

Search for data in the EPOS Data Portal

In this tutorial, the EPOS Data Portal is presented and walks through series of steps in search for scientific data. A video demonstration of searching for data is also publicly available on YouTube, accessible at the following URL: <https://www.youtube.com/watch?v=IV4hanuCwwM>

How to access the Data Portal?

The portal is available at www.ics-c.epos-eu.org, which is a landing page for the EPOS ICS. From here, the data portal can be accessed through the “Data Access” button (see fig.1).

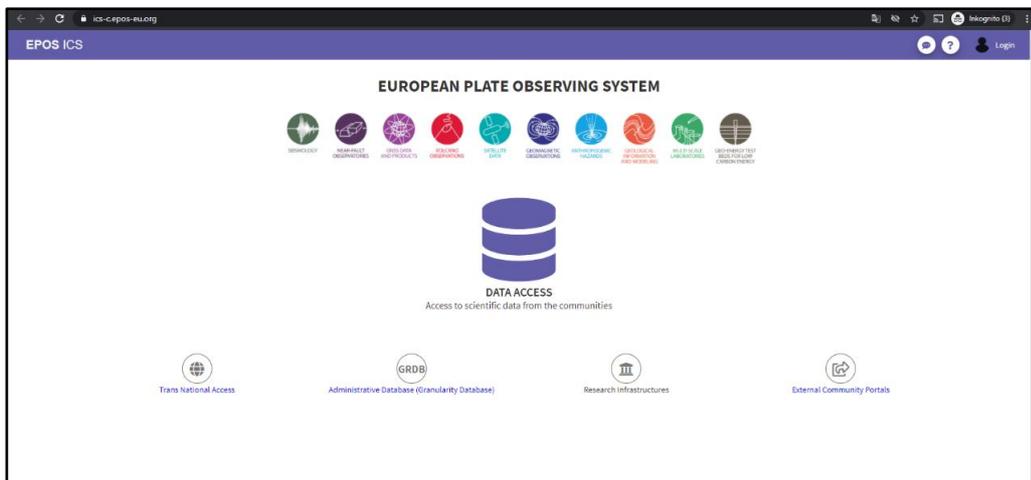


Figure 1: Landing page of the EPOS Portal

Upon entering the data portal, the default view is the search area. The search area is where you will find the relevant data for your research. Other areas such as workspace and processing exist and will be covered in later tutorials. It is possible to switch between these areas in the menu bar on the left side (authentication required).

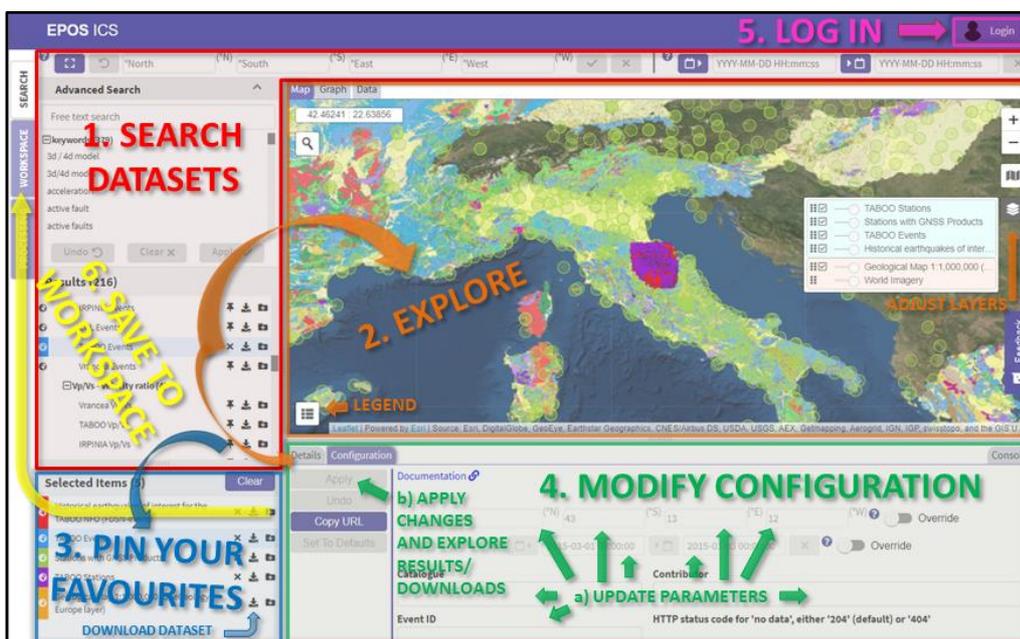


Figure 2: Overview of the various sections within the search area.

The search area, which is in focus in this tutorial can be divided into multiple sections as illustrated in fig. 2. On the left side, the section for textual searching appears with the opportunity of browsing through categories of services and filtering the same list of services by specifying keywords. Additional filters are available at the top bar, by specifying graphical coordinates and timestamps. Each service can be clicked and subsequently visualized in a map, graph, or table within the larger top right section. Multiple services can be selected and kept in a temporary list while searching for additional services. The lower right section of the search page contains detailed information about each service and the possibility of configuration of the data returned. Configuration of services is not in the scope of this tutorial but will be presented on its own in a dedicated tutorial following this one.

How to browse for data?

Upon entering the data portal, the default view is the search area. The search area is where you will find the relevant data for your research. Other areas such as workspace and processing exist and will be covered in later tutorials. It is possible to switch between these areas in the menu bar on the left side.

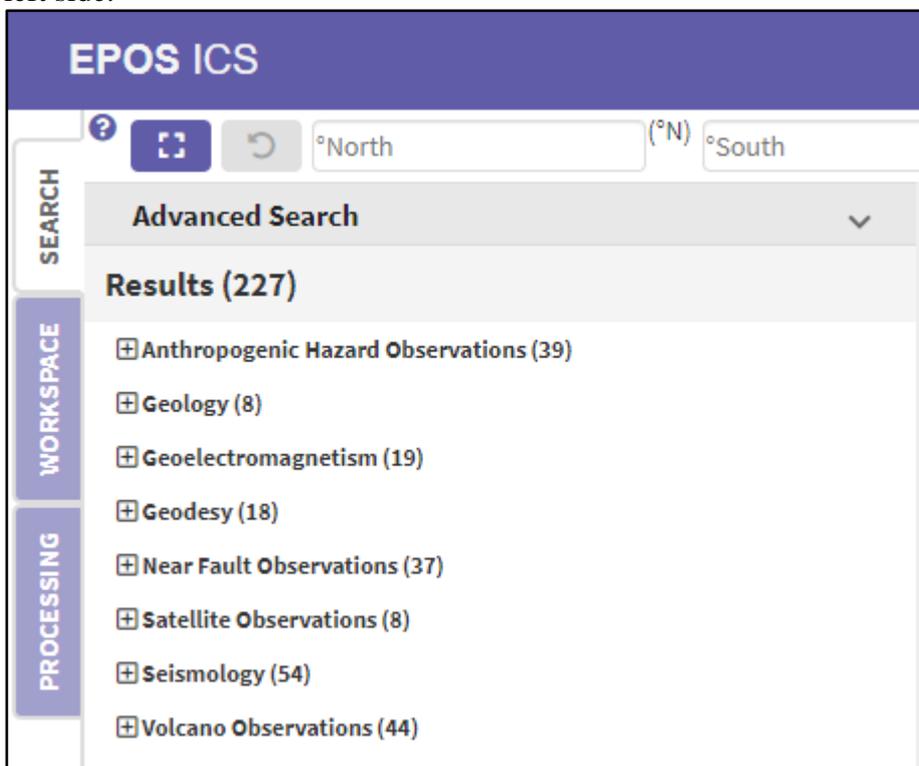


Figure 3: List of scientific domains.

