



## **The warm interglacial marine isotope stage 31: evidences from the calcareous nannofossil assemblages at ODP Site 1090 (Southern Ocean)**

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Calcareous nannofossil assemblage has been investigated through the Pleistocene interval between Marine Isotope Stage (MIS) 29 and MIS 34, at ODP Leg 177 Site 1090. This site is located in the eastern subantarctic sector of the Southern Ocean (42°54.8'S, 8°55.2'E), south of the modern Subtropical Front (STF), which is characterized by abrupt hydrographic gradients. The investigated sediments consist mainly of calcareous ooze. The studied interval is of great interest since it falls within the Mid-Pleistocene Revolution, which is characterized by a complex global climate change and includes MIS 31, which was the last significant warm interglacial of the obliquity-dominated world. Recent data from both continental-shelf (Scherer et al., 2003) and deep-sea sediments (Teitler et al., 2007; Flores and Sierro, 2007; Villa et al., 2007), pointed out that MIS 31 was a key climate event, which may have compromised the stability of the Antarctic Ice Sheet. In the studied interval, the composition of calcareous nannofossil assemblage from Site 1090 is in agreement with water masses located south of the STF and in particular, seems to reflect the southern border of Subantarctic Zone, at the transition with the Polar Front Zone. Using previously developed age model, it is remarkable that at Site 1090 the most striking feature in the calcareous nannofossil assemblages occurs across MIS 31. Specifically, abundance variations of *Helicosphaera* spp. and *Syracosphaera* spp. appear valuable tracers of paleoclimatic-paleoceanographic changes in the Subantartic Zone. Modifications in the calcareous nannofossil assemblage are correlated to the available Sea Surface Temperature record

and mineralogical proxies and are interpreted as reflecting significant variations in the characteristic of sea surface waters in response to a southward migration of the STF. These evidences are consistent with results at more poleward sites, observed around 1 Ma, when an anomalous warming event and a southward displacement of the Polar Front has been recorded. The results from Site 1090 allow to assert that the warm pulse is distinctly correlated to MIS 31, which is an interval associated to high amplitude variations in summer insolation signal.

#### References

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