



Project of Strategic Interest NEXTDATA

NextData System of Systems Infrastructure (ND-SoS-Ina)

Deliverable D2.7.8.a NextData Web Portal

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Abstract	This document presents the development status of the NextData SoSIna Web Portal , as well as its novel features and results.

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1. Introduction

This document presents the work done on the SoSIna Web Portal during the second year of activity of the Special Project (2014) that led to the release of the first prototype.

This work was done within the Special Project SosIna WP3 Task 3.2 and pertains to the development of the Web Portal based on the outcomes of the SosIna WP2. The achieved results include:

- Deep modifications of the SoSIna Web Portal interface.
- Implementation of the core concepts of SoSIna Web Portal, following the requirements expressed by users.
- Introduction of a complete data access mechanism to download files from end sites.
- Implementation of the major part of the requested features, including: query specific constraints, an innovative graphical map-oriented layout, data preview and online tooltip-based help guide.
- Exception error handling.
- Updating of GIAPI [\[R1\]](#) and Openlayer 3 [\[R2\]](#) libraries to the last released versions.

We will now present advances in NextData SoSIna Web Portal development.

2. Advances in NextData SoSIna Web Portal development

Much work was done in the last year both to implement novel requirements and to refine already existing functionalities.

2.1 Old Functionalities vs New Functionalities

Based on the description of functional and nonfunctional requirements that was previously prospected in other Deliverables (Web Portal Architecture), a first web portal prototype was released during the last year. It included base features for discovery (simple, advanced and semantic search) for access (download and transformation function) and for evaluation (access to metadata). A preliminary version of some secondary features was also released, such as, for example, help functions, user feedback and documentation.

We will show next that much more was done in order to complete the SoSIna Web Portal implementation and to provide a good tool for data search in the context of environmental and climate data. However, novel specific requirements were introduced regarding the user interface and the search functionalities. The large amount of new requests led initially to a slow down of the development process but, at the same time, to a higher quality level of the released product.

2.2 Main SoSIna Web Portal features

In this section we present the list of the main features implemented in the first prototype divided by category:

- **Authentication and Authorization functions**
 - At present the map is always visible to unauthenticated users (Guest) and files can be downloaded as well. A Liferay [\[R3\]](#) based authentication and authorization mechanism (account creation with mail verification and

approval required) allows authenticated users to access feedback pages and hidden documents. More powerful roles can be defined and assigned to particular users for example to create and edit pages. In the future this will be potentially used to allow/deny access to subset of data for guests or specific users. This will be discussed together with NextData community to define the correct needs and the policies to implement.

- **Discovery**

- A mandatory input field allows to add one or more keyword search terms (eventually separated by the boolean operators AND and NOT). The lens button or the enter key submits the query and shows paged results.
- A cog icon allows to access the settings for advanced search tools:
 - The *Data sources* panel allows to include/exclude sources from queries
 - The *Space and Time* panel allows to restrict queries to results that contain or overlap a specific space domain. This domain may be optionally synchronized with the viewed map area or manually added. The *From* and *To* input fields allow to restrict queries to results that contain the inserted time extents.
 - *The Fields and Semantics* panel allows to specify the search fields where to perform the search between *Title*, *Keywords* and *Description*. It also enables a semantic-enriched search by selecting a semantic relation between *Specific*, *General* or *Similar*.

- **Access**

- Under the result description a download icon allows the access to a separate panel to specify a name to save the file, as well as, if available, transformation options like CRS (Coordinate Reference System), Raster Format, Subsetting and Resampling.

- **Evaluation**

- Each page of results shows ten results with one line title and description. Clicking on the title the whole description appears with an overview, if available. Under the description, an info and download icons allow the access to metadata and download options, respectively.
- Metadata for sources can be accessed by clicking on the source name in the *Data sources* panel, whereas the service icon links to the source page, if available.

- **Visualization**

- The geographical extents of the selected results page are shown, clustered on the map and highlighted when selected. A map marker is used for punctual geographical extent with a number representing the count of result with a close extent. Whereas a flag icon is used for rectangular geographical extent with a number representing the count of results with a “close” extent.

- **General**

- A new NextData theme was created in order to change the layout according to the preferences expressed by users:
 - The main page fits on a single page, avoiding the scroll of the page to view the entire application.
 - The map area covers the entire page except for the heading of the page.
 - The heading contains the logos of the Project, of the participants and of the data providers, besides to the sign *in* and *menu* buttons.
- Besides the keyword input field, the lens icon and the cog icon, the map contains buttons to:
 - go in fullscreen mode;
 - increment/decrement the zoom level;
 - fit the max extent (whole world);
 - show map attributionsand labels to show
 - mouse position;
 - metric and US (United States) scale line;
- A toolbar has been added to minimize, restore, maximize and close the result, metadata and sources panel.
- To select area around the dateline, it is possible to specify a value for the east coordinate smaller than the west coordinate value.

