

## Sixth Annual Conference Recent trends in climate sciences, adaptation and mitigation

### WDB-Paleo: a paleo-climatic proxies database of marine sediment cores from the Mediterranean Sea.

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The analysis of various paleoclimate proxies such as pollen, planktonic and benthonic organisms and tephra, that are preserved in paleoclimate archives (e.g., marine sediments and ice cores) provide quantitative information on past regional climate, and allow high resolution climatic reconstructions for the last millennia. This knowledge is useful to quantify the mode and the extent of future changes of the climate at regional and global scale.

In this frame, the Sub-project 2 (Long-term system of digital data on climate and environment) of the NextData Project was focused on the implementation of a system of repositories storing environmental and climate data from mountain and marine areas of the Mediterranean basin.

The activities of WP 2.4 «Archives of paleoclimate data from marine sediment cores» aim at the creation and usability of data archives on sea sediment cores and associated chemical-biological data (when available).

A conceptual and logical model was drawn to physically implement a paleoclimatic database named WDB-Paleo that includes data on paleoclimatic proxies of marine sediment cores of the Mediterranean Basin (Alberico et al., 2017). It records: a) the presence/absence of paleoclimatic proxies, the data of  $\delta^{18}\text{O}$ , AMS $^{14}\text{C}$  (Accelerator Mass Spectrometry), and the occurrence of tephra layers as reported in about 200 scientific papers and b) quantitative analysis of planktonic and benthonic foraminifera, pollen, calcareous nannoplankton, magnetic susceptibility, stable isotopes, radionuclides and tephra from several cores recovered during the NextData Project.