The data offered through this portal are divided into 10 distinct scientific domains (fig. 3), like Anthropogenic Hazard, Geology, etc. These are found in the result list right next to the menu. Each domain has a variety of services that provide data and are organized in a nested tree structure, which is a hierarchical view of the domain with subcategories. Click on the domain name to open or close the tree branches. The amount of data services under each domain or subcategory is shown by the respective number given in the parenthesis.

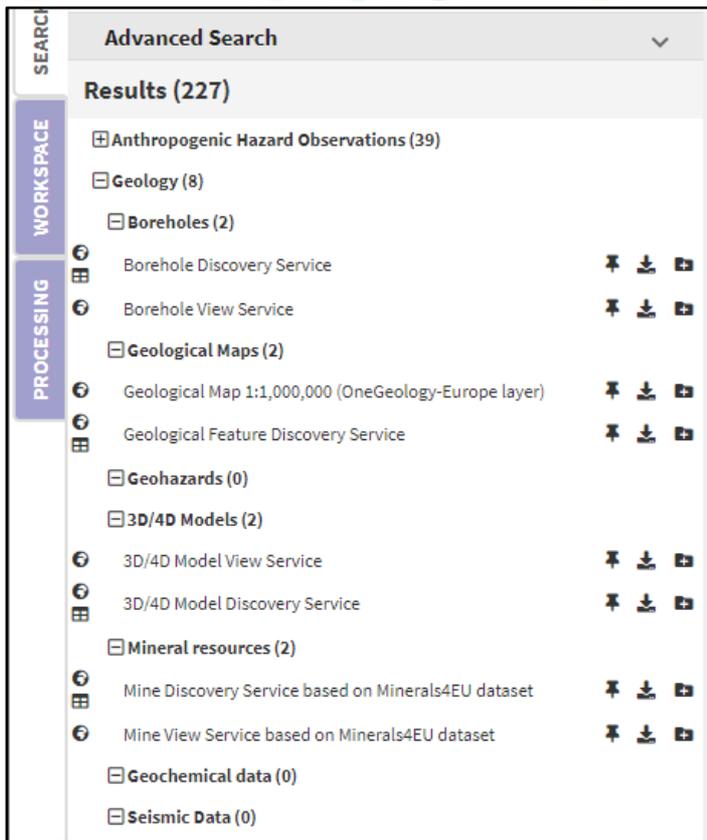


Figure 4: Browsing through the tree list structure for the Geology domain.

By choosing a domain, for instance geology, a subset of various categories appears such as boreholes and geological maps (fig. 4). For other domains, the tree list may go even deeper with further under categories. Below these categories, the services are listed.

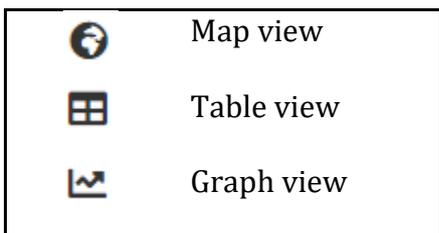


Figure 5: List of visualization icons

To the left side of each individual service name, icons are shown to identify what kind of visualization that is expected for that particular service within this portal. If no icon is present, the data provided by the service is only available for download. A service can support more than one type of visualization and the service is thus marked with additional markers in a vertical direction. To demonstrate the map view, click for example on the service, “Geological Map 1:1,000,000 (OneGeology-Europe layer)”. The service is automatically queried, and the geological map will shortly after render in the map in the larger top right section (fig. 6). In general, the rendering speed on the map is highly dependent on user’s internet connection and on the size of the dataset being loaded.

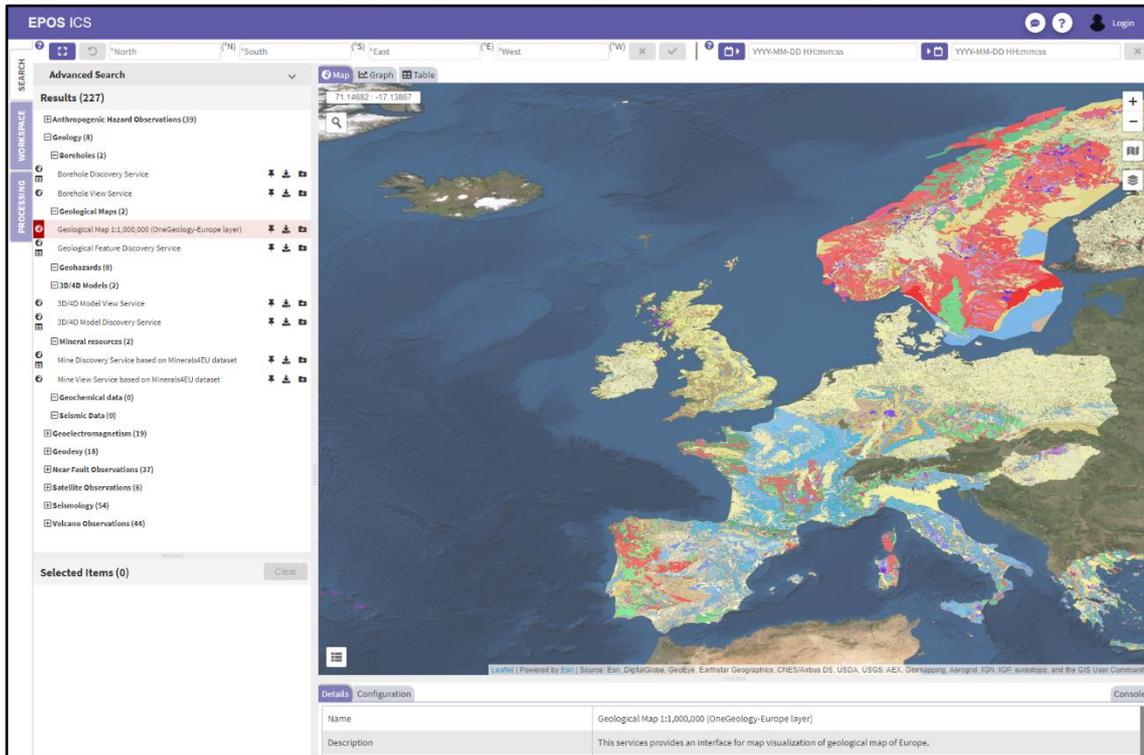


Figure 6: Map visualization of the geological map layer which is rendered as image tiles.

To demonstrate the other visualizations, the first goal is to find services that support these kinds of visualizations. For demonstration purposes, open another domain, for example the “Geodesy”. For a cleaner look of the tree list, please close the “Geology” domain. Under the subcategory, “Data”, the map and table icon are displayed on one service while the graph icon are shown on multiple services under the “Products” subcategory. Click the service, “GNSS Stations with RINEX Data”, under the “Data” category. The map gets filled with many red circles, representing individual stations. Each circle is clickable and a popup window with additional information is shown (fig. 7).

