Project of Strategic Interest NextData

Deliverable D2.2.2
Report on user-friendly catalog and database

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Contents

1. Introduction

WP2.2 aims at creating a specific portal providing access to the enormous amount of Reconstruction-Reanalysis (RR in the following) data for the Mediterranean Sea for the past hundred years. It will provide user-friendly access to essential climate data, data quality indexes and the derived physical and statistical products.
This is a big goal considering the high spatial and temporal resolution of the products that will be offered to end users.

2. RR Specific Portal Architecture

The specific portal for access to RR data was designed following the latest guidelines of the European INSPIRE directive in order to create an infrastructure integrated into a community context.
The specific portal will link to the General portal containing all the information on metadata of available RR products, although the property and network services will remain in the specific portal, as shown in Figure 1.

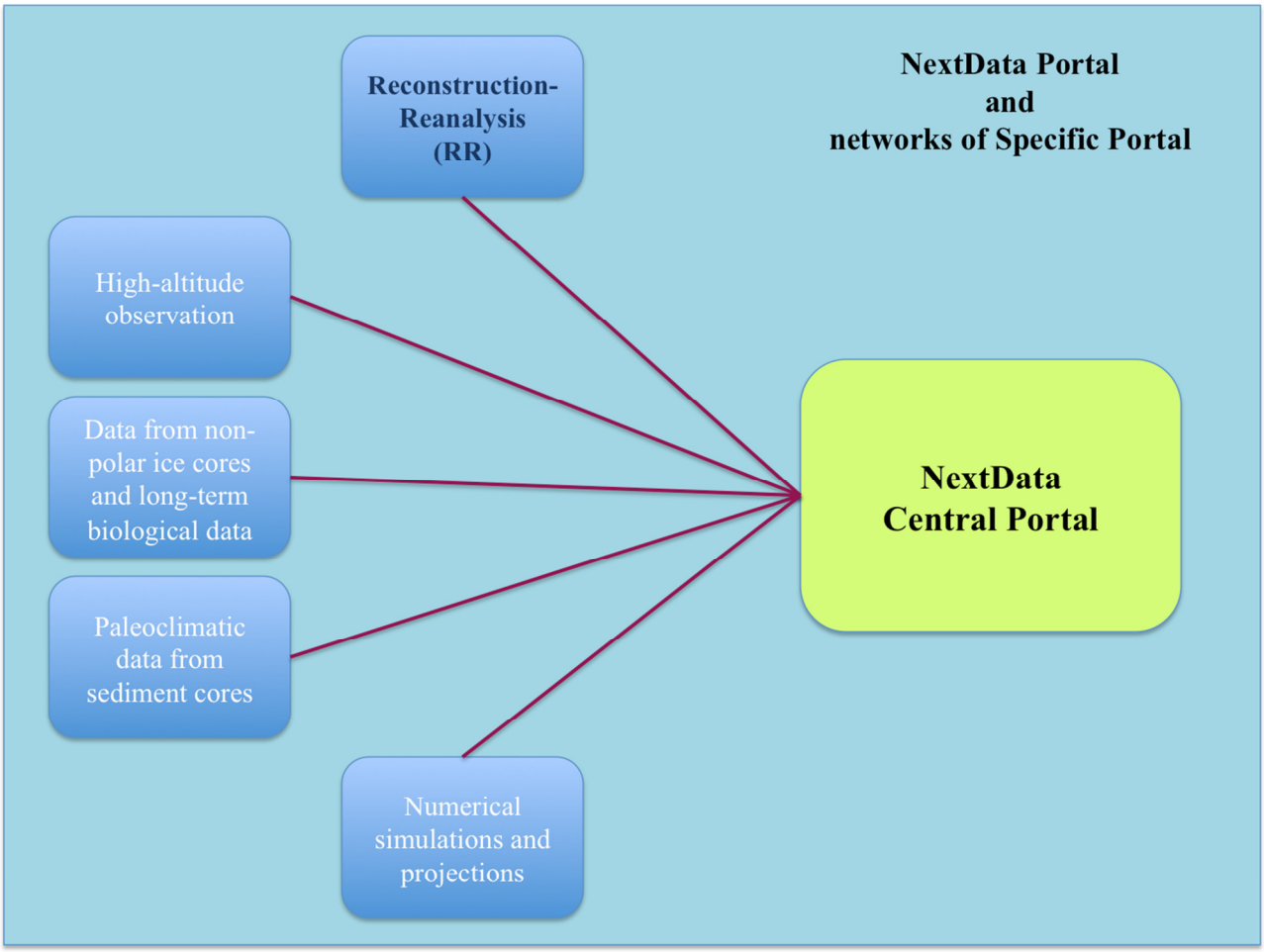

Figure 1. Scheme of dataflow between the RR specific portal and the NextData general Portal.

The specific portal will provide network services indicated by the INSPIRE directive: discovery, view, downloading and transformation, as shown in Figure 2.

