conditions' keyword. The keyword is inserted into acceptance text (left) and transformed into a hyperlink in the actual form (right)

Once the form has been updated and saved, data providers will be encouraged to fill it in with a popup message shown after logging in.

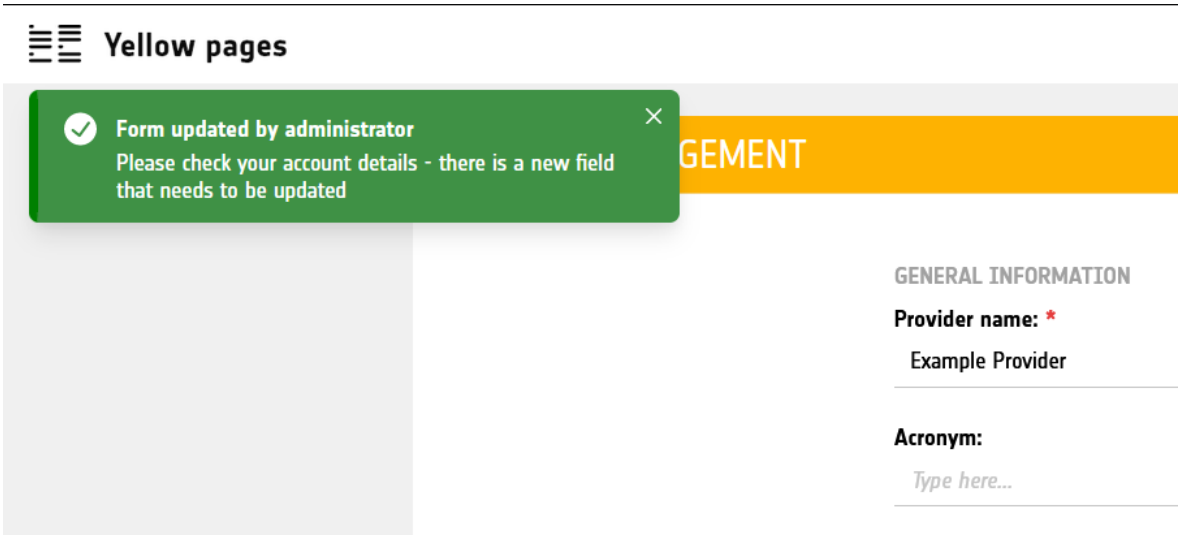


Figure 40 - Popup message encouraging the data provider to update their details

4. GEOSS Platform Proof of concepts

4.1 First Set of Applications

4.1.1 AFRIGEO COMMUNITY PORTAL

It has been provided the software package for the AfriGEO community portal and the Installation Guide ([RD-1]).

In the installation Guide have been reported all the information for the:

- Deployment
- Server configuration
- Features configuration
    - Map
    - Catalogues and Views
    - Menu
- Header Configuration
- Pages management
- Other settings

4.1.2 SDG15.3.1 Land Degradation

The GEOSS portal (https://www.geoportal.org) is the single web-based discovery and access point of EO resources from various providers all over the world through GEOSS. It is aiming not only to facilitate data and information accessibility but also help users to generate and discover knowledge. To demonstrate the facilitated access and integration of the model and outputs and the separation of concerns proposed by the Model Web approach, the different components of the workflow have been integrated into the GEOSS platform.

The following use scenarios have been defined:

1. An end-user wants to know what the situation of land degradation in Europe is.
2. In the GEOSS portal and a for “Land degradation” is performed.
3. The user obtains a number of resources that matches his search criteria.
4. Under the Knowledge tab, a description about the SDG15.3.1 indicator is provided. The user can then navigate deeper into the knowledge.
5. The user discovers that there is a model available
6. He/She finds that there are some data available for visualization and download and an external link to other resources on SDG15.3.1.
7. He/She can discover three resource layers that can be loaded on the map: indicators at national level from global sources. He selects the national data and his able to visualize it.
8. The user is « not convinced » with the global data sets because he wanted to access more local/national data sets (“trustworthiness in national data”). From here, there are two sub-scenarios:
    a. He/She is a “traditional national user” only searching and accessing more local/national data to generate the SDG indicator 15.3.1

b. He/She realizes that there is a Service associated to this model. The GEOSS Platform associates the model to the actual processing services that enable its computation, which the user can access and run in a user-friendly way. In particular, he/she can inspect the process workflow and search and select data as input to the service. In addition, he/she has the capability to choose a Cloud computing platform of preference among the available (these include all the DIAS Platforms and Amazon Web Services).

9. Discover more national/local data sets.
10. The user login into GEOSS portal and then starts the computation on the selected infrastructure and wait for the results
11. He can now visualize outputs with his own data
12. He can additionally build his own dashboard with the newly widgets implemented (maps; graphs, text, …)
13. He/She is a data provider from the selected country who can register his/her national datasets
14. He/She realizes that there is a Service associated to this model. The GEOSS Platform associates the model to the actual processing services that enable its computation, which the user can access and run in a user-friendly way. In particular, he can inspect the process workflow and search and select data as input to the service. In addition, he/she has the capability to choose a Cloud computing platform of preference among the available (these include all the DIAS Platforms and Amazon Web Services).
15. Register new as a new data provider and add the necessary data.
    a. the discovery of the model/service
    b. the discovery of the newly registered data to be fed to the service.
16. The user login into GEOSS portal and then starts the computation on the selected infrastructure and wait for the results.
17. He can now visualize outputs with his own data.
18. He can additionally build his own dashboard with the newly widgets implemented (maps; graphs, text, …)