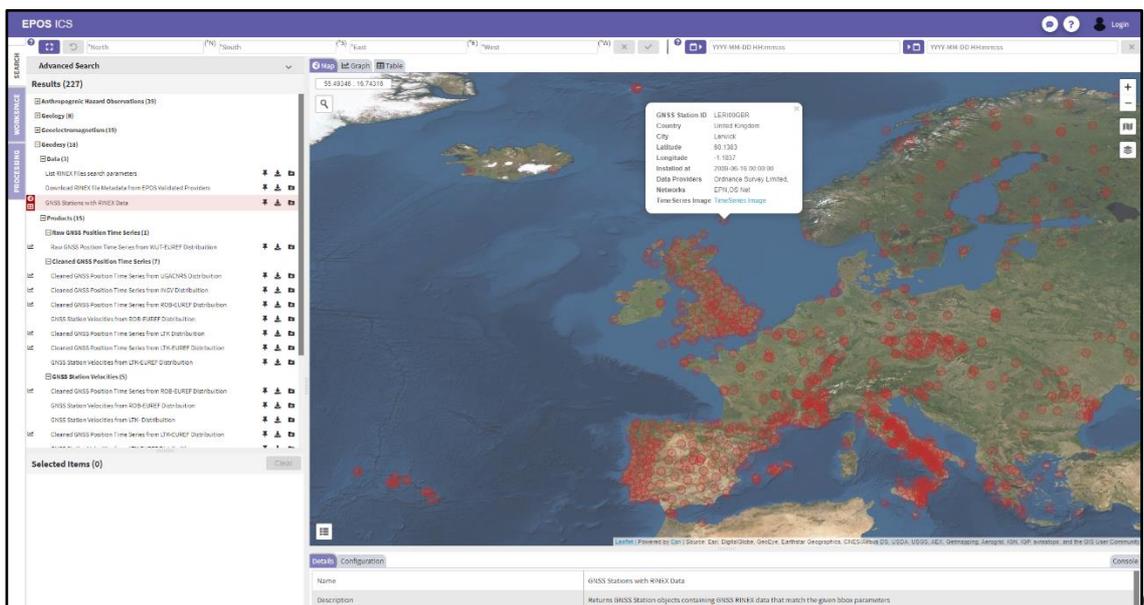


Figure 7: Map visualization with clickable points.

The same service also has an icon for table visualization. The default visualization view is the map regardless of which visualization the service supports. To view the table of data, click the “Table” tab in the top left corner of the map (fig. 8). The tabs are marked by the same icons as displayed along the services in the result list.



Figure 8: Tabs to switch between visualization views.

By clicking the “Table” tab, the display renders data in a tabular format with built in features such as filtering and pagination (fig. 9). Above the table the service name is presented within a colored box, which in this case is red. If additional services with table support were selected, the user could switch between those datasets by clicking the individual boxes. Multiple selections of services will be covered later in this tutorial, under how to select data category.

Name	IAGA	Elevation	Home page	longitude , latitude	Institutes
Trivandrum 2	TRD	300	Home page	76.95.8.483	National Centre for Geophy...
Bear Island	BJN	80	Home page	19.2.74.5	
Nampula	NMP	374	Home page	39.2542,-15.0886	
Byrd Station	BYR	0	Home page	-119.517,-80.017	
Qsaiybeh	QSB	525	Home page	35.644.33.871	
Esashi	ESA	396	Home page	141.355.39.237	
Chengdu	CDP	653	Home page	103.7.31	
Annamalainagar	ANN	0	Home page	79.663.11.367	
Val Joyeux	VLJ	114	Home page	2.014.48.821	
Toledo	TOL	0	Home page	-4.047000000000255.39.883	
Santa Elena	SEL	288	Home page	85.612.10.921	
Allahabad	ALH	100	Home page	82.25.05	
Nord	NRD	0	Home page	-16.759999999999999.61.6	
Ulian Bator	UBA	1615	Home page	106.75.47.85	
Tehran	TEH	0	Home page	51.382.35.737	

Figure 9: Table visualization.

The third type of visualization is the graph view, which currently supports the representation of time series. The “Geodesy” domain has various services that deliver time series to the user. From within the “Products” subcategory, multiple types of time series can be found. By for example clicking the “Cleaned GNSS Position Time Series from UGACNRS Distribution” service, the graph view will present an empty graph with options of adding traces (fig. 10). The available traces are

found within a small box within the graph and represent different components that each has an individual time series. By clicking on the circled plus icon for each component, a time series is added as its own graph within the view (fig. 11). After initializing one graph of time series, another square plus icon appears for the other components, which is an additional option of merging that particular component within an existing graph already presented.

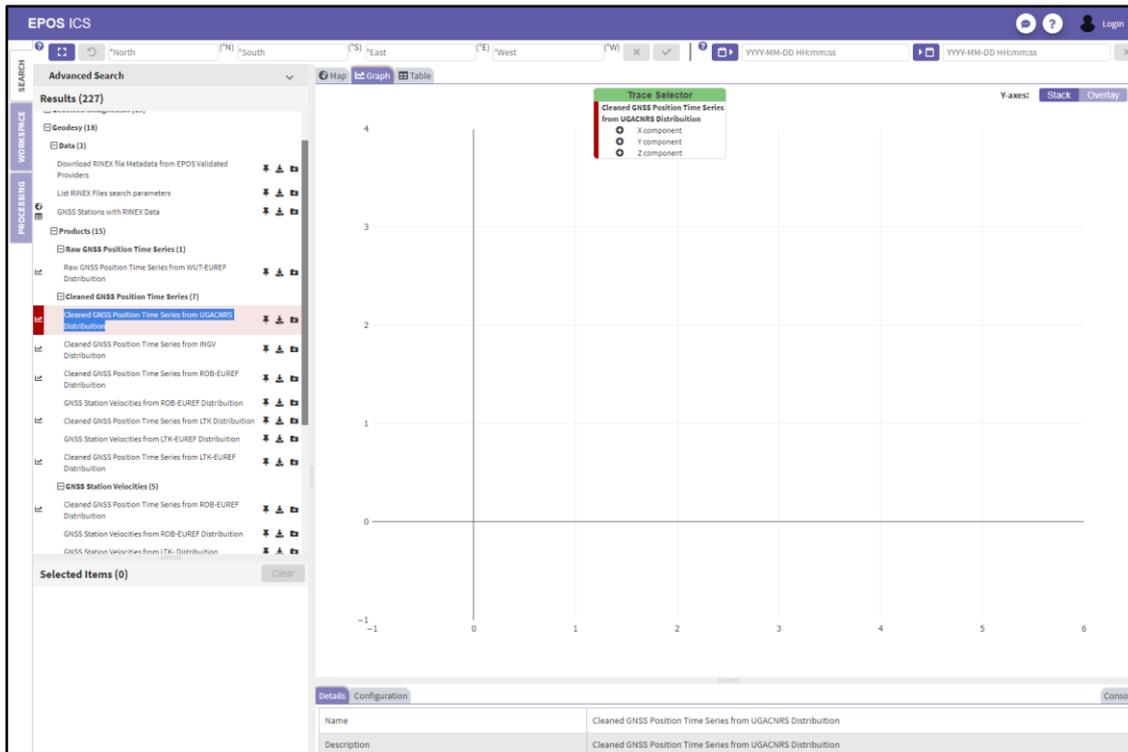


Figure 10: Graph visualization of time series as a default view with no traces selected.