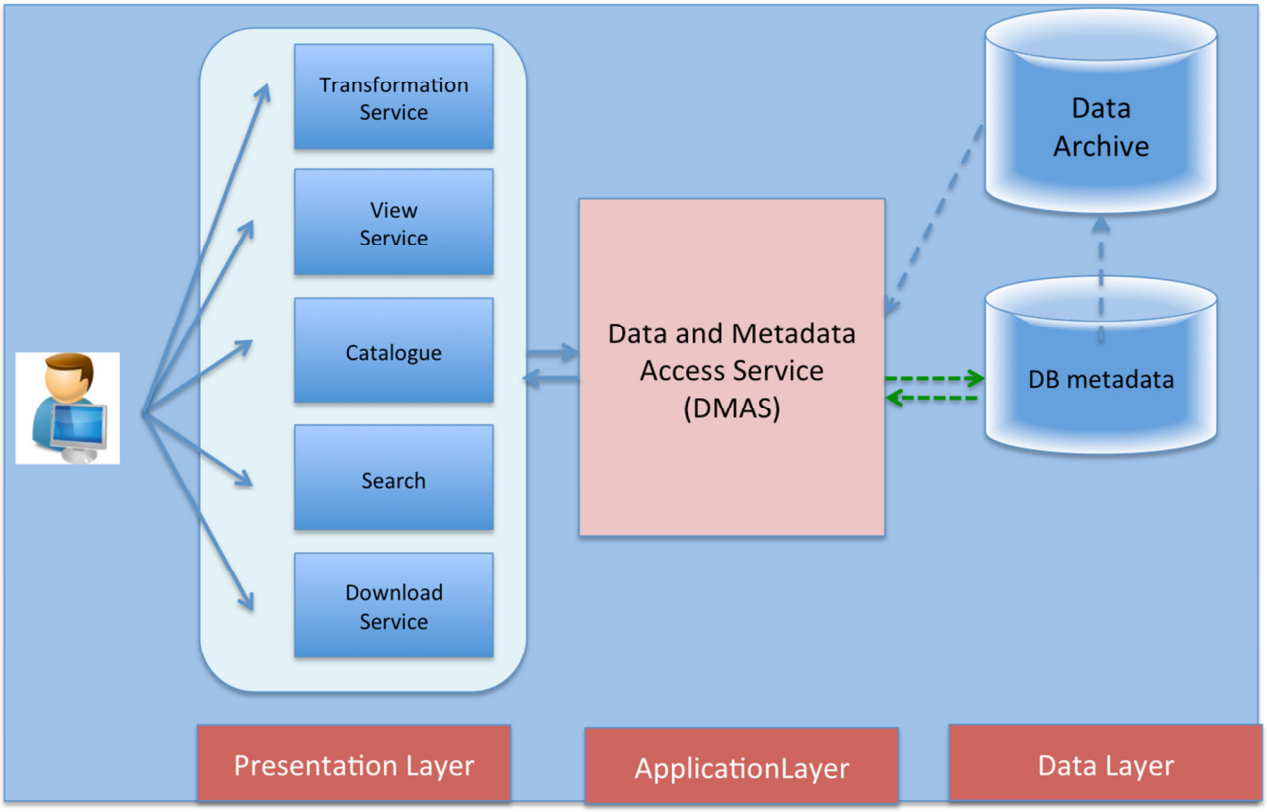

Figure 2.RR Specific Portal architecture .

There are three closely-connected layers:

- **Presentation Layer** : contains network services (Transformation, View, Search, Download, Catalogue) to be implemented.
- **Application Layer**: contains Data and Metadata Access Service (DMAS).
- **Data Layer**: contains storage and metadata database.

Users will approach the portal via a graphical interface (web page) and will have easy access to catalog, search, view and download RR products.

The core of the system is DMAS, which has a dual function. It manages the metadata for search and discovery of the data archive and allows the data archive to be accessed through the metadata database. The data archive will provide physical storage and will consist of a file system.
This architecture was adopted in view of the enormous amount of data involved and because it is independent from the database management system.

Users will consult the catalog of available RR products, as shown in Table 1. This catalog is set up using the existing reanalysis data for the last twenty years and may be modified in the version that will be released during the project.

Variables	Geographical coverage	Spatial resolution	Number of levels	Temporal resolution	Temporal coverage
Temperature	6° W - 36.25° E 30.19° N – 45.94° N	0.0625°	33	24 hr average field	1912-2011
Salinity	6° W - 36.25° E 30.19° N – 45.94° N	0.0625°	33	24 hr average field	1912-2011
Sea Surface Height	6° W - 36.25° E 30.19° N – 45.94° N	0.0625°	1	24 hr average field	1912-2011
Horizontal velocity (meridional and zonal component)	6° W - 36.25° E 30.19° N – 45.94° N	0.0625°	33	24 hr average field	1912-2011
Surface fluxes	6° W - 36.25° E 30.19° N – 45.94° N	0.0625°	1	6hr	1912-2011
Surface S,T and currents	6° W - 36.25° E 30.19° N – 45.94° N	0.0625°	1	6hr	1912-2011

Table 1. RR products that will be released for the project.

Temperature, salinity and horizontal velocity:

3-dimensional fields, given as a daily mean centred at 24 UTC of each day. Vertical levels are in meters, geographical coordinates in degrees and decimals. A means of filtering the inertial current signal through a "high-pass" filter will be studied in order to eliminate bias from the daily mean.