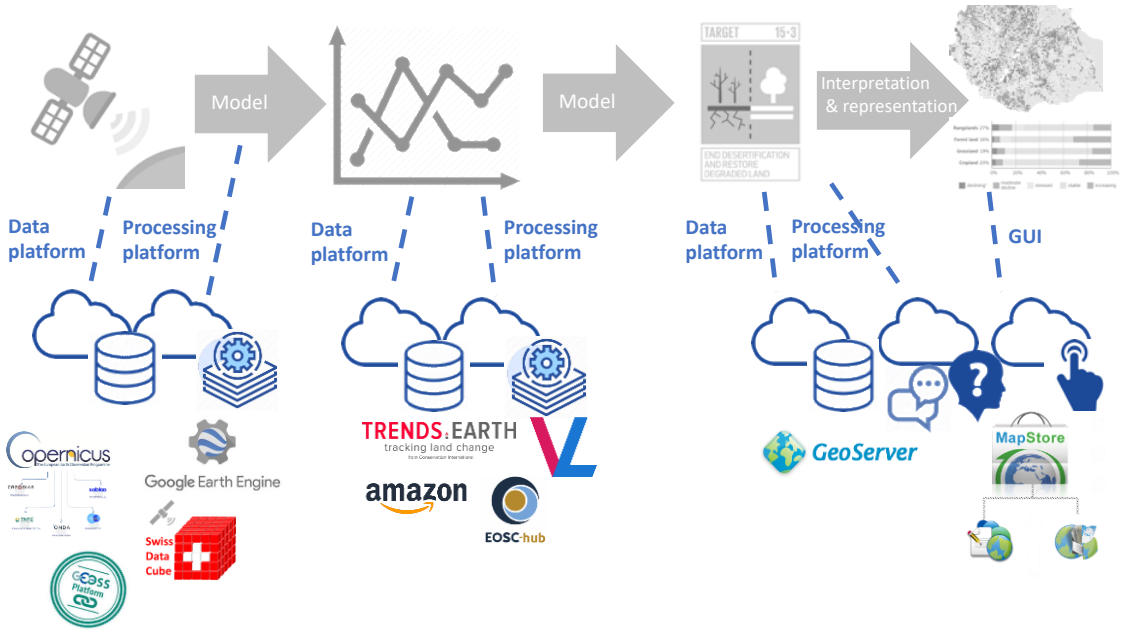


Figure 41 - SDG 15.3.1 Processing

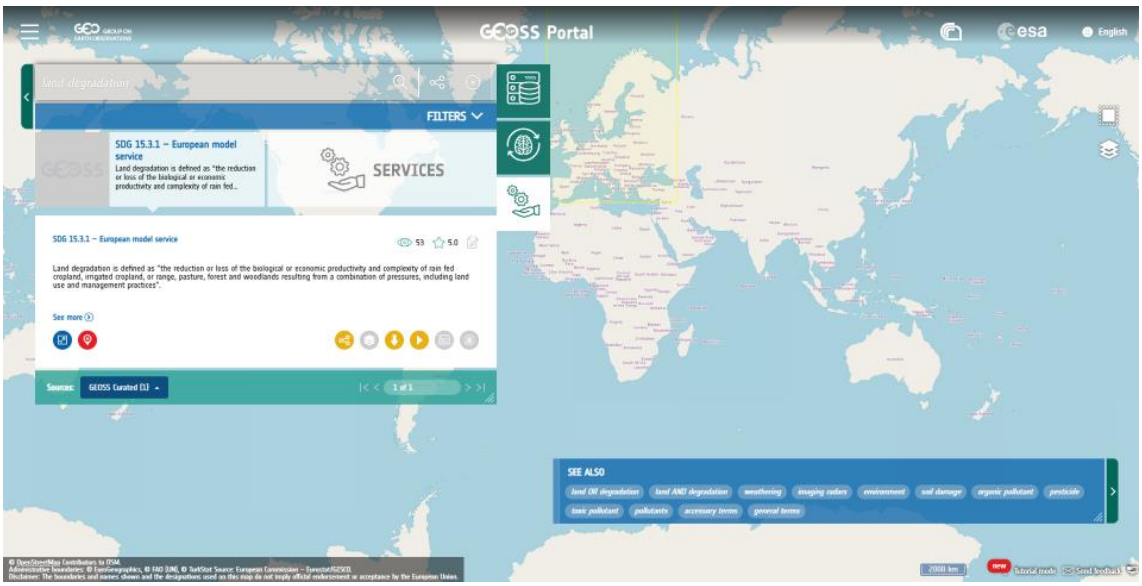


Figure 42 - SDG 15.3.1 GEOSS Portal data discovery

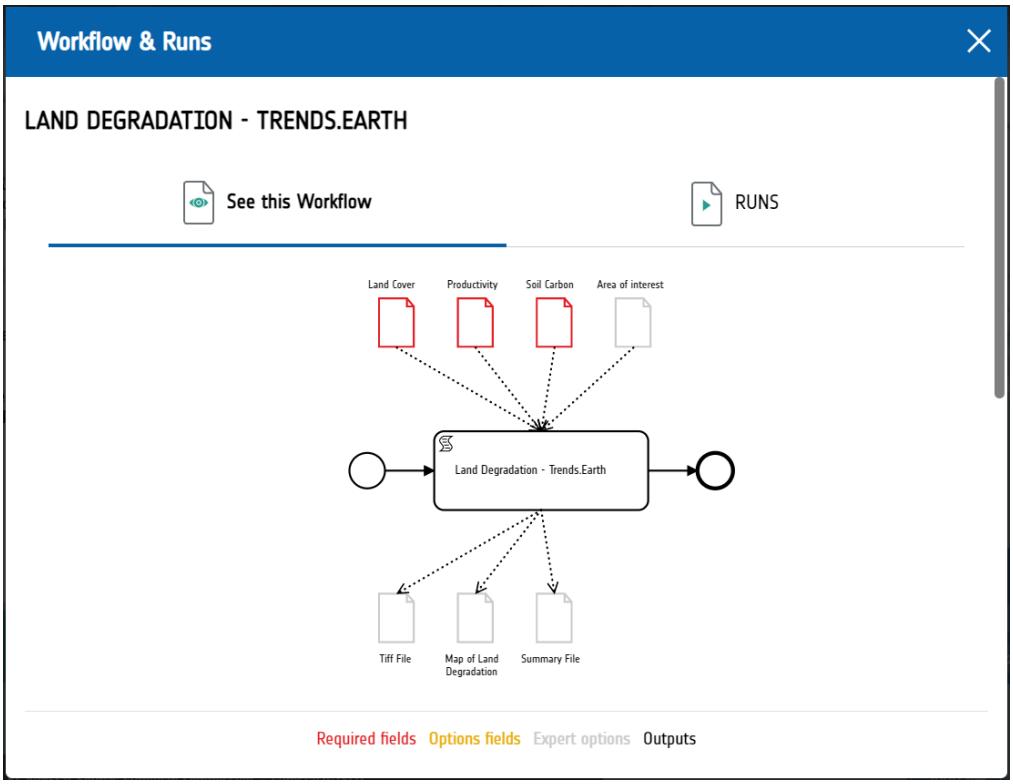


Figure 43 - Land Degradation Workflow

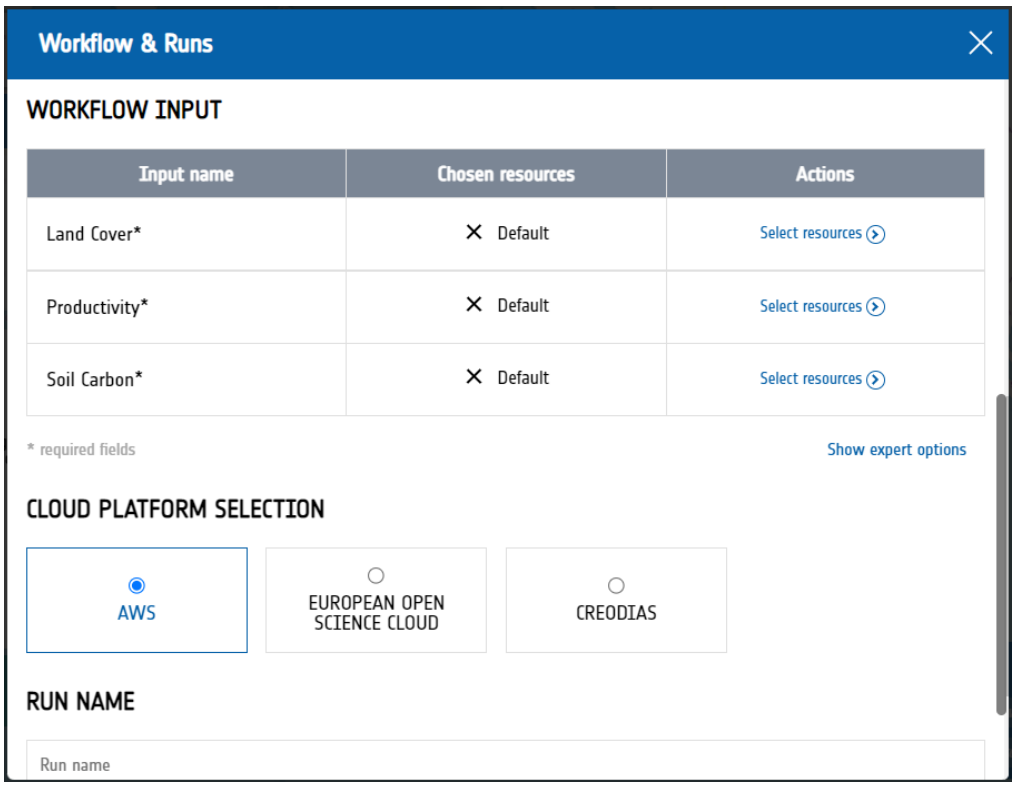


Figure 44 - Land Degradation Workflow Input

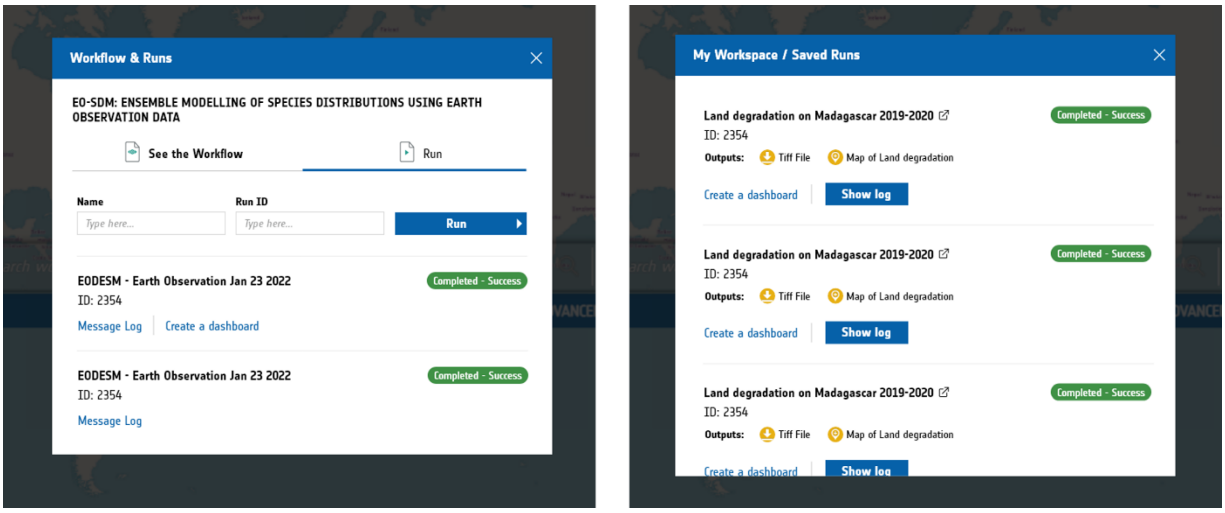


Figure 45 - Land Degradation Runs and Saved Runs

4.2 Second Set of Applications

4.2.1 SDG15.3.1 Land Degradation (Full Workflow and Dashboard)

The tool works as described in the first set of application in section 4.1.2 but in addition the user can: Select own AOI though the dedicated functionality: Set bounding box within the show export options from the workflow & run window.