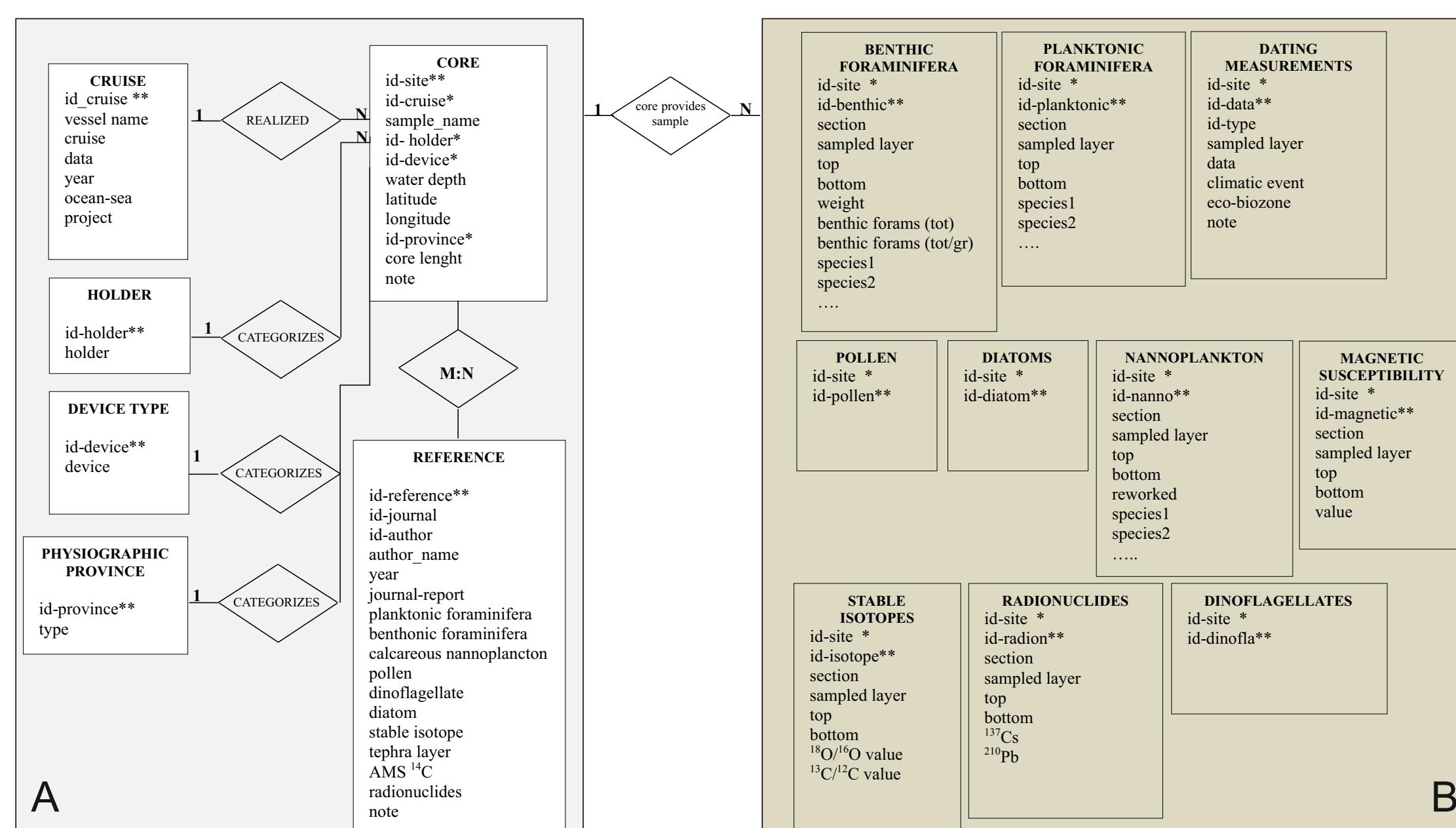


Figure 2 - Marine sites entity-relationship diagram; the double asterisk shows the primary key and the single asterisk shows the foreign key. A) Entities recording metadata; B) entities recording quantitative data from CNR-IAMC projects and from scientific literature.

The database of marine sediment cores takes advantage of a link with a Geographical Information System (GIS) to visualize the data distribution and elaborate thematic maps that supply a synoptic view of data disposal for single proxies.

