



## **Project of Strategic Interest NEXTDATA**

Scientific Report for the reference period  
01-01-2013 / 31-12-2013

### **WP 2.4 Archive of paleoclimate data from sediment cores**

**WP Coordinator: Luciana Ferraro**  
CNR-IAMC, Napoli

**Authors:**  
**L. Ferraro, I. Alberico, E. Anzalone, F. Lirer**  
CNR-IAMC, Napoli

**F. Florindo, P. Lurcock**  
INGV, Roma

## **1. Scheduled activities and expected results**

As reported in the Executive Project Plan, the activities of the second year are focused on finalizing the collection of all information needed for the compilation of the metadata archive and on finding valid proxies for paleoclimatic studies based on cores collected in the Mediterranean Basin.

All the metadata were archived in the SHARE (Stations at High Altitude for Research on the Environment) GeoNetwork platform while climatic proxies in WDB (Weather and Water Database); both systems are used for recording high latitude climatic data (Melis et al., 2010, 2011). The metadata were successively published on the General Portal of the NextData Project.

In order to obtain information (metadata) on the marine sedimentary cores from the Mediterranean Basin, that are not available in the scientific literature or in the international databases, during the second year of activity formal requests were sent to numerous research institutions.

National and international scientific literature was analyzed for the collection of metadata and of valid proxies for paleoclimatic studies related to marine cores, available for the Atlantic Ocean near the Strait of Gibraltar.

A suitable site for the construction of a new *core-repository* for the storage of marine cores acquired during NextData Project was identified and a feasibility study was carried out.

M2 (PM24): Completion of metadata for analysed marine sedimentary cores.

## **2. Deliverables expected for the reference period**

D2.4.2 (PM24): Archive of sediment core data and metadata; transmission to the General Portal

## **3. Activities which have been actually conducted during the reference period**

### *3.1 Research activities*

During the second year of activity the archival research was completed through the analysis of international databases and of national and international scientific literature, in order to gather all useful information for paleoclimatic studies related to sedimentary cores in the Mediterranean Basin, which were identified according to the criteria defined in the first year of the project.

At the time of writing, the number of collected cores for the Mediterranean Basin is just under 3500.

The new data, compared to those acquired during the first year of the project, correspond to cores collected by CNR institutes involved in marine research activity such as IGAG and IAMC. New data acquired by IAMC CNR in Naples for the Project NextData were also added to the previous sets. In particular, two oceanographic cruises were carried out in 2013, during January/February in the Gulf of Gaeta, and in September in the Gulf of Taranto and in the Channel of Sicily respectively.

Only a part of all collected cores present valid proxies for paleoclimatic studies.

The bibliographic research on the sedimentary cores in specific extra-Mediterranean sectors, Strait of Gibraltar, was carried out through the analysis of international databases and national and international literature with the aim to acquire all useful information available and/or accessible for paleoclimatic studies.

Census cores are about 920; only 14 marine cores present scientific references with useful paleoclimatic proxies.

As the NextData Project collects climate data recorded by observational networks at high altitudes and from ice cores (WP2.1 and WP2.3), during the second year of activity a close cooperation with the other WPs, according to common guidelines, was carried out for data storage.

As reported in the executive plan of the project, different research institutions were in contact in order to retrieve information on marine sedimentary cores in the Mediterranean Basin, which were not accessible through inspection of the scientific literature/international databases. The following institutions replied and sent useful information for the Mediterranean Basin:

- IAMC CNR: metadata related to 227 cores.
- IGAG CNR: metadata related to 1024 cores.
- OGS report EUROFLEETS Cruise Summary Report "Salt deformation and sub-salt fluid circulation in the Algero-Balearic abyssal plain (SALTFLU)" - R/V OGS Explora, Cruise No. E12; metadata related to 2 cores, however not usable because located in areas out of WP2.4 interest.

A suitable site for the storage of the marine sediment cores acquired for the NextData Project was identified and the feasibility study for its implementation was carried out.

The technical characteristics of the new *core-repository* are as follows:

- the main area with a constant temperature (4°C) and humidity chamber for core storage;
- racks to archive cores (120 cm long and 20 cm high). Typically, cores are cut into standard lengths of 1 m and then split longitudinally;
- a cell freezer locker (-20°C) with racks to store smaller cores (60 cm long and 20 cm high).
- The *core-repository* will archive sediment cores acquired during the NextData Project (WP1.5). It will be available to the scientific community for the storage of marine sediment cores from other projects and will be linked with other *core-repositories* in the Mediterranean area.

### *3.2 Applications; technological and computational aspects*

Project activities thus far have resulted in the creation of a logical scheme and physical implementation for marine sediment core data storage. The data managed in WDB and GeoNetwork will be available to users through the General Portal of the Project.

### *3.3 Formation*

None in the reference period.

### *3.4 Dissemination and disclosure*

None in the reference period.

### *3.5 Dissemination*

None in the reference period.