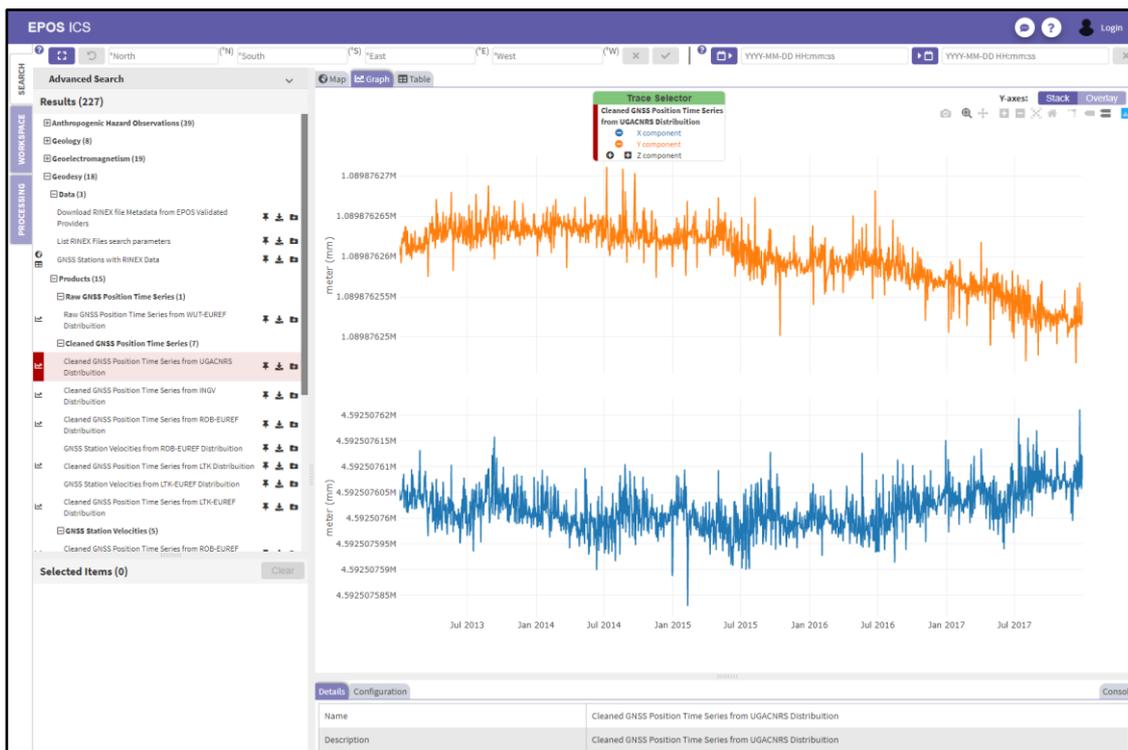


Figure 11: Graph visualization of time series with two of the three available traces are selected.

Information about the service selected can be found within a dedicated view on the lower right area. The area also serves as the view for other features offered through the portal (fig. 12), such as configuration of services and logging of the user's actions through the console, but these topics are covered in the next tutorial. By default, the detail information of the services is displayed in this area. As the view appears to be small in terms of the viewport (basically to give more space to the main map, graph and table view above), the user can expand this view by click dragging the thick grey line (fig.12) upwards.



Figure 12: Tabs for additional information and configuration of services.

The dark grey dots on the thicker light grey line in this figure indicates an adjustable splitting of views in this portal. In other words, these lines can be moved to extend or reduce the current view area in focus. The information given about each service is displayed in a tabular format (fig. 13). The fields have been tailored to provide users with important information such as a short description of the data, the geographical area and time range the data cover, metadata, provider of the services and license. For more extensive descriptions (if accessible for the service) is given by an external documentation link.

Details Configuration	
Name	GNSS Stations with RINEX Data
Description	Returns GNSS Station objects containing GNSS RINEX data that match the given bbox parameters
Spatial Coverage	Show on map <input type="checkbox"/> Center on map
Temporal Coverage	1988-01-01T11:01:00+00:00 - unspecified
DOI Metadata	Show metadata
DOI Link	Unspecified
Service Provider	Côte d'Azur Observatory
Service Description	Returns all the stations (products) that are inside the bounding box in multiple outputs
License	http://creativecommons.org/licenses/by/4.0/
Endpoint	http://gnssdata-epos.oca.eu:8080/GlassFramework/webresources/stations/v2/station/bbox/
Documentation	https://gnss-epos.eu/ics-tcs/
Data provider(s)	Côte d'Azur Observatory
Internal ID	WP10-DDSS-004

Figure 13: Detailed information about the selected service.

How to apply filters to more easily finding data?

In the previous section, browsing through data were done by opening and closing a variety of categories in a tree structure. The list of items in this tree can appear quite long and even though the services within is distributed among scientific domains, it can require some time to find the service that provide the data the user wants. In this regard, the application offers multiple filters to reduce the result list. These filters include geographical constraints, definition of a time windows, selection of predefined keywords or do a free text search.

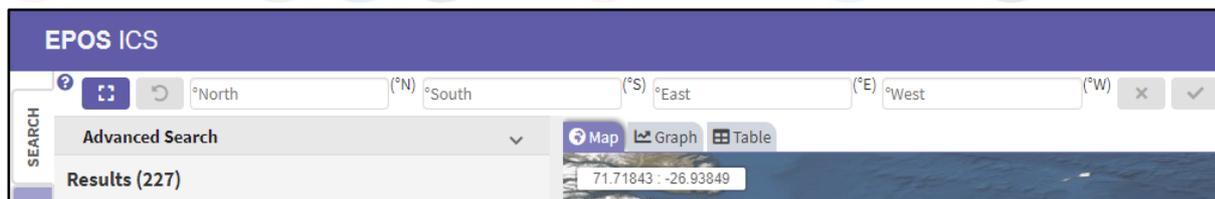


Figure 14: Location of spatial coordinates filter controls.

Below the header, a set of tools exist to constrain the service list with geographical coordinates and time. The geographical constraints, also known as the spatial filter, consists of a button for drawing a box in the map and multiple input fields to set the coordinates manually (fig. 14). The fastest way of defining a spatial filter is to enable the tool of drawing a box, known as a bounding box, directly on the map. Click the dashed square icon and a change of color marks that the tool is active. Move the mouse over the map, click and drag a rectangle to select the geographic area of interest. Release the mouse to finish the drawing and the result list of services on the left side will be reduced to only show services that have data covering the drawn area (fig. 15). It is important to know that the services appearing in the list may also give you data outside the box, but the constrain itself guarantees that the data coverage of the services includes the drawn area. To make a more accurate box, the input fields below the main header can be altered. Remember to apply these changes by the confirm button on the right side of the input fields. To clear the selected area, click the “X” button.