Temperature and salinity surface fields:

2-dimensional fields, given as an instantaneous field (snapshot) at 6hr.

Sea surface height fields:

2-dimensional fields, given as a daily mean centred at 24 UTC of each day.

Air-sea flux fields:

2-dimensional fields, given as an instantaneous field (snapshot) at 6hr. These consist of all the components of heat fluxes (short wave radiation, long wave radiation, sensible and latent heat), momentum flux (zonal and meridional wind stress) and surface water flux (difference between precipitation, runoff and evaporation).

RR products are released on the regular grid. The horizontal grid step is regular in Latitude and Longitude and is 1/16 of degree (~6.5 km).

The grid is a staggered Arakawa C-grid. The dataset of temperature, salinity, sea surface height and surface fluxes are centred at the T point of the grid, whereas the zonal and meridional velocities are centred at the u and v points respectively (Figure 3). The zonal and meridional velocities are released in the same dataset even if they have a different lat/lon grid.

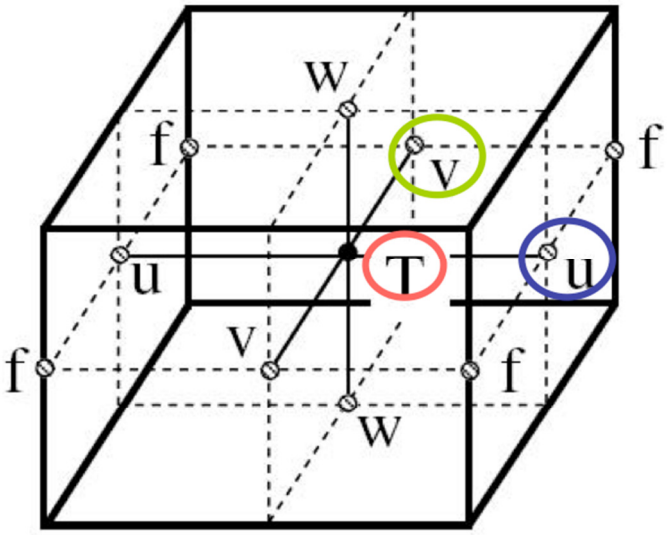

Figure 3. The staggered Arakawa C-grid used by INGV RR models.

The spatial coverage is shown in Figure 4

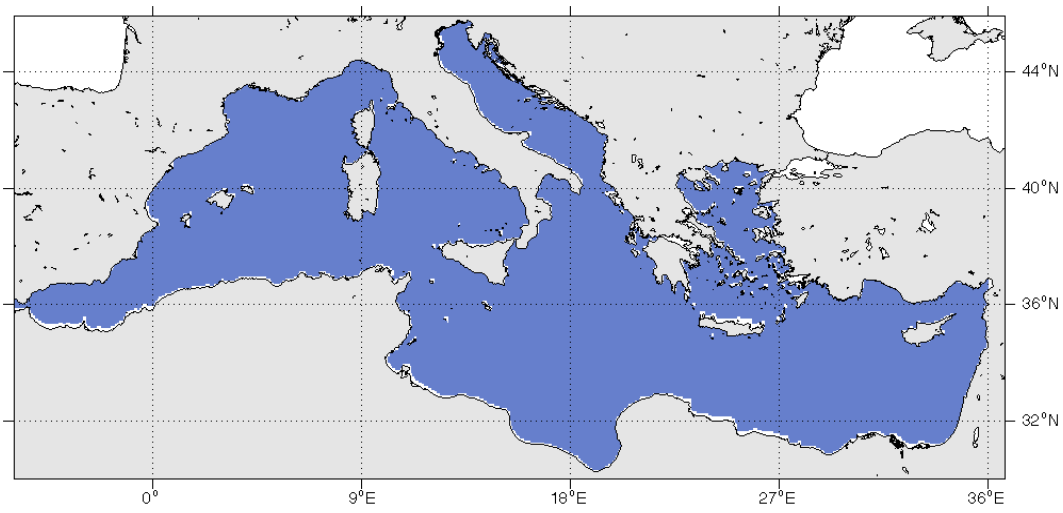

Figure 4: Spatial coverage of RR products.

3D parameters will be released on IODE standard levels (5500, 5000, 4500, 4000, 3500, 3000, 2500, 2000, 1750, 1500, 1400, 1300, 1200, 1100, 1000, 900, 800, 700, 600, 500, 400, 300, 250, 200, 150, 125, 100, 75, 50, 30, 20, 10, 0 m).

The Portal interactive viewing options will be possible only for mean fields such as:

- Monthly mean
- Annual mean

This choise is justified by the large volume of daily data that will not allow to have good performances in terms of request/response time of the Portal. So interactive visualization will be allowed only for mean fields.

The full extended data set of Table 1 will be only available via ftp protocols and with support from the INGV staff. The selected products will be in NetCDF (Network Common Data Form) format, (www.unidata.ucar.edu/software/netcdf/) with the CF-1.0 convention.

References

Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)