Changes to the SoSIna Web Portal Layout

The SoSIna Web Portal layout was changed in order to reflect the new portal behaviour. A NextData theme has been created and deployed in Liferay. Figure 1 shows the new graphical appearance as well as the new interface components and buttons.

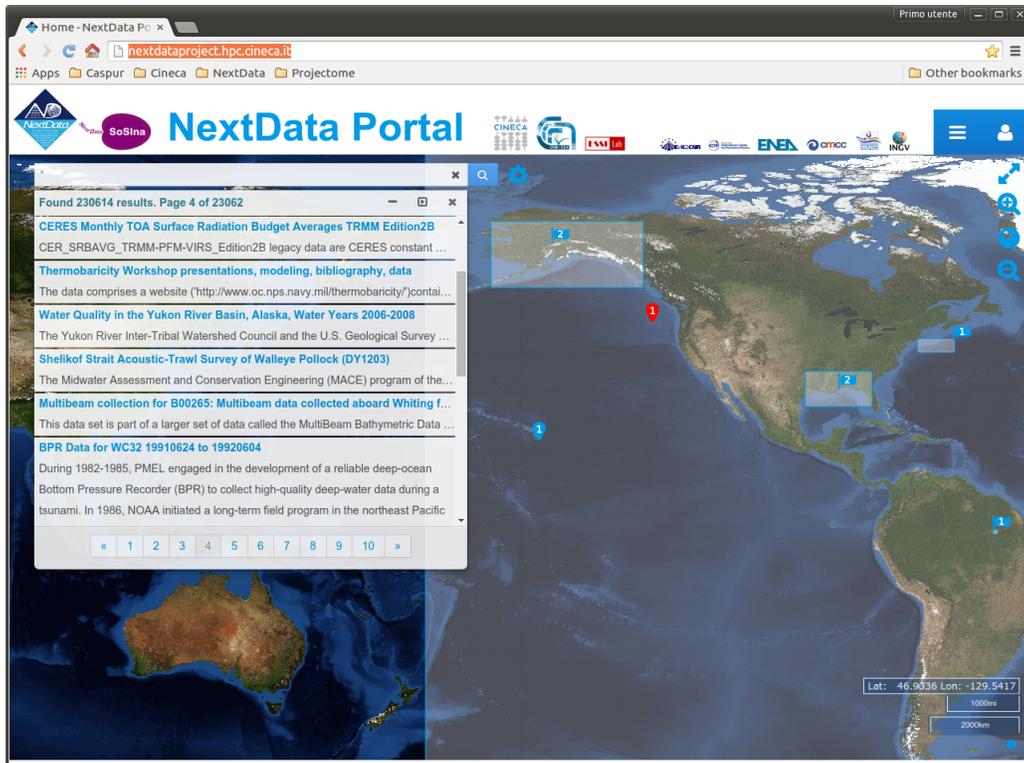


Fig. 1. SoSIna Web Portal Web Interface

A novelty of the new Web Portal appearance is the capability to run in Full Screen mode. Clicking on the double row on the top right of the map will result in changing the map size so that to cover the whole screen, as shown in Figure 2. Note that in fullscreen mode the web portal logos are rendered on the bottom left of the map.