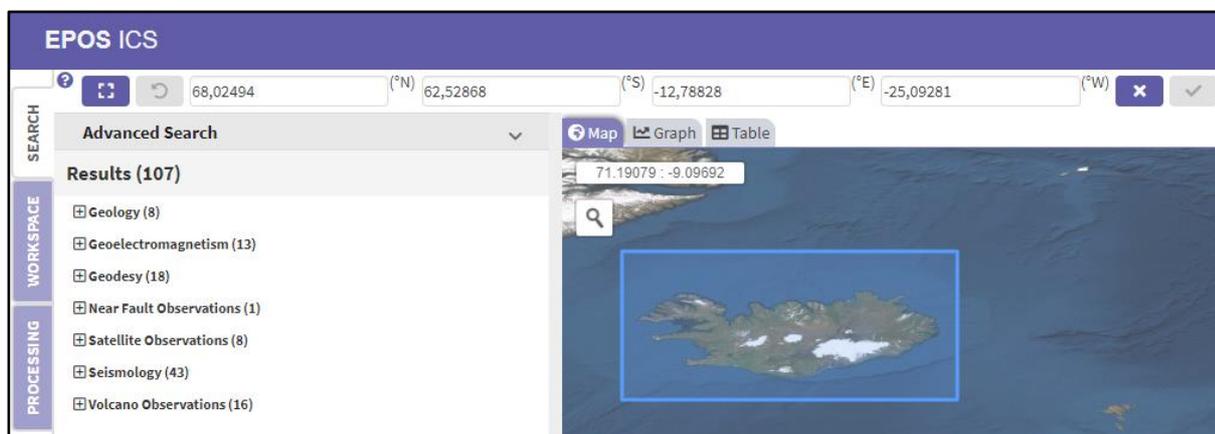


Figure 15: A geographical box that constrains the list of services to the defined area of the drawn rectangle.

Selection of a time window, also known as temporal, to constrain the data can be achieved by selecting start and end time within the input fields on the right side below the main header. The input can be done through the datetime selector or by typing in values manually by the format given in the input's placeholders (fig.16). By applying the time constraints, the list of results will be reduced in the same manner as for the spatial constraints. Both the spatial and temporal constraints can be applied together.

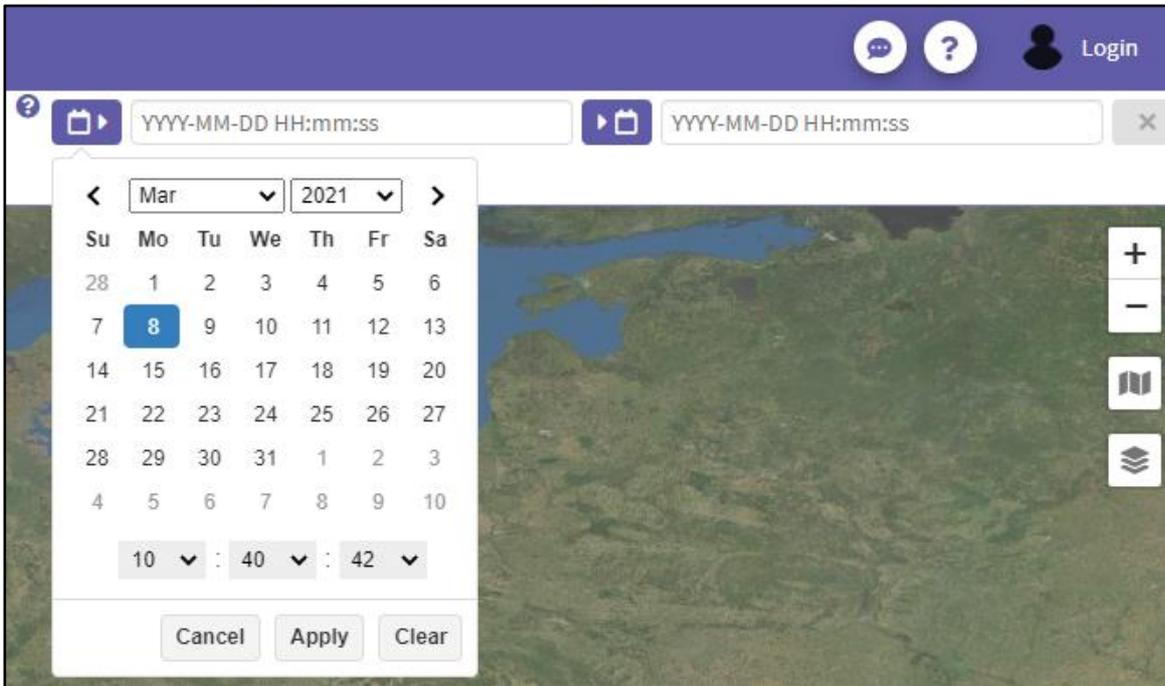


Figure 16: Select a time window to constrain the result of services.

Above the result list itself, an advanced search can be enabled by first clicking on “Advanced Search” bar to reveal the options. Within this area, the user can choose between a list of predefined keywords or do a free text search to filter the list of services (fig. 17).

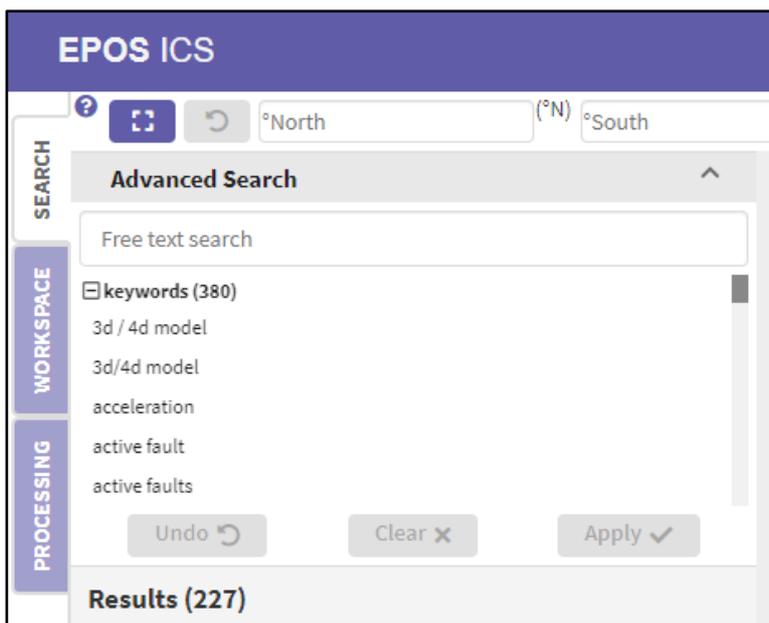


Figure 17: Overview of the advanced search area with free text search and a list of keywords.

A vast number of keywords is listed, and it is possible to choose multiple keywords. For example, if the user wants to find services that offers data about faults, the user can select more specific keywords such as “active fault” and “crustal fault” (fig. 18) and get a narrow result, but the user can also add the more generic keyword, “fault”, as well and get a wider list of services (fig. 19). Remember to click the “Apply” button to make the keywords active as filters.

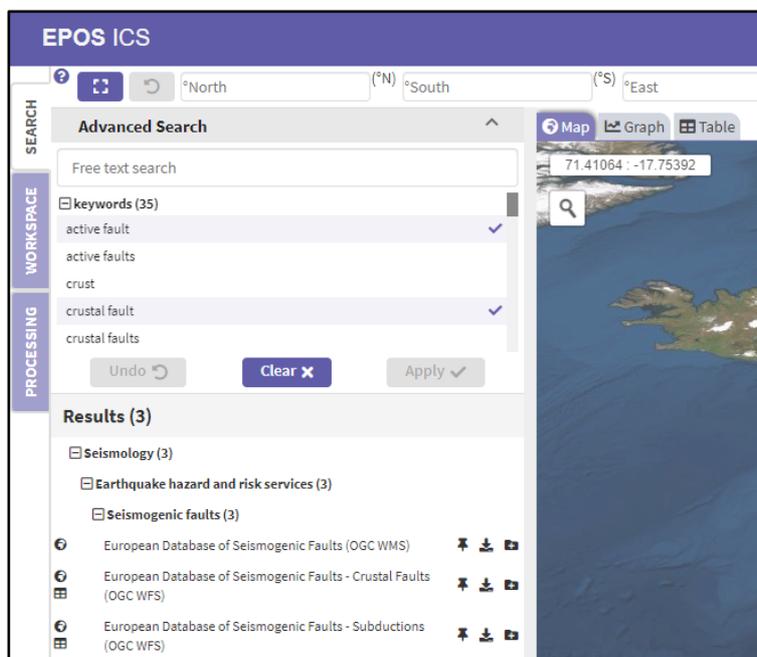


Figure 18: Use of the keywords, “active fault” and “crustal fault”, as filters to reduce the result list.