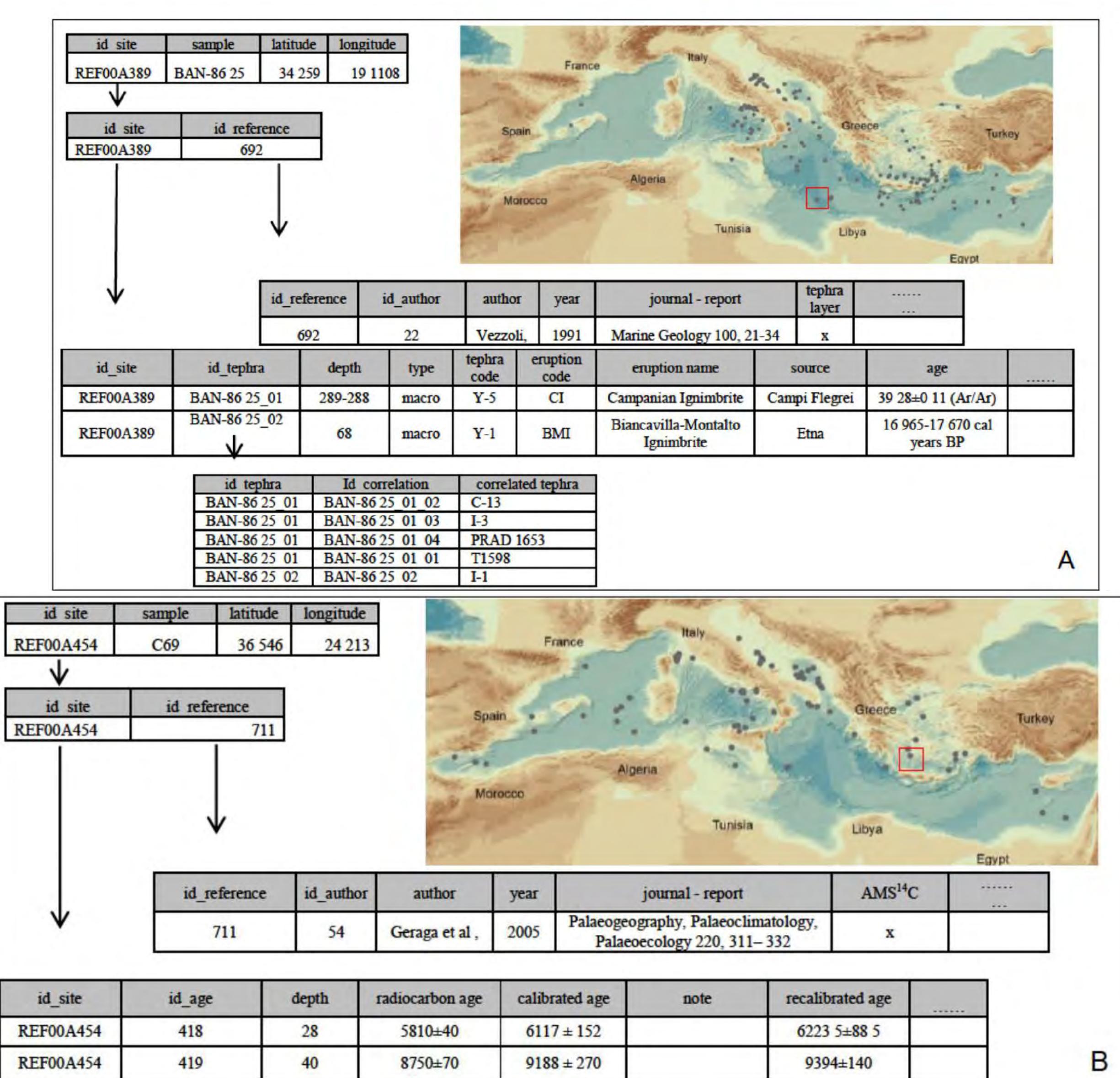


Figure 4 - Example of frames representative of data storing into WDB-Paleo for tephra layers (A) and AMS $^{14}\text{C}$  (B), paleoclimatic proxy.