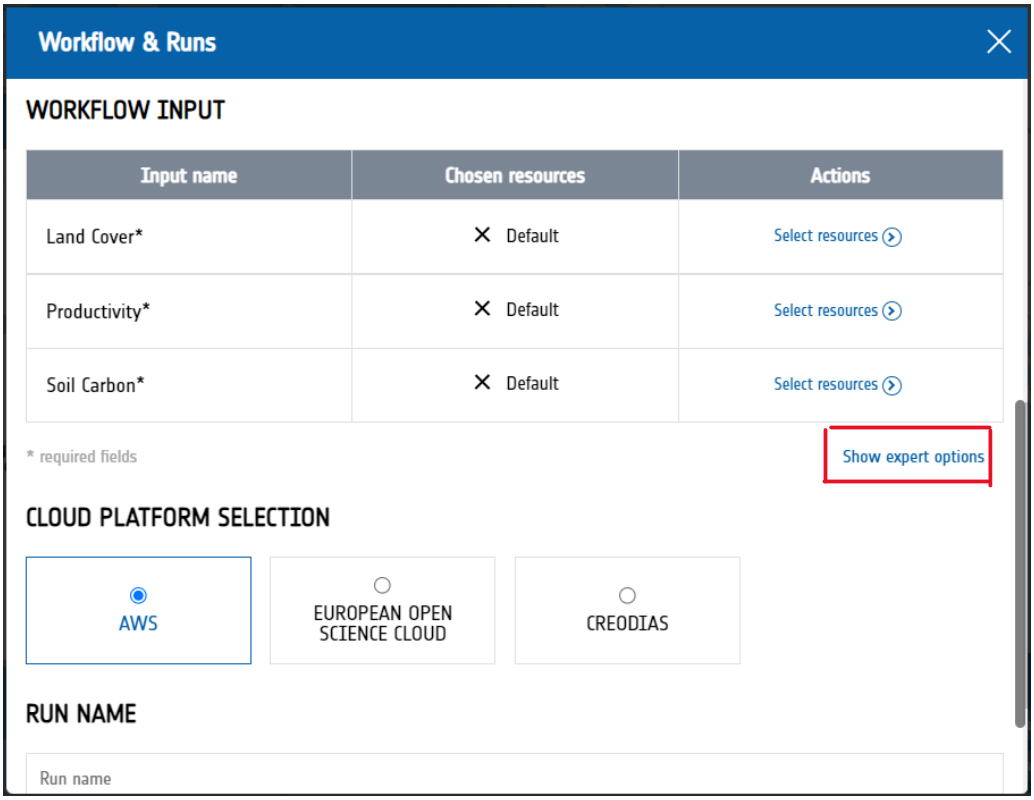


Figure 46 Selection of the own bounding box functionality

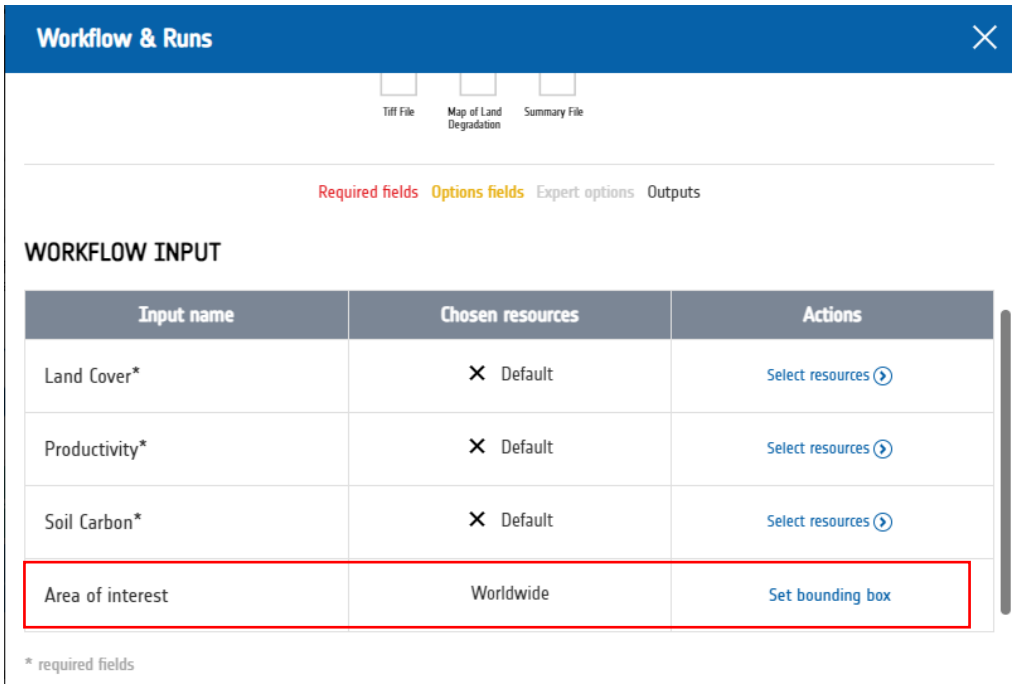


Figure 47 Set up of the bounding boxes coordinates.

The user is redirected to the bounding box filter available in the search panel and can use the different "selection" options.

The Bounding box feature in red on the right side of the panel, or the filters in the advanced search.

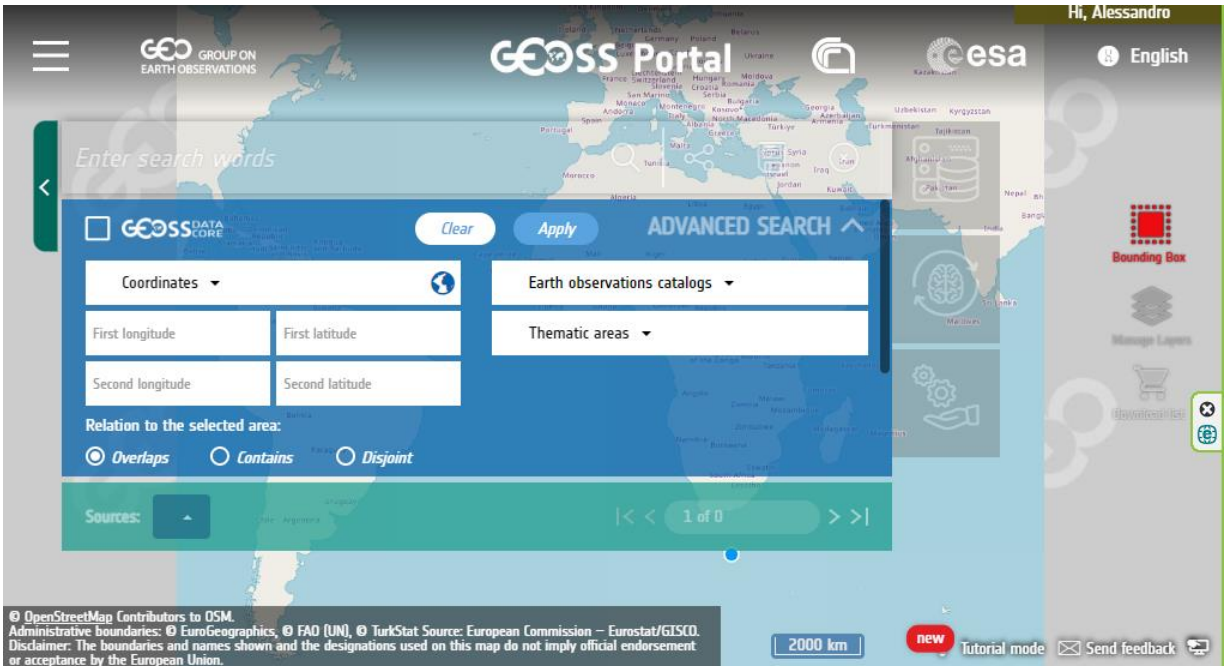


Figure 48 Bounding boxes features available in the Portal.

After the user select the AOI (in the example: Austria), the bounding box is then visible in the Area of Interest of the workflow and run panel, and the run can start.

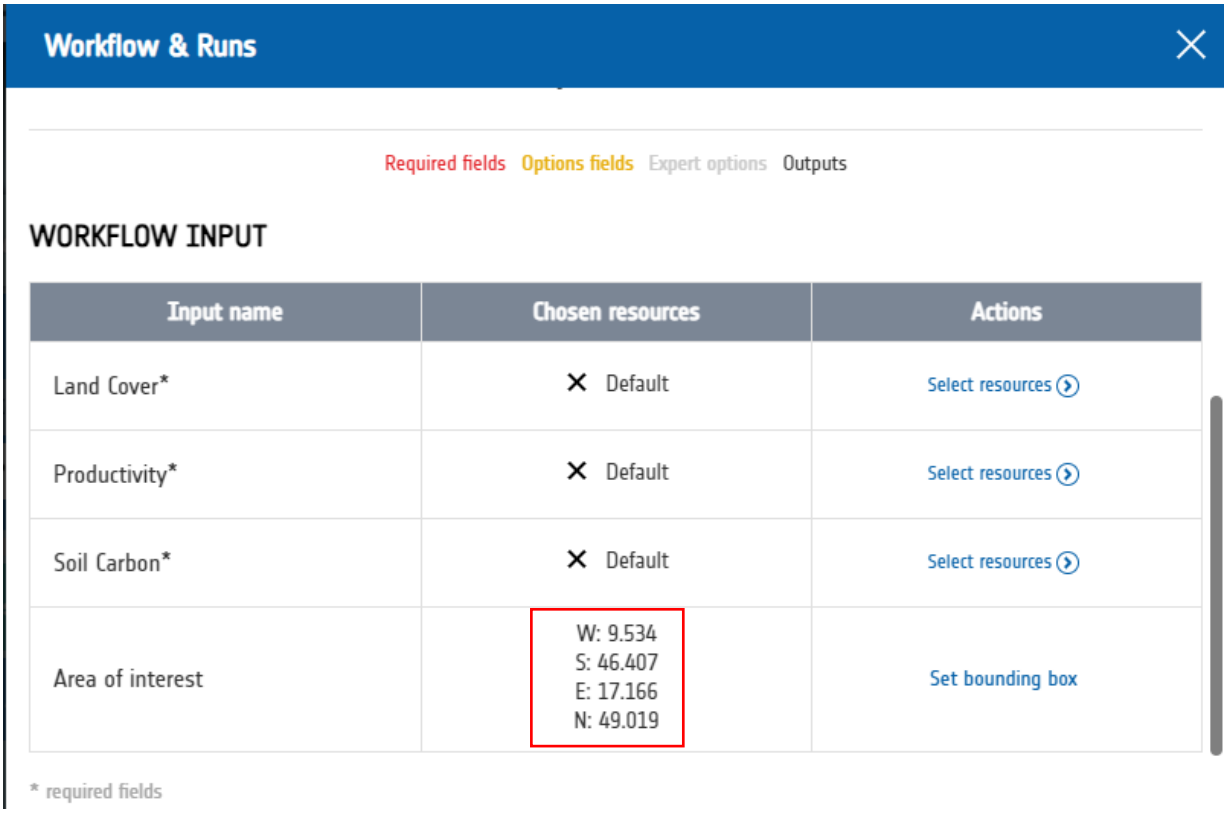


Figure 49 after setting the AOI the coordinates are visible in the panel

When the run is executed, the user can find the results in "my workspace/saved runs" as in the right side picture below (Figure 50).