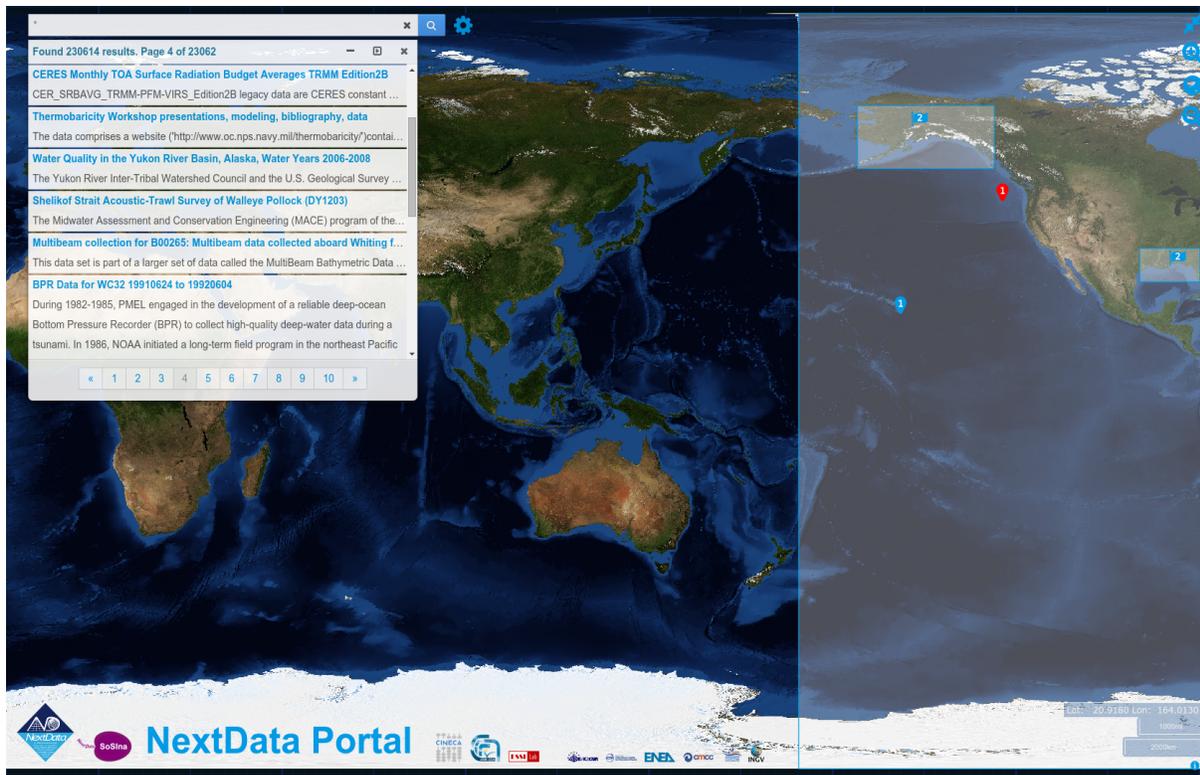


Fig. 2. SoSina Web Portal in Full Screen Mode

The Settings menu

As explained above, the Settings menu shows three different panels: *Data Sources*, *Space and Time* and *Fields and Semantic*.

Data sources panel (Figure 3) allows users to choose the proper source between those published by the broker.

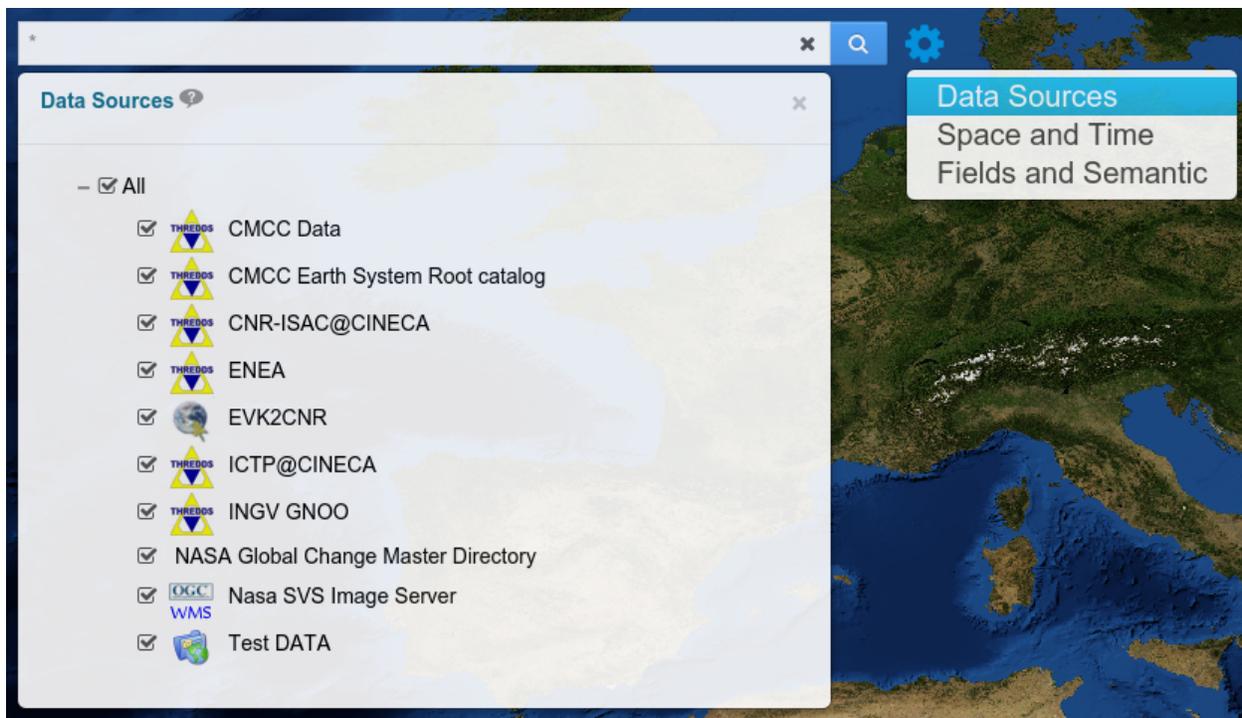


Fig. 3. Data Sources panel

Sources are described by metadata (clicking on a single source will make the metadata description appear). This is shown in Figure 4.