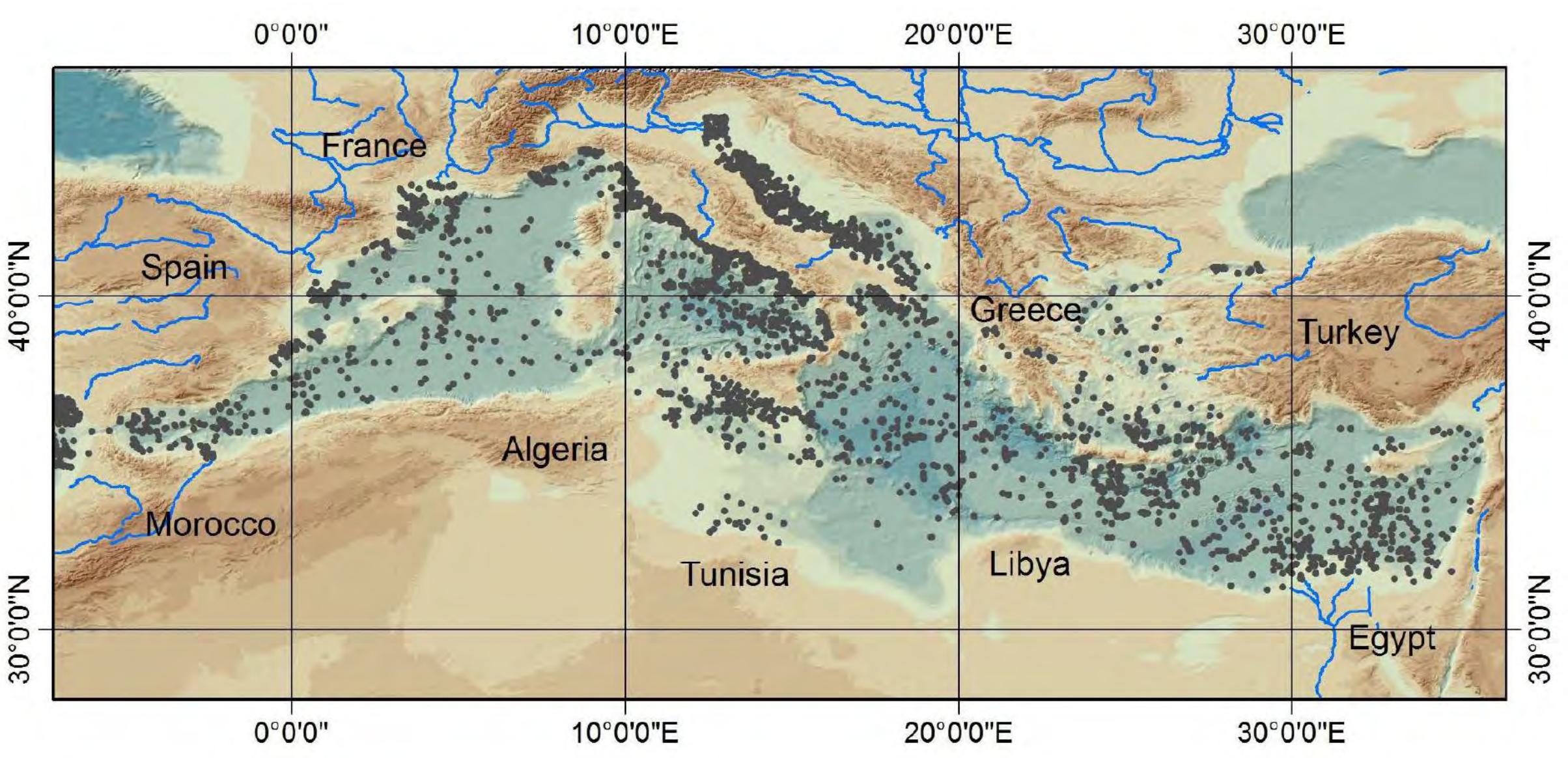
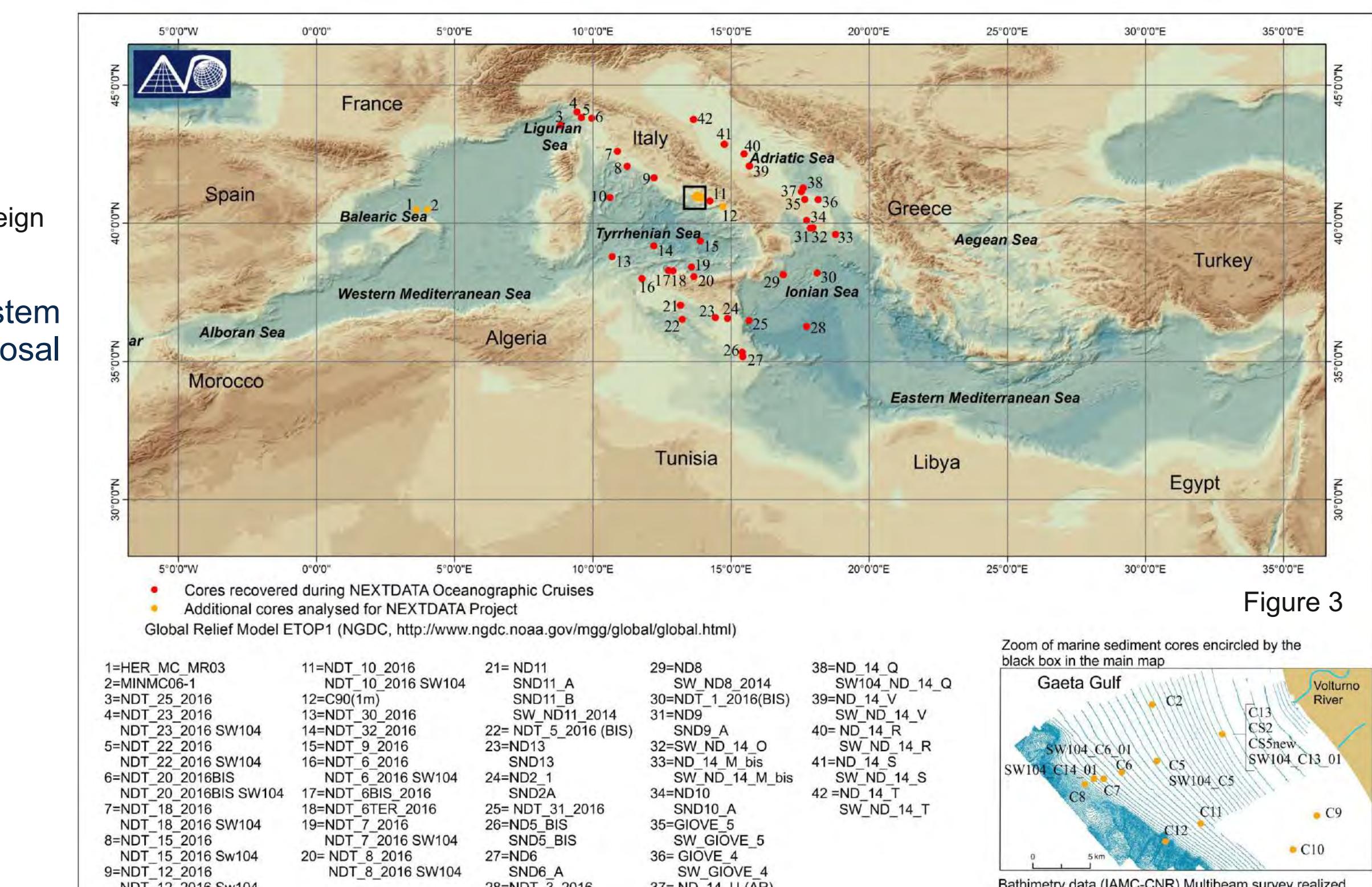