Figure 50 – My Workspace/Saved Runs

4.2.2 Custom Dashboard tool

The dashboard tool allows the user to customize and create the reports to be shared with other users and made available as a GEOSS resource.

To create the Own report the user have to explore the saved runs as in the right side picture of Figure 51 and click the create Dashboard button.

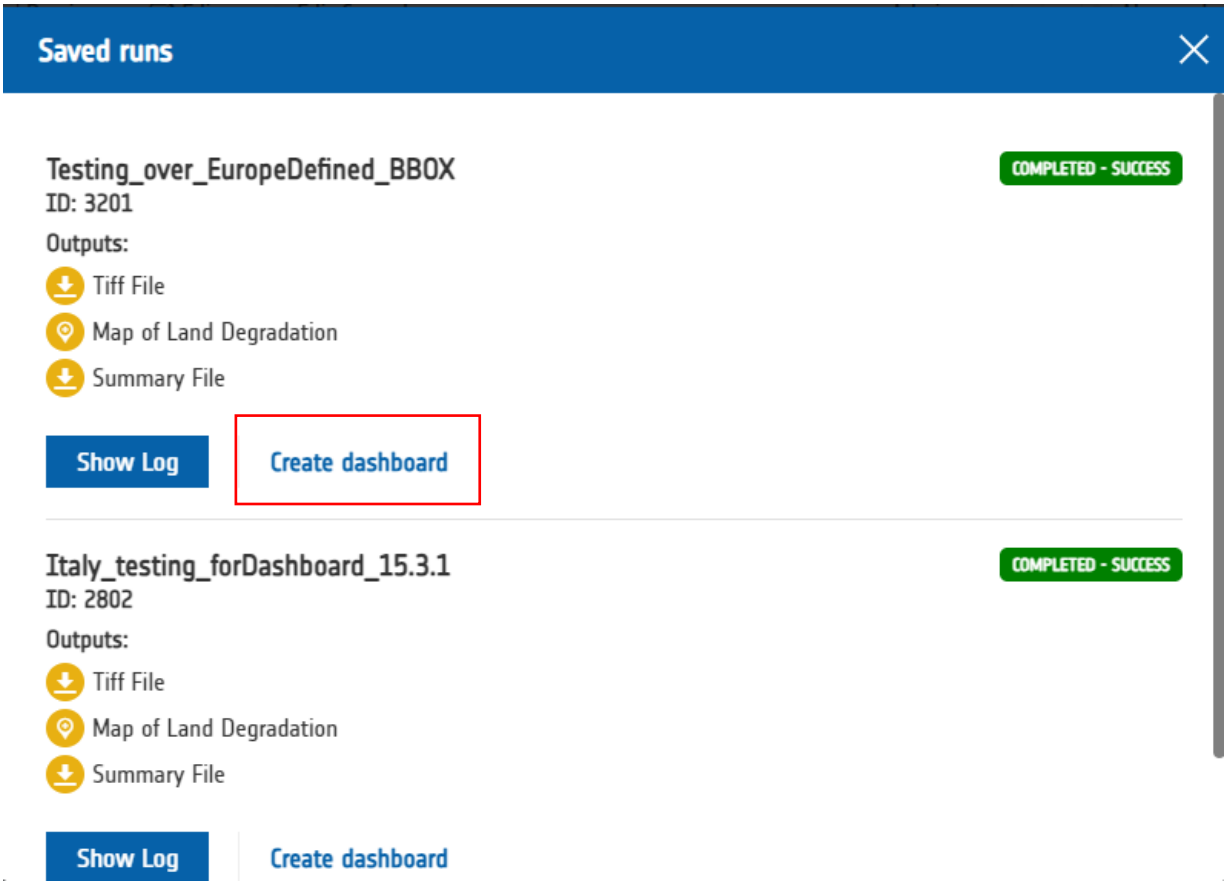


Figure 51 The create Dashboard button.

When clicking the create dashboard button a new feature will open and allow the user to customize the report as shown in Figure 52

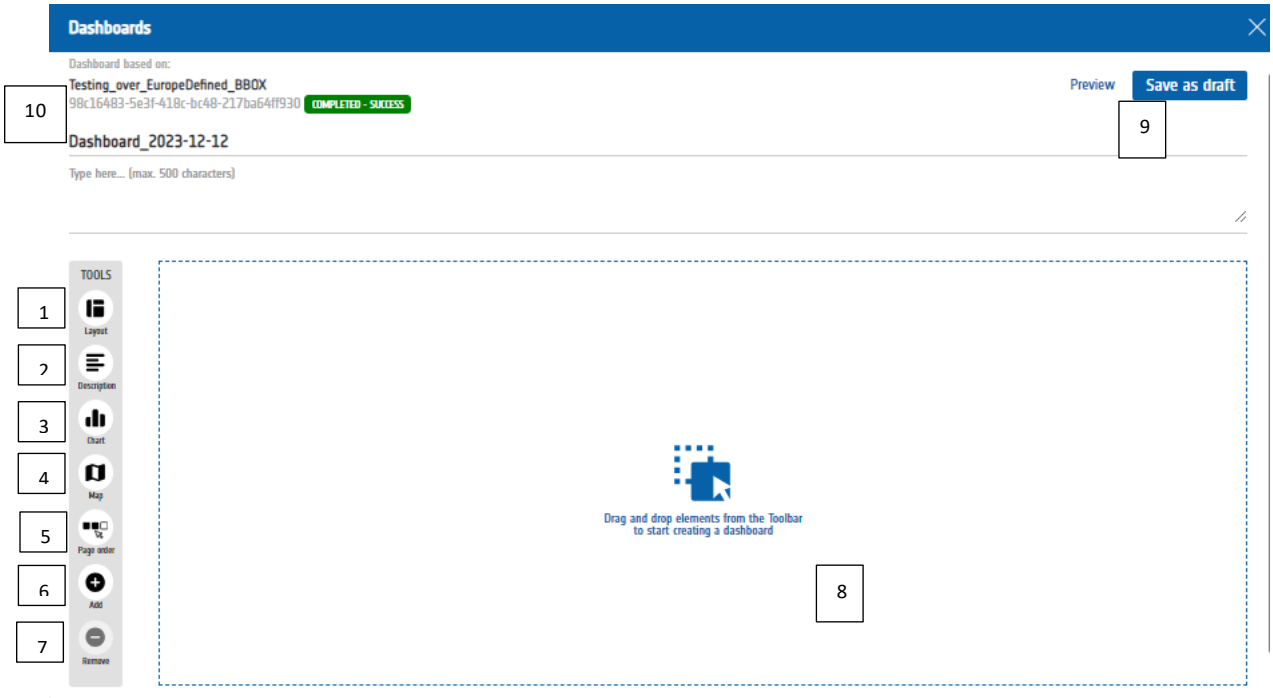


Figure 52 Custom Dashboard feature and possible customisation options

1. Page layout: allows the user to select different page layout option
2. A text block option: allows the user to enter text in a specific section
3. Charts option: allows the user to select different charts obtained by the output of the model and to show them in a dedicated block section
4. Allows the user to select the map and visualize it in the block section
5. Allows the users to select the page order
6. Allows the user to add additional pages
7. Allows the users to remove pages
8. It is the visualisation area where to drag and drop the different options
9. Allows the user to visualize the preview and to save the output as a draft
10. Allows the use to provide a title and a description of the dashboard