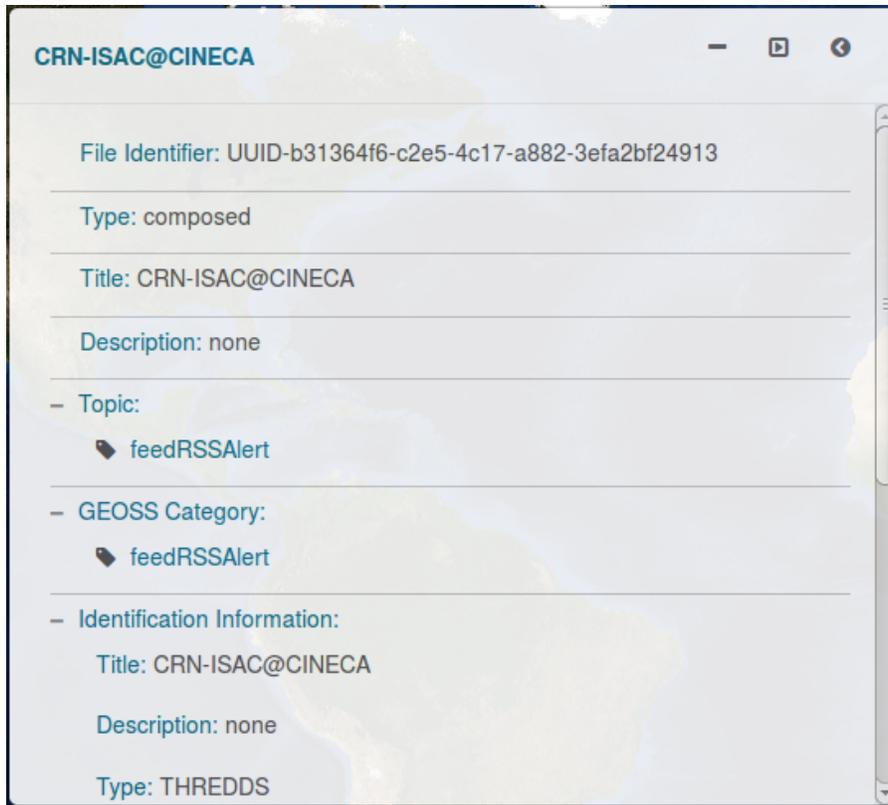


Fig. 4. Sources metadata

From the *Space and Time* constraints panel (Figure 5) it is also possible to select between *Contains* or *Overlaps*. “Contains” constraints the results to be contained in the selected bounding box whereas “Overlaps” constraints the results to overlap the selected bounding box. The “Visible map” option, if checked, constraints the result to the map view, otherwise the constraints can be set through the input fields *North*, *East*, *South* and *West*. The *Time Domain* constraint can be set through the input fields *From* and *To* or *By* the attached calendar widget and allows to restrict queries to results that contains the inserted time extent.

