

## **Coccolithophore export production during the last deglaciation at ODP Site 1089 (Southern Ocean)**

Chiara Balestrieri (1), Patrizia Ziveri (2,3), Peter Graham Mortyn (2,4), Eliana Fornaciari (1), and Claudia Agnini (1)

(1) Dipartimento di Geoscienze, Università di Padova, Italy (chiara.balestrieri@phd.unipd.it), (2) Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona (UAB), (3) Catalan Institution for Research and Advanced Studies (ICREA), (4) Department of Geography, Universitat Autònoma de Barcelona (UAB), Bellaterra 08193, Spain

In order to assess the Southern Ocean carbonate budget change during the last deglaciation we evaluated the significance of calcification changes observed in calcareous nannofossil assemblages. In particular, we analysed coccolithophore assemblages from TNO57-21, a site survey core drilled as part of ODP Site 1089 (40°57'S; 9°53'E, 4620 m water depth), over the last 25 kyr in the Subantarctic South Atlantic. This region is characterized by strong hydrographic gradients and ODP Site 1089 is optimally located in order to monitor the evolution of the Subtropical Front and Subpolar Front and the Agulhas Current (Flores et al., 2003) through time. The mean sedimentation rate is in the range of 15-20 cm/kyr, and the recovery of coccolith-bearing sediments provides a powerful tool to study deep-sea carbonate export production at high-resolution. Much of the CO<sub>2</sub> drawdown from the atmosphere has been proposed to be stored into the deep ocean but evidence for increased carbon storage are still elusive (Martínez-Botí et al., 2015). Here, we present data on the *Florisphaera profunda* index and CaCO<sub>3</sub> concentrations per gram of dry sediment, which were used to interpret the productivity trend during the last 25 kyr. These data clearly show a decrease in carbonate production throughout the last deglaciation. Moreover, we have calculated the *Calcidiscus leptoporus*-*Emiliania huxleyi* dissolution index (CEX<sup>\*</sup>), which suggests a strong link between increasing coccolith dissolution and the evolution of the bottom water mass dynamics during Termination 1 (T1). Finally, mass estimations of the coccolith carbonate allow us to assess the role of each species as carbonate producers across this time span. These results reveal that during the last 25 kyr the productivity was influenced by the mid-latitude westerlies, the study site was bathed by different bottom water masses, and was affected by a shoaling of the lysocline during T1 and the Holocene.

### References

Flores J-A., Marino M., Siervo F.J., Hodell D.A., Charles C.D., 2003. Calcareous plankton dissolution pattern and coccolithophore assemblages during the last 600 kyr at ODP Site 1089 (Cape Basin, South Atlantic): paleoceanographic implications. *Palaeogeography Palaeoclimatology Palaeoecology*. 196:409-426.

Martínez-Botí M.A., Marino G., Foster G.L., Ziveri P., Henehan M.J., Rae J.W., Mortyn P.G., Vance D., 2015. Boron isotope evidence for oceanic carbon dioxide leakage during the last deglaciation. *Nature*. 518(7538):219-22.