

# Paleoclimatic reconstruction of the past 28 kyr BP based on calcareous nannofossil assemblages in the Ligurian Sea

## Laura Bronzo

University of Florence, Earth Sciences Department, Florence, Italy; laura.bronzo@unifi.it

## Antonio Cascella

University of Florence, Earth Sciences Department, Italy and National Institute of Geophysics and Volcanology (INGV), Florence, Italy; antonio.cascella@ingv.it

## Pierluigi Martinelli, Rocco Gennari

University of Turin, Earth Sciences Department, Turin, Italy; pierluigi.martinelli@unito.it; rocco.gennari@unito.it

## José Abel Flores

University of Salamanca, Geology Department, Salamanca, Spain; flores@usal.es

## Sergio Bonomo, Giulia Margaritelli

Italian National Research Council, Institute of Environmental Geology and Geoengineering (CNR-IGAG), Rome, Italy; Italian National Research Council, Research Institute for the Geo-Hydrological Protection (CNR-IRPI), Perugia, Italy; sergio.bonomo@igag.cnr.it; giulia.margaritelli@irpi.cnr.it

## Caterina Morigi

University of Pisa, Earth Sciences Department, Pisa, Italy; caterina.morigi@unipi.it

## Isabel Cacho, Jaime Frigola

Universitat de Barcelona, GRC Geociències Marines, Departament de Dinàmica de la Terra i de l'Oceà, Facultat de Ciències de la Terra, Barcelona, Spain; icacho@ub.edu; jfrigola@ub.edu

## Mar Selvaggi, Letizia Di Bella, Fabrizio Lirer

Sapienza University of Rome, Earth Sciences Department, Rome, Italy; selvaggi.mar@gmail.com; letizia.dibella@uniroma1.it; fabrizio.lirer@uniroma1.it

<https://doi.org/10.58998/jnr3214>

The climatic events that marked the last 28 kyr (e.g., Heinrich Stadials [HS], Last Glacial Maximum, Younger Dryas, and Bølling-Allerød) have been identified and described in the Mediterranean Sea. Nevertheless, some of its areas, such as the northern Tyrrhenian Sea, are still poorly investigated and lack data and paleorecords. The core NDT\_22 was collected from 436 m of water in the Ligurian Sea and consists of 320 cm of greenish to greyish fine sediments. The age model is based on 14 radiocarbon ( $^{14}\text{C}$ ) accelerator mass spectrometry (AMS) measurements on the planktonic foraminifera *Globigerina bulloides* and dates the bottom of the core at 27.4 kyr BP. Calcareous nannofossil assemblages were studied at a resolution of 170 yr/sample. The distribution of calcareous nannofossils was investigated by considering the calcareous nannofossil accumulation rate (NAR) and their relative abundance (%).

In general, abundance of the warm-water group (*Calciosolenia* spp., *Discosphaera tubifera*, *Oolithothus fragilis*, *Rhabdosphaera* spp., *Umbellosphaera* spp., and *Umbilicosphaera* spp.) increased from the onset of the Bølling-Allerød interval (~14.4–12.8 kyr BP), peaking during the early Holocene (between 10.3 and 9 kyr BP). Conversely, the cold-water group (*Coccolithus pelagicus*, *Emiliania huxleyi* >4  $\mu\text{m}$ , and *Gephyrocapsa muelleriae*) showed higher values throughout the Late Pleistocene, decreasing after the Younger Dryas (~12.8–11.7 kyr BP). *Florisphaera profunda* increased from the Bølling-Allerød and reached significant values during the Holocene, marking the development of seasonal stratification. Higher values of reworked coccoliths and the presence of *Helicosphaera carteri* highlighted enhanced runoff during HS2 (26.1–23.7 kyr BP) and HS1 (17.2–14.4 kyr BP).

## Acknowledgements:

This research was financially supported by the ERC-Consolidator 539 TIMED project (REP-683237), Project of Strategic Interest NextData PNR 2011–2013, MUR (University of Florence) PhD and Erasmus+ scholarships.