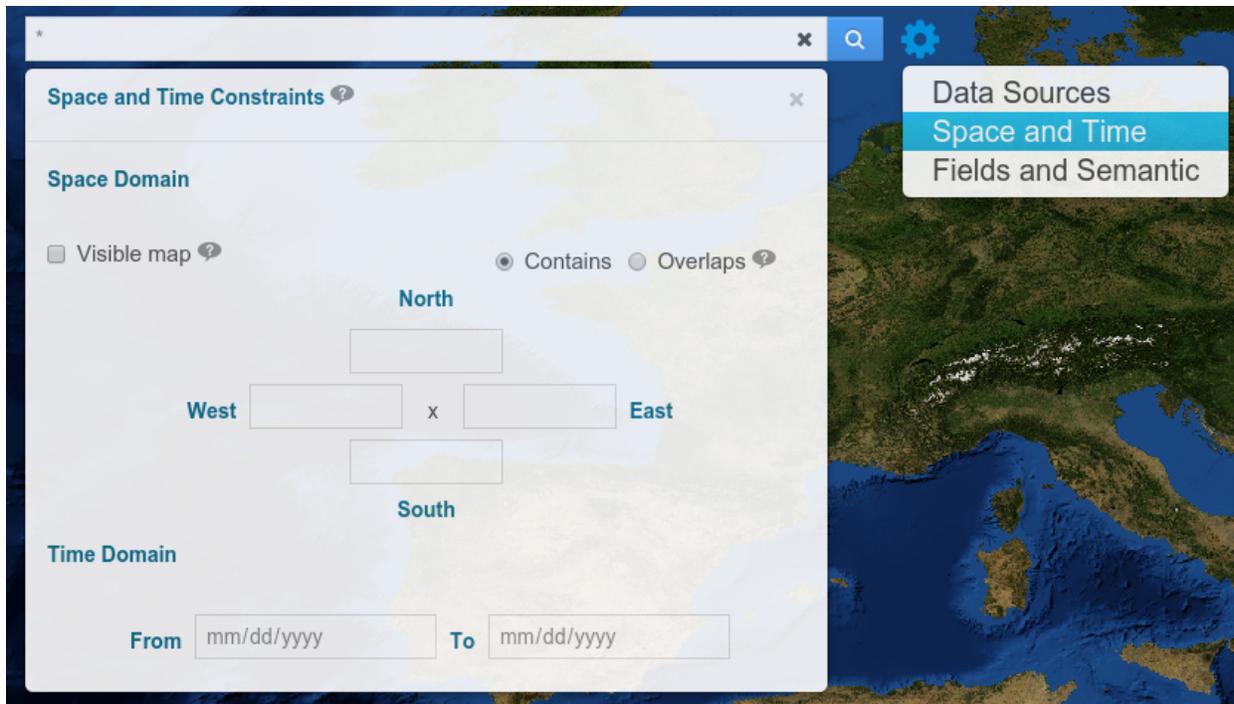


Fig. 5. Space and Time constraints panel

The Fields and Semantic panel (Figure 6) allows users to select which fields to consider in order to perform the search query by checking *Title*, *Keywords* and *Description*. It also allows to enable a semantic-enriched search by selecting a semantic relation between *Specific*, *General* or *Similar*. The semantic-enriched search enables also a multilingual search for the languages highlighted in the same panel (Italian, French, Spanish and English).

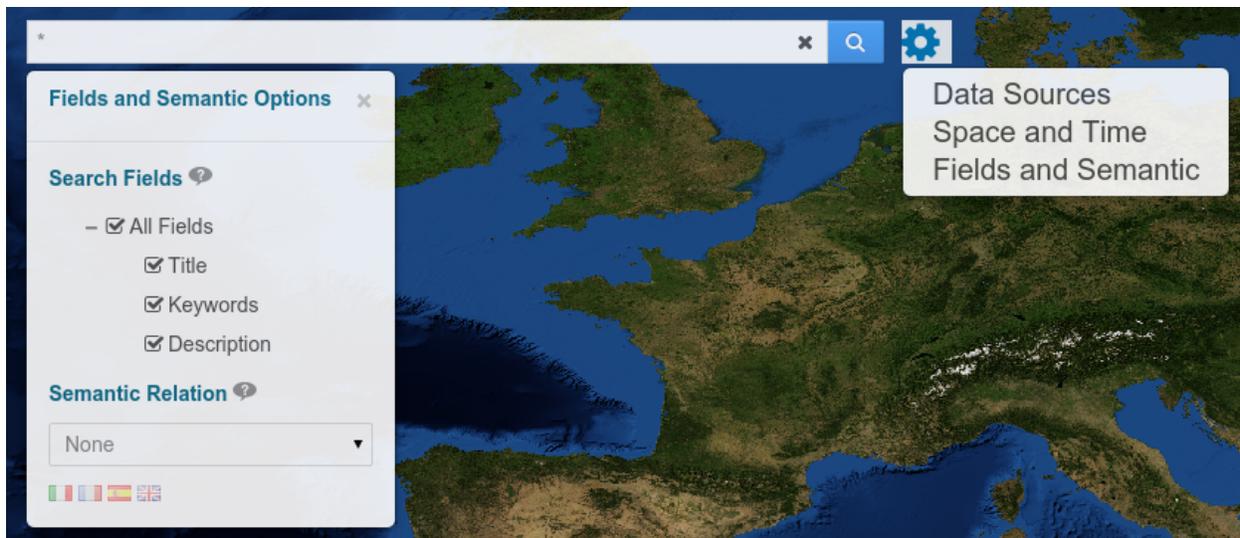


Fig. 6. Fields and Semantic panel

Search results are presented into a paginated catalog rendered in a panel on the left of the

web page (Figure 7). Moreover a toolbar has been introduced to maximize, minimize and close the catalog view (Figure 8). The same figure shows how, by clicking on the title of the result, an overview of the data, if available, appears, along with the full description, the info and the download icon. The info icon shows the metadata (Figure 9), including the *File identifier*, *Type*, *Title*, *Description*, etc..