Once the dashboard has been saved as draft, the user can find the dashboard saved in my workspace/dashboard (see Figure 53)

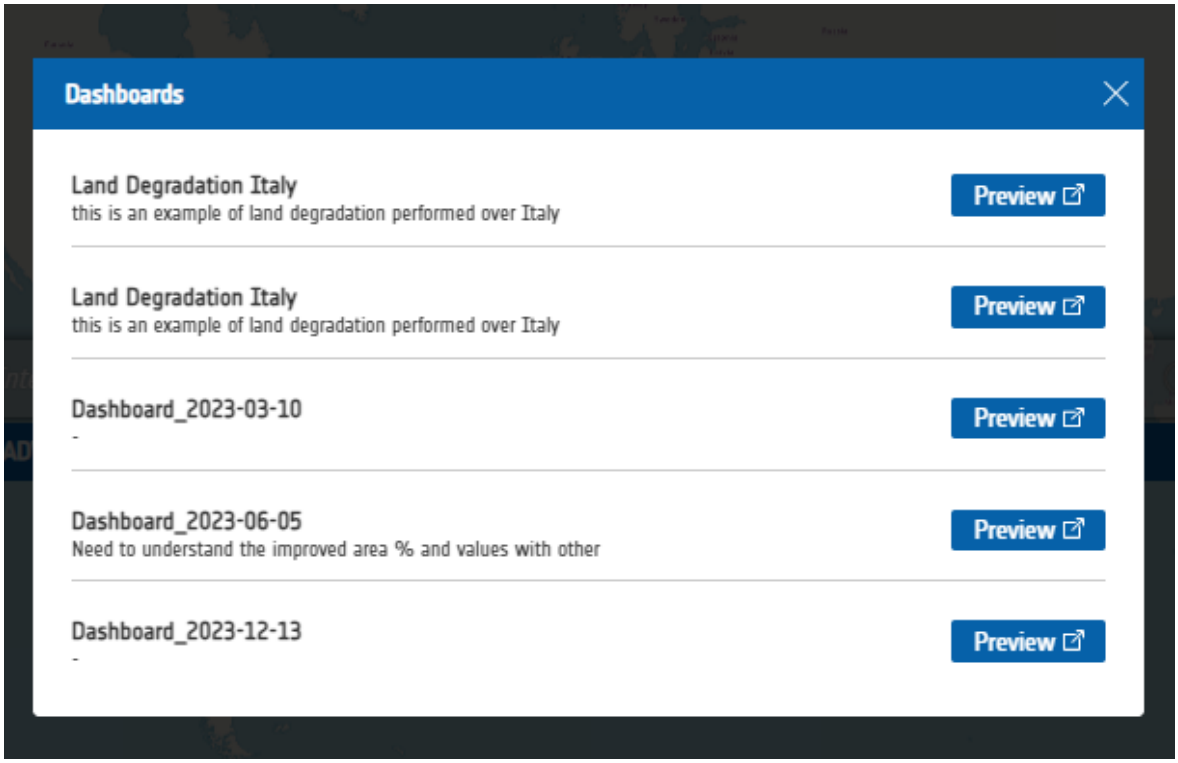


Figure 53 dashboard saved list

From this panel the user can preview a pre-created dashboard as seen in Figure 54.

Figure 54 Preview of the Report generated

4.2.2.1 Feature not yet implemented

The functionality remaining to be implemented is Report sharing. After implementation, users will be able to share reports generated through custom dashboard with others. Currently, dashboard and reports generated within them are only visible to users who created them.

4.2.3 All Atlantic updates

During the second project cycle the team has implemented the requirements resulting from UX/UI changes based on All Atlantic suggestions from Phase I.

The following changes have been implemented in the UAT environment:

- AtlantOS has been removed from Community portals menu and replaced with "All-Atlantic Ocean Data"
- Portal logos have been enlarged
- Bulk download list is now visible to logged out users
- Image and other downloadable types have been differentiated
- 'Image' and 'other' now use different icons for easier differentiation
- Data types are now always shown on downloaded resources
- Data download UI/UX has been further improved
- Added the option to hide thematic areas in advanced search form's fields

Most of the applied changes concern minor UI and UX improvements and did not modify the underlying logic of processes carried out by our users.

The first such change was replacing the AtlantOS item in community portals menu with All-Atlantic Ocean Data (as shown in Figure 55).

Figure 55 GEOSS Portal UAT Hamburger menu and community Portal section

In addition, in the main portal view:

- Portal logo has been enlarged to make it more apparent which portal the user is currently using

- The bulk download list (now accessible through the shopping cart button) has been made visible at all to all users to make navigation to list of bulk downloads easier – if no downloads are currently available for the user's account, then they will be notified of this after opening the list
- Users are now notified when their query does not return any results – this is done through a popup shown after such query is entered into the search field by the user

Sections of the portal view affected by these changes have been highlighted in Figure 56.

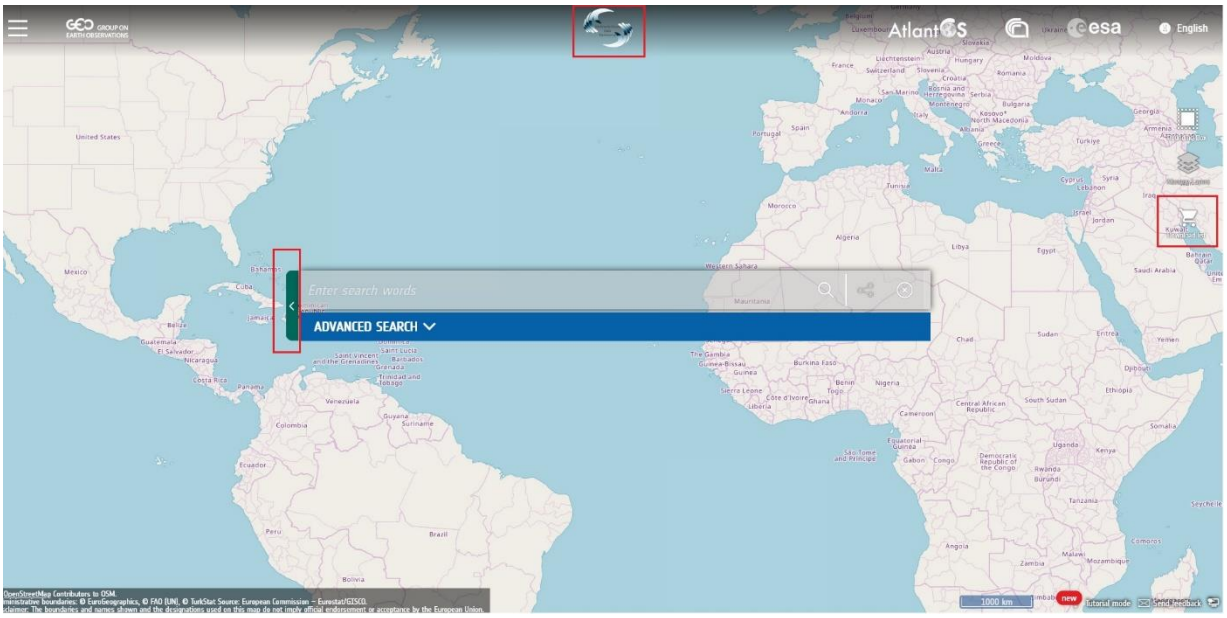


Figure 56 The enhanced All Atlantic Community portal with three areas of interest highlighted (from the top: portal logo, bulk download button/shopping Cart, search field and its advanced options)