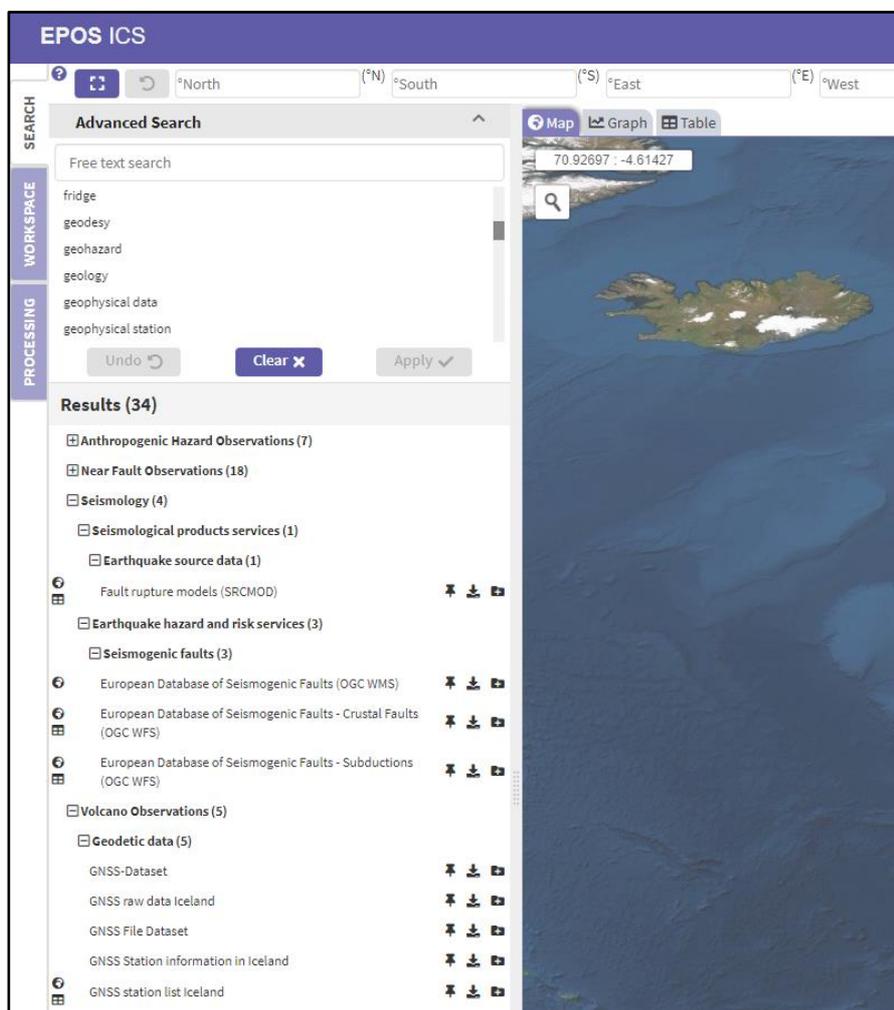


Figure 19: Use of the more generic keyword “fault” in addition to “active fault” and “crustal fault”, to get more services.

Beside the keywords, which is given by the service providers, the user may use the free text search. An input field just above the keyword list is provided to make the user add his own search parameters. The word given in this input will be compared against any other words given within the keywords list or any description of the services. For example, if the user wants to find services related to earthquake, simply write earthquake in the input field and click apply (fig. 20).

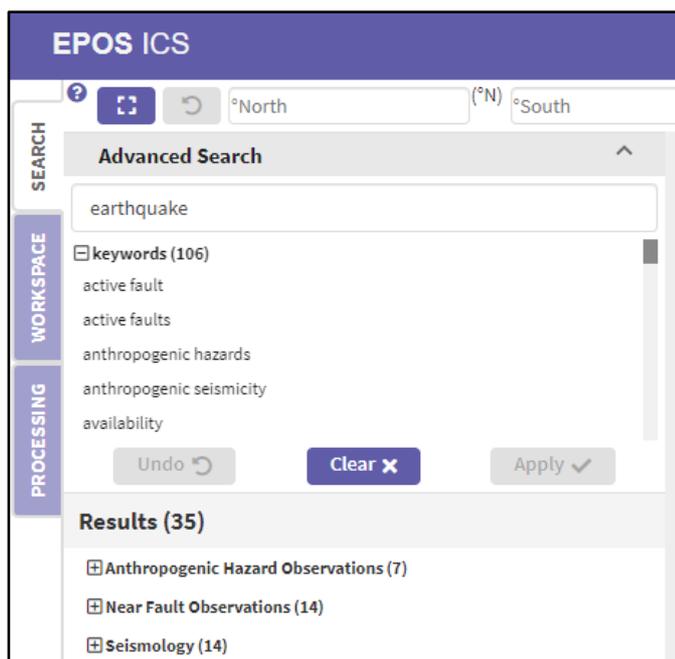


Figure 20: Use of the free text search, with the search word “earthquake”.

How to select data?

While browsing through the list and clicking on the services, the pre-visualization can only display one service at a time. To enable stacking of multiple layers, each service can be selected and temporarily stored within a “Selected Items” list (fig. 21). The selected items list is located beneath the result list.



Figure 21: Selected items list.

To add a service to the selected items list, find a service, for example the “Geological Map 1:1,000,000” service, and click the “Pin” icon located to the right side of the service name (fig. 22).

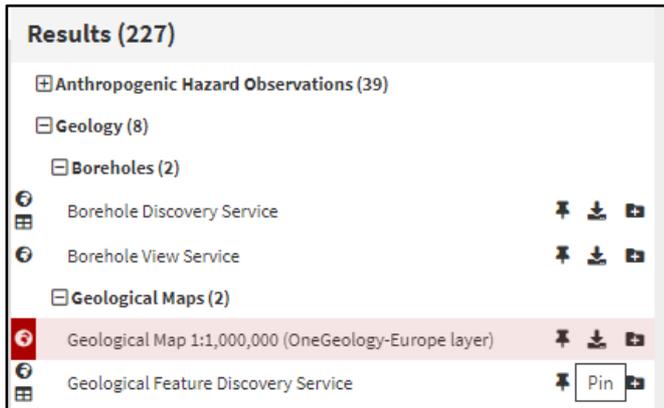


Figure 22: Item for selecting the service through the “Pin” icon.

Upon pinning the service, the service will be added as an item to the selected items list. The item automatically gets a colour assigned, in this case red color, to easily distinguish this service from others. The order of assigning color is fixed and hence red will always be first color. The item can be removed from the list by clicking the “x” icon (fig. 23). All services in the list can also be removed by the clear button.