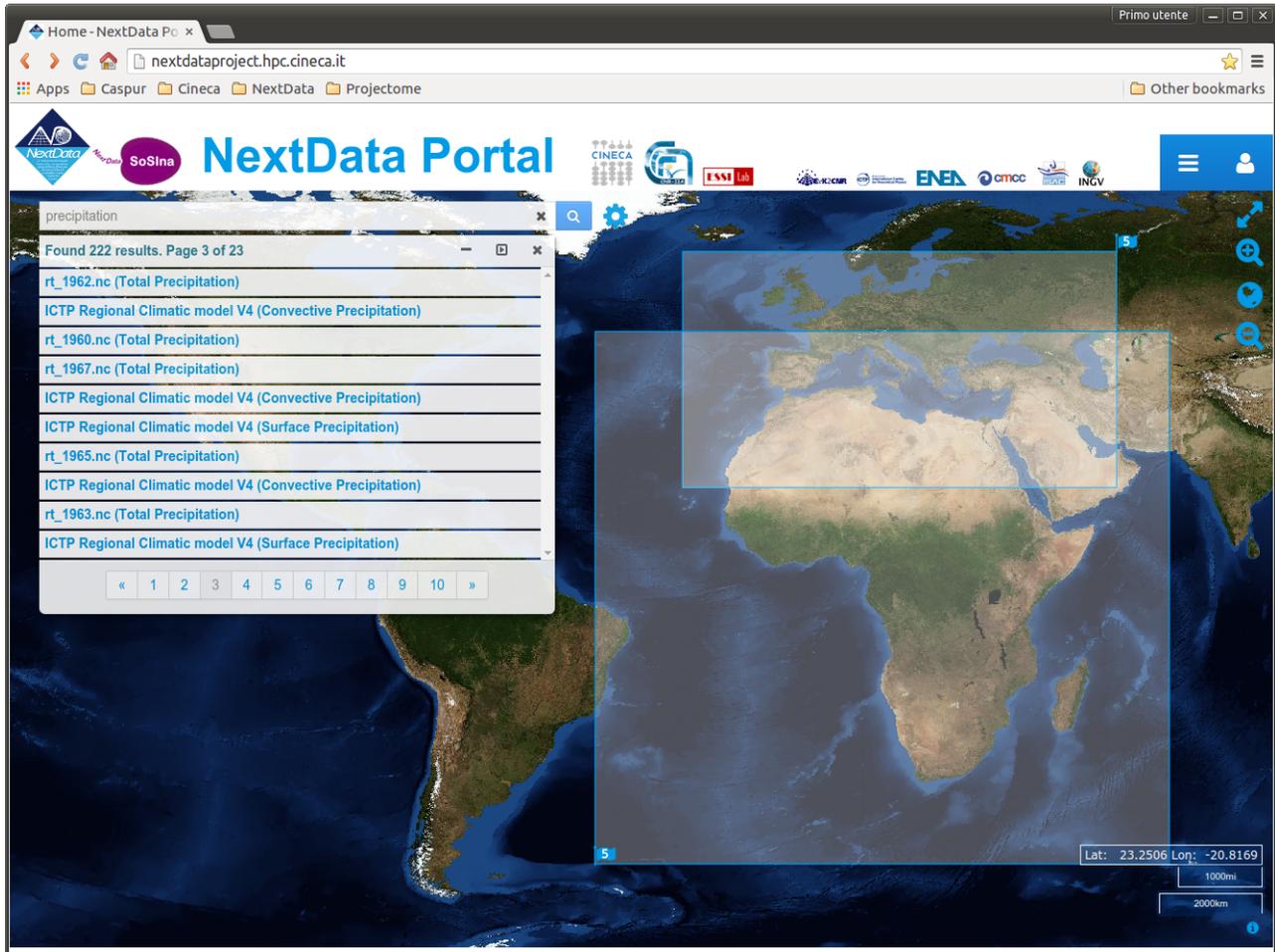


Fig. 7. Results panel as paginated catalog

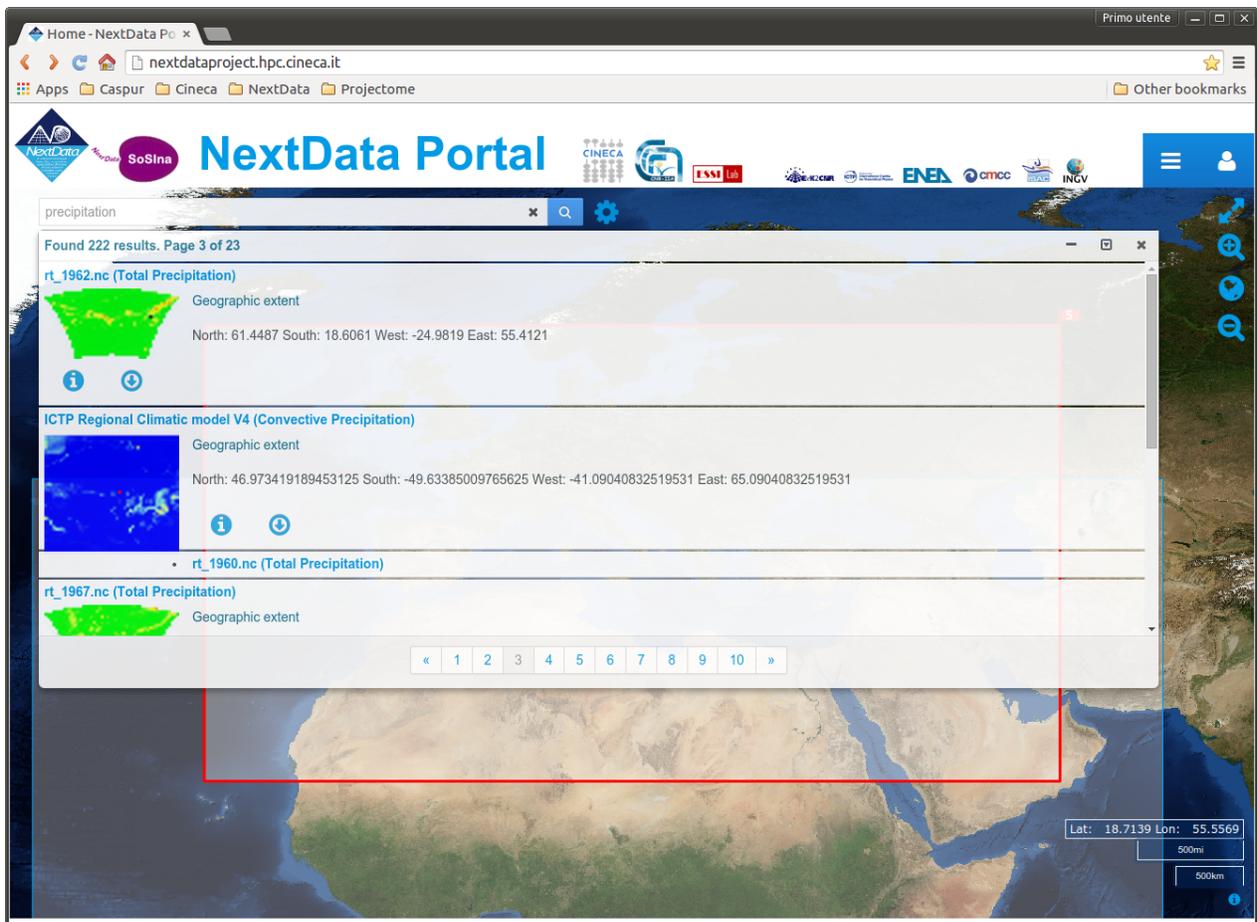


Fig. 8. Maximized result panel

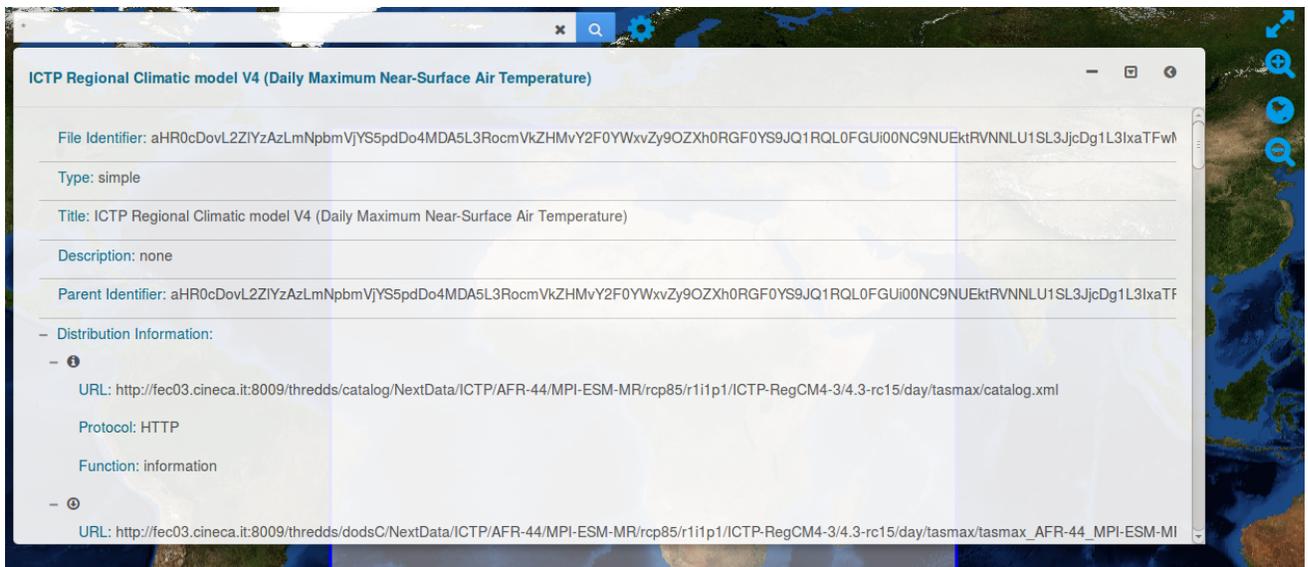


Fig. 9. Result metadata info

The Online Help guide

An Online Help guide has been created to help users to get started using SoSIna. It is accessible through the menu button on the top right.