The data download process has been improved by providing more descriptive text and names to many of available buttons, tooltips, and other elements. In addition, elements which cannot be used by users who are not logged in are now disabled and greyed out – hovering over such elements displays a tooltip notifying users that they need to log in to access such features.

Additional toasts (messages shown in the application in a form of a popup) are now displayed to clarify the effect of actions the user has performed in the following situations:

- After adding item to bulk download (from both search results and custom download window)
- After requesting a download in custom download window

To aid users in the download process, the following changes in design have been made:

- The bulk download icon has been changed to shopping cart (as shown in Figure 56)
- Data types are shown for all available data, to make it clear what type of resources will be downloaded (for example: HTML, PDF, PNG, XML, and FILE for other formats).

Figure 57 Users can now identify what type of resource formats are available for download

The download flow was simplified to make the process easier through the following changes:

- Bulk download list is now available at all times, even to users who are not logged in
- The options to download now and download later are immediately accessible from download options, without additional intermediate steps
- Resources are now immediately available for download after using the custom download option

The final update in this phase, was adding the system for hiding thematic areas in the advanced search form. This allows the administrator to hide thematic areas, which are not relevant, from community portals.

To open the

1. Log into CMS
2. Navigate to any community portal
3. Open site configuration for the selected community portal
4. Scroll down to the bottom of the configuration page until list of 'global views' becomes visible

Afterwards you will be presented with a list of resources, which can be hidden (or enabled again after being hidden) from showing in the advanced search form.

Page 1 of 2 | 20 Items per Page | Showing 1 - 20 of 34 results. | ← First | Previous | Next | Last →

optionValue	Label	
v6bd09285c0781c1fa54e164fb59989c4	Climate	Show
vb49d8bde613147989ea91defcf358a7f	Water Resources Management	Show
vdd9a0064a20442bd8cb0fc031cfd9e19	Disaster Resilience	Show
v656eb88c14544aca51fb7c217209536	AtlantOS	Default Hide
dbar-view	DBAR focal area	Show
v6bd09285c0784c1fa54e164fb59989c2	GEO Mountains Community	Show
v6bd0928a45911e7abc4cec278b6b50a	Gos4m Community	Show
v675ea24d7f44575a775187b92d28854	Sustainable Caucasus	Show
v610f20774aa458ba53bc4651b358270	AmeriGEO	Show
v6621194704b2a49b38e4494dfe0cf5e	EnviDat Community	Show

Figure 58 List of thematic areas which can be enabled or disabled for a community portal.

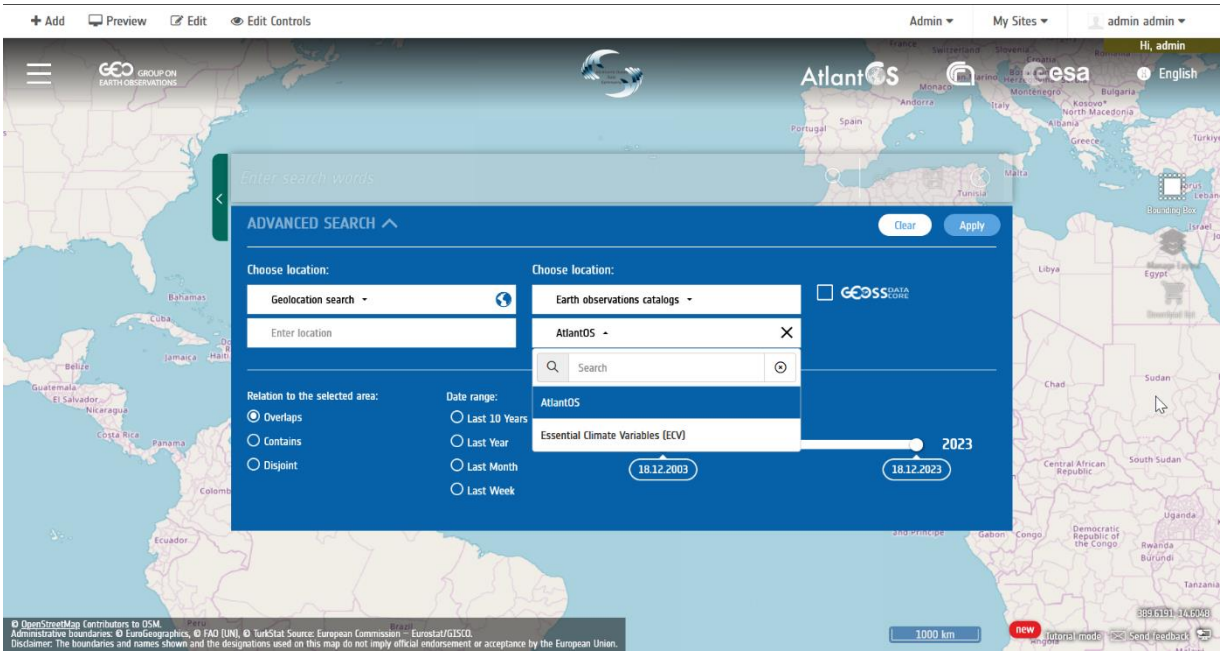


Figure 59 Advance search. Thematic areas in this form have been narrowed down through options in CMS.

4.2.4 Nutrient Pollution in European Inland and Coastal Waters - VLAB functionalities

For the implementation of this use-case the GREEN model, developed by JRC, was shared in VLab. This allowed its exploitation via VLab APIs, allowing to create dedicated Web applications. The GREEN Web application, developed by GEOSS Platform Plus project and the Joint Research Centre, allows the replication of GREEN model results of the impact assessment, contributing to a transparent and

evidence-informed policy making process, according to the principles of the European Commission Better Regulation agenda.

Through GREEN Web application users can select an area of interest and define the settings for the simulation, including different policy scenarios.