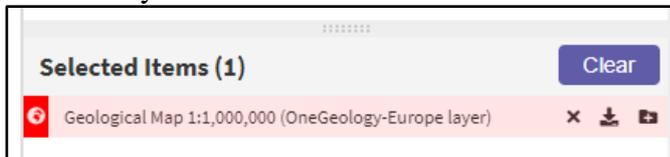


Figure 23: Item added to the selected item list.

However, the default color for the pre-visualization is also red, so if another service is activated, for example by clicking the “Parameters of historical earthquakes (1000-1899) - OGC WFS” service underneath the Seismology domain, it also will appear with a red color (fig. 24).

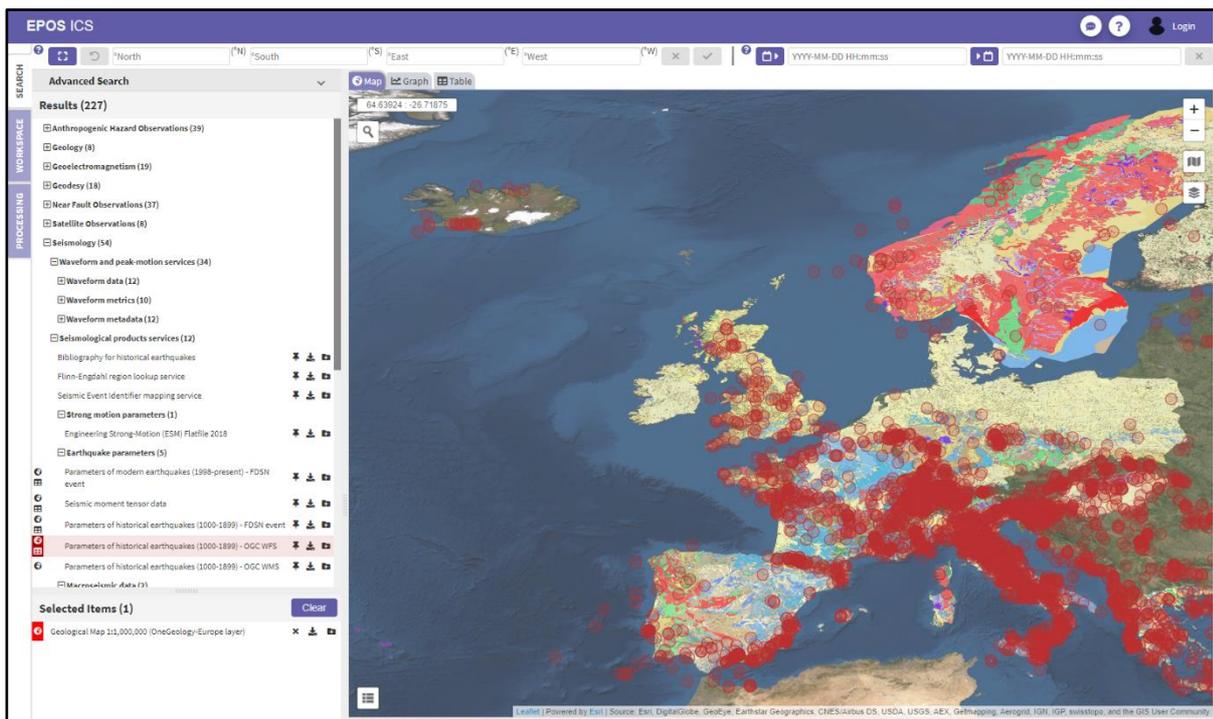


Figure 24: Color issue in pre-visualization of a new service when the selected items list contains an item.

In this case, the geological map is rendered with image tiles and hence do not reflect the red color in the map itself. The historical earthquake service on the other hand, is of type WFS and will render the data as individual points on the map with the active color. If both had been of type WFS it would obviously been an issue to distinguish which points is belonging to which service. This issue is easily resolved by pinning the service. Items added to the selected items list will automatically receive a unique color, so by pinning the historical earthquake service, the color of that service will change to blue color (fig. 25).

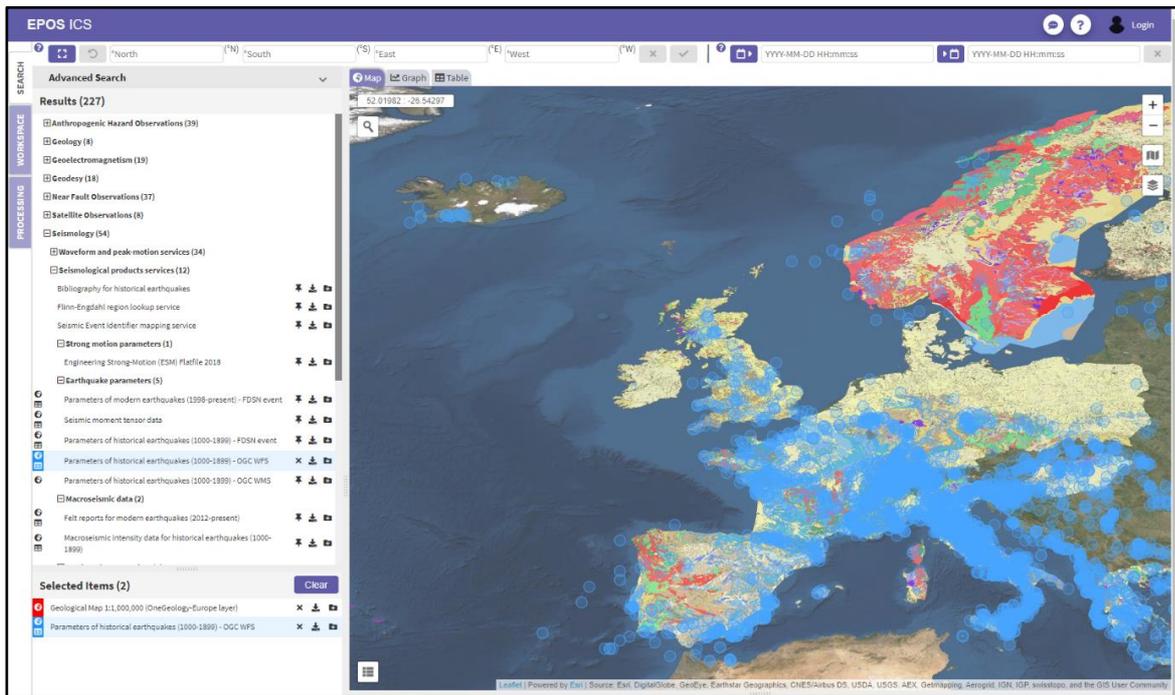


Figure 25: Assignment of unique colors for each added service to the selected item list.

When stacking multiple services on top of each other, the layers will by default superimpose each other. The transparency of each layer is adjustable and can be changed through the layer control tool in the map (fig. 26).