## **4. Results obtained during the reference period**

### *4.1 Specific results (Data libraries, Measurements, Numerical simulations, etc)*

During the second year of project activities, the analysis of international databases and of the national and international scientific literature allowed to have an overview of the available information for paleoclimatic studies on sedimentary cores drilled in the Mediterranean Basin and in the Atlantic Ocean, Strait of Gibraltar.

Cores acquired for Mediterranean Basin are 3500. The analysis of the data shows that approximately 10% of the cores are associated with valid information to achieve the objectives of the WP and that about 80% of these information are described in scientific papers published after 2000, which underlines the growing interest of the scientific community to climate and its changes.

Almost 915 cores were collected from the Strait of Gibraltar. However, only 5 scientific papers have been published on climatic proxies and are related to 14 marine sedimentary cores.

Metadata and data were structured according to WP2.1 and WP2.3, so that they can be rapidly archived by SHARE GeoNetwork and WDB platforms.

### *4.2 Publications*

ALBERICO I., ANZALONE E., FERRARO L., LIRER F., BONOMO S., VALLEFUOCO M. (2014): WDBPALEO: a database to archives climatic proxy data from marine sediment cores in the Mediterranean Basin (*in prep*).

BONOMO S., LIRER F., FERRARO L., ALBANO L., ALBERICO I., ANZALONE E., BARRA R., CAPPELLI C., CASCELLA A., CASTELLANO M., CAVALLINA C., DI STEFANO E., D'ORIANO C., FERRARO R., FRANCESCONI M., GAZZOLA R., GIORDANO L., LURCOCK P.C., MARGARITELLI G., MARSELLA E., PELOSI N., PUNZO M., VALLEFUOCO M., TARALLO D., ZARCONE G. (2013): Final Report of the Oceanographic Survey NextData 2013. Project NextData WP-1.5: Paleoclimatic Data from Marine Sediments.

Technical Report CNR IAMC, 1-16. *CNRSOLAR*. Solar Identification code: 3691TR2013.<http://eprints.bice.rm.cnr.it/7177/>

BONOMO S., LIRER F., FERRARO L., ALBANO L., ALBERICO I., ANZALONE E., BARRA R., CAPPELLI C., CASCELLA A., CASTELLANO M., CAVALLINA C., DI STEFANO E., D'ORIANO C., FERRARO R., FRANCESCONI M., GAZZOLA R., GIORDANO L., LURCOCK P.C., MARGARITELLI G., MARSELLA E., PELOSI N., PUNZO M., VALLEFUOCO M., TARALLO D., ZARCONI G. (2014): Core description collected during Oceanographic Survey NextData 2013 (12 – 19 September, 2013). Technical Report, IAMC-CNR, Napoli. *CNRSOLAR*, 1-47. Solar Identification code: 4517TR2014. <http://eprints.bice.rm.cnr.it/8143/>

#### *4.3 Availability of data and model outputs (format, type of library, etc.)*

The metadata and the data were collected and structured within a personal database from which it is possible to extract the useful data to publish metadata on SHARE GeoNetwork and climatic proxy on WDB. Currently, the recovered data can be exported as ODBC database, dBASE, Excel files and text files.

#### *4.4 Completed Deliverables*

D2.4.2: Archive of sediment core data and metadata; transmission to the General Portal.

During the second year of the project the metadata related to 4416 cores from Mediterranean Basin (3500 cores) and Strait of Gibraltar (915) were archived.

In the metadata and data were also archived new marine sedimentary cores collected during 2013 (WP1.5) for NextData Project.

### **5. Comment on differences between expected activities/results/Deliverables and those which have been actually performed.**

In order to carry out further research of available scientific papers for the implementation of the georeferenced database, we expect to continue this activity also during the third year of the project.

### **6. Expected activities for the following reference period**

For the third year of the project, following the activities carried out during the second year, we have planned to complete the retrieval of all information on the Mediterranean Basin and Strait of Gibraltar.

A georeferenced database will be implemented, for the management of both non-spatial data (attributes) and usable spatial data, to send to the General Portal for the implementation of the WEB GIS, useful for data sharing and management (update and/or input of new data).

Activities for the creation of a core repository for marine sedimentary cores acquired in different areas of the Mediterranean Basin will be carried out as well.

### **References**

MELIS M.T., DESSÌ F., BONASONI P. (2010): SHARE Information System: un database geografico condiviso per il monitoraggio degli ambienti di alta quota. *14<sup>a</sup> Conferenza Nazionale A.S.I.T.A.*, Brescia, Italy, 9-12 November, 2010.

MELIS M.T., DESSÌ F., BUSILACCHIO M., DICARLO P., VUILLERMOZ E., BONASONI P. (2011): Il portale GeoNetwork di SHARE. Un catalogo condiviso di metadati a servizio delle ricerche in alta montagna. *Rivista GEOmedia* n°3, 2011. ISSN1128-8132