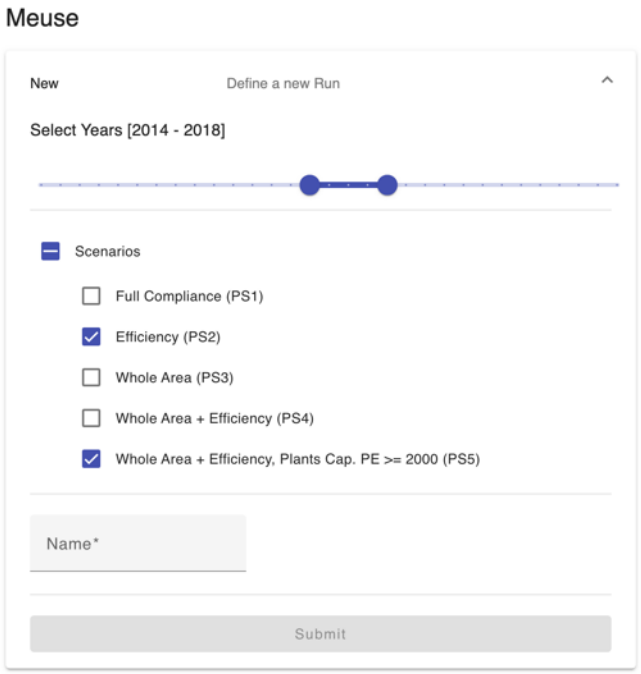


Figure 60 – Definition of the simulation settings in GrEEN Web application

After a few minutes, users can visualize the simulation results. By selecting one policy scenario, the user displays the resulting yearly average load of nitrogen in the entire selected area.

It is possible to compare how the different simulated policy scenarios perform. By selecting the nitrogen result, users can display the calculated total yearly average load, both to the river outlet and in the entire region.

When two policy scenarios results are selected, users can visualize the difference of nitrogen and phosphorus loads over the entire area of interest.

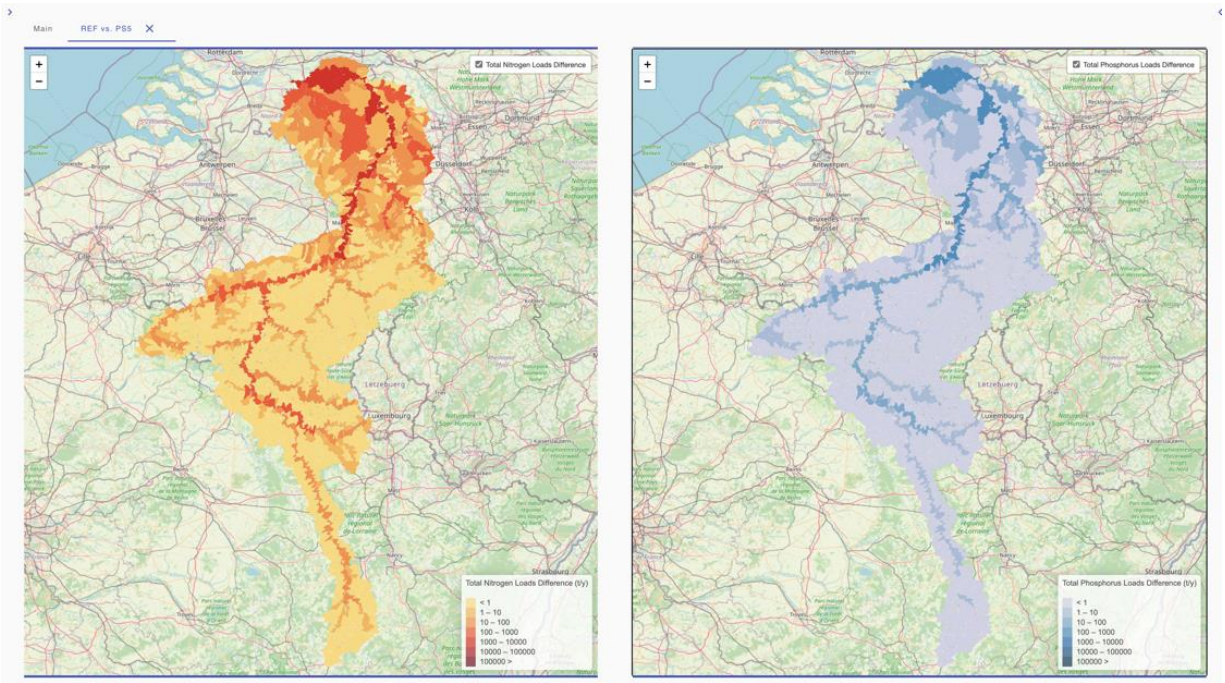


Figure 61 -Difference of nitrogen and phosphorus loads over. Meuse Basin region

Annex A. References

Reference Documentation

[RD-1] GPP-WP3-DEL-AfriGEOSS_installation_guide_1.0

[RD-2] GPP-WP3-DEL-D3.1 Enhanced GEOSS Platform with 1st set of applications

[RD-3] GPP-WP2-DEL-D2.2 Functional and non-functional enhancements specification v1.0

[RD-4] GPP-WP3-DEL-D2.1 Use Cases Description and User Requirements Document

[RD-5] GPP-WP3-DEL-Community Portal - Administration Guide

[RD-6] GPP-WP3-DEL-D3.4 Enhanced GEOSS Platform v2 with 2nd set of applications

[RD-7] GPP-WP2-DEL-D2.4 Functional and non-functional enhancements specification v2.0

[RD-8] GPP-WP3-DEL-D2.3 Use Cases Description and User Requirements Document v2.0

Web reference documentation

[WR-1] GEO DAB API REST and JS are documented at http://api.geodab.eu/

[WR-2] VLab APIs are documented at https://vlabdev.geodab.org/vlab/docs/

[WR-3] EDGE GEOSS Portal enhancements at https://www.earthobservations.org/documents/articles_ext/EDGE-WP3-DEL-D3.4-v2.0.pdf

Annex B. Figures and Tables

Tables

Annex C. Terminology

C.1 Acronyms and Abbreviations

GPP	GEOSS Platform Plus
CA	Consortium Agreement
CEOS	Committee on Earth Observation Satellites
CNR-IIA	Consiglio Nazionale delle Ricerche – Istituto per l'Inquinamento Atmosferico
CO	Confidential
DESCA	Development of a Simplified Consortium Agreement
DEL	Deliverable
DG	Directorate-General
DN	Direct Negotiation
DOA	Description of the Action
EAB	External Advisory Board
EC	European Commission
EO	Earth Observation
EOP	Earth Observation Programme
ESA	European Space Agency
ESAW	European Ground System Architecture Workshop
ESRIN	European Space Research Institute
EU	European Union
FP7	Seventh Framework Programme
GA	Grant Agreement
GCI	GEOSS Common Infrastructure
GEO	Group on Earth Observation
GEO DAB	GEO Discovery and Access Broker
GEOSS	Global Earth Observation System of Systems
GFOI	Global Forest Observation Initiative
GLAM	Global Agriculture Monitoring
GPE	GEOSS Portal Enhancements
H2020	Horizon 2020
INT	Internal Note
IPR	Intellectual Property Right
JRC	Joint Research Centre
MOM	Minutes of Meeting
OTH	Other
PD	Project Director
PP	Programme Participants
PQMP	Project Quality Management Plan

PRE	Presentation
PSB	Project Strategic Board
PU	Public Usage
QA	Quality Assurance
QAS	Quality Assurance Support
RE	Restricted
SUS	System Usability Scale
TBD	To Be Defined
TEP	Thematic Exploitation Platform
UNICEF	United Nations International Children's Emergency Fund
USGS	United States Geological Survey
PIMB	User and Technical Board
WBS	Work Breakdown Structure
WGISS	Working Group on Information Systems and Services
WP	Work Package
WPL	Work Package Leader