

EGU21-12655

<https://doi.org/10.5194/egusphere-egu21-12655>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Production and calcification variations of the key coccolithophore species *Gephyrocapsa* during the Late Pleistocene (MIS 14 to MIS 7)

Alba González-Lanchas, José-Abel Flores, and Francisco J. Sierra

SALAMANCA, FACULTY OF SCIENCE, GEOLOGY, SALAMANCA, Spain (lanchas@usal.es)

There is an increasing interest in understanding the role of coccolithophores, a group of major calcifying phytoplankton, in the marine carbon cycle: they have a dual contribution to the operation of the carbonate and biological pumps during their lifecycle. How the recent changes in seawater carbonate chemistry are affecting their production and calcification is a matter of debate in the scientific community. Culture experiments suggest that modern coccolithophore species (*Emiliana huxleyi*) is sensitive to such variations. Conversely, could past evolutionary or adaptative changes in the most important coccolithophore species have an impact on ocean chemistry?

We focus on the interval comprising the MIS 14 to 7 (Mid-Brunhes, Pleistocene) when a remarkable increase in the amplitude of glacial/interglacial atmospheric CO₂ was recorded. We analyzed (i) the composition of the dominant coccolithophore *Gephyrocapsa* assemblages and (ii) the morphometric parameters (length, mass, and thickness) of its coccoliths (carbonated scales) in samples from a set of sediment cores (Sites IODP U1314, U1385 and ODP 925 and 977) located in a north-south transect in the North Atlantic and the western Mediterranean Sea. We estimated the primary productivity conditions at the different regions and explore methodological approaches to measure the calcification of *Gephyrocapsa* coccoliths.

Preliminary results show a correlation between the abundance of coccoliths, assemblage composition, and coccolith morphology at different regions. A comparison with geochemical and sedimentological records suggests a significant role of *Gephyrocapsa* coccolithophore in marine organic and carbonate production throughout the interval. These observations open the discussion about the existence of a global environmental relationship between coccolithophore assemblages and coccolith morphometrical variations, but also, a possible impact of the changes in the *Gephyrocapsa* production and calcification on the ocean chemistry.