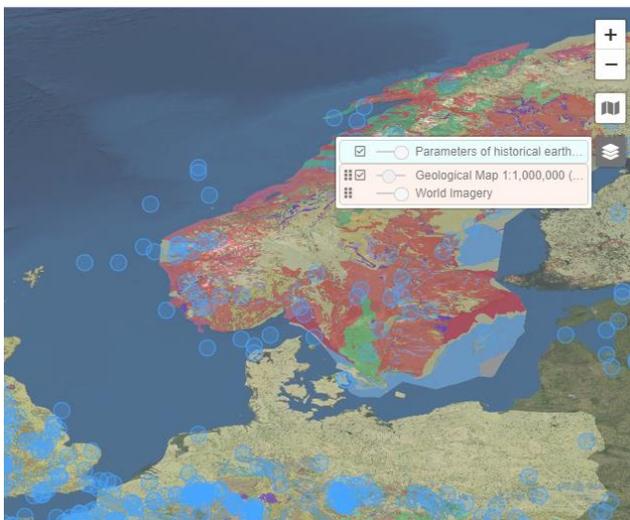


Figure 26: Changing layer transparence through the map's layer control tool.

How to download data?

In many cases, people would like to use the data found within other applications to do their research. For this purpose, a download function is available for each service (fig. 27).

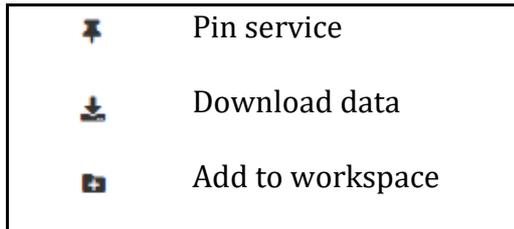


Figure 27: Actions on each service

The download function has two presets for data retrieval, meaning that you could either download the data as a file or receive view of the raw data with the associate URL attached. The direction of download is configured automatically based on the format received. As the portal is running through a web-browser, formats like “JSON”, “XML” and “TEXT” are rendered directly in new windows within the browser (fig. 28). Other formats initiate a download of an external file. To choose the desired format, a popup window opens when clicking on the download icon (fig. 29). The user can then click on the format and a download is automatically initiated.

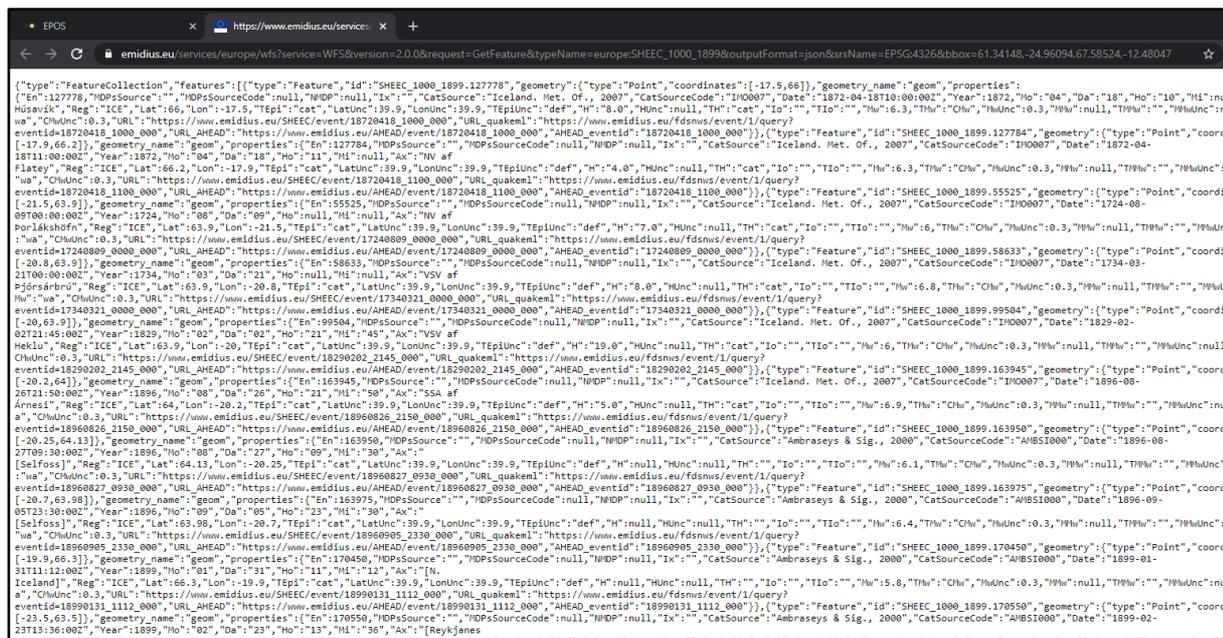


Figure 28: View of raw data through a new window in the browser. In this case the JSON format.

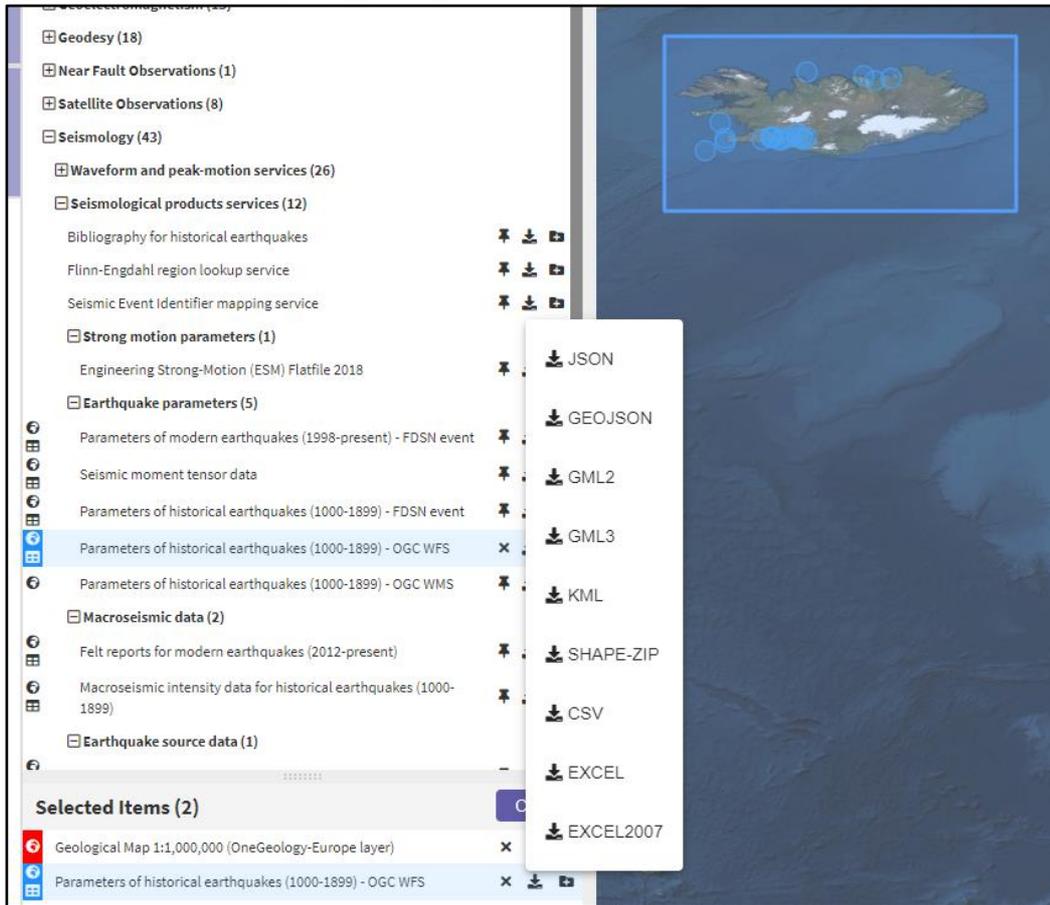


Figure 29: List of available formats for download to be chosen.