Figure 1- Location map of marine sediment cores (black circles) drilled in the Mediterranean Sea.  
At present about 6000 sites were realized in the whole Mediterranean Basin.

A						
id_sample	id_nanno	section	Sample level	top (cm)	bottom (cm)	Emiliania huxleyi (%)
IAM00A062	C5_A001	F	99-100	246	247	0,00
IAM00A062	C5_A002	F	98-99	245	246	65,72
IAM00A062	C5_A003	F	96-97	243	244	52,92
IAM00A062	C5_A004	F	94-95	241	242	50,30
IAM00A062	C5_A005	F	93-94	240	241	0,00
IAM00A062	C5_A006	F	92-93	239	240	99,01
						3,59
						23,20

B						
id_sample	id_planc	section	Sample level	top (cm)	bottom (cm)	Globigerina bulloides (%)
IAM00A062	C5_A139	F	99-100	246	247	80
IAM00A062	C5_A140	F	97-98	244	245	11
IAM00A062	C5_A141	F	96-97	243	244	78
IAM00A062	C5_A142	F	94-95	241	242	18
IAM00A062	C5_A143	F	93-94	240	241	101
IAM00A062	C5_A144	F	91-92	238	239	70



At present, WDB-Paleo improves the possibility to: - recognize the available climatic paleoproxies for both geographical area and specific time interval; - rapidly identify the availability and distribution of tie-points (dated tephra layers, AMS $^{14}\text{C}$  dating); - assess the variability of available proxies in response to their geographical distribution, allowing to better understand the potential effects of local conditions on their behavior; - rapidly integrate data for multi-proxy investigation in a defined time range.

Moreover, in the light of data sharing, the WDB-Paleo can provide the basic information useful to know the available sea sediment cores and associated proxies in order, for example, to correctly plan future Mediterranean oceanographic expeditions.

Next developments for WDB-Paleo will aim to:

- record new paleoclimatic proxies (e.g. sapropel, chemical analysis of tephra, quantitative data on radionuclides, Mg/Ca ratio);
- store new quantitative biotic data;
- assess the possible relation between huge volcanic eruptions and extreme climatic variations during the Quaternary.

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#### References

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