To guide the user in navigating through the portal, some help tooltips (Figure 10) were also added to the portal in some key points.

Moreover, a User Feedback page has been added, where users can add posts and comments in order to provide feedback about portal functionalities and usage. This page is available only to registered users.

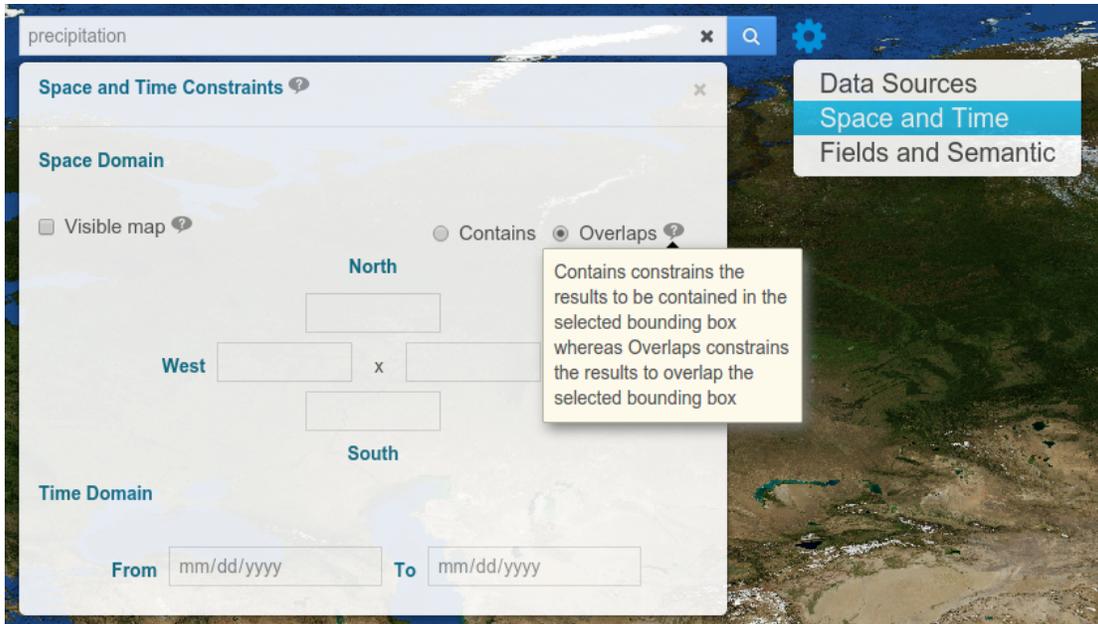


Figure 10. Tooltip example

3. Resources

The new version of the SoSIna Web Portal has been deployed at two different sites:

<http://nextdataport.hpc.cineca.it/>

<http://130.186.16.66/>

These instances of SoSIna have been made public in order to allow users to test the new version and have been deployed on the CINECA Front End Cluster (FEC) and on a virtual machine of the Nubes cloud infrastructure.

A new version of the broker has been installed on another virtual machine of Nubes with the relative MarkLogic DB.

Finally, a third virtual machine hosts an instance of Geoserver that offers the WMS (Web Map Service) service to the portal. At present a Blue Marble Next Generation [R4] with topography and bathymetry (86400 x 43200 pixel) is available, configured as a pyramid of mosaics.

4. Development plan

During the third year of activity (2015) all the remaining requirements will be implemented, and a fully functional second portal prototype will be released. The activity to enhance the scalability and to put the portal in full production will be started.

5. Conclusions and future extensions

After the first year of work the SoSIna Web Portal showed a completely different appearance and a new entirely map-based layout. Many fixes were done in javascript/jsp code and new features were added. Data overview, as well as bounding boxes, file download and help tooltips, were introduced. The feedback page and the online help page are now published on the portal.

The first portal prototype was also presented during a meeting held on the third of November 2014 with the main data providers of the NextData community helping to gather further requirement and study and use cases.

A new version of the Broker has been installed and the new service infrastructure will follow some precepts in order to guarantee scalability improvement and availability. The work that has been done in the last year has produced significant results and we are now proud to finally deliver a high quality tool to support communities towards research about environmental and climate data.

6. References

R1	GIAPI: http://api.eurogeoss-broker.eu/docs/index.html
R2	Openlayer3: http://openlayers.org/
R3	Liferay Web Site: http://www.liferay.com
R4	Blue Marble Next Generation: http://visibleearth.nasa.gov/