Nutri-thermocline dynamics reconstruction and coccolith carbonate contribution during the middle and late Pleistocene in the eastern equatorial Pacific ODP Site 1241

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Sediments recovered at Ocean Drilling Program (ODP) Site 1241, located in the warm pool of the eastern tropical Pacific (5˚50'N, 86˚26'W at 2027 m water depth), are mostly constituted of clayey foraminiferal-nannofossil ooze, calcareous nannofossils being the dominant biogenic component (30-60%; Mix *et al*., 2003). The sedimentary sequence studied is controlled by the warm-water regime of the North Equatorial Countercurrent (NECC), the displacement of the Equatorial Front and the displacement of the Intertropical Convergence Zone (ITCZ).

A quantitative analysis, taking into account the nannofossil assemblage, the N index (ratio between upper photic zone species *vs*. lower photic zone species) and the carbonate-mass produced, allow us to reconstruct the paleoproductivity pattern and the nutri-thermocline variability over the middle and late Pleistocene. Higher N ratio values reflect high paleoproductivity and an uplifted nutri-thermocline, and lower N ratio values indicate low paleoproductivity and a deep nutri-thermocline. Furthermore, species-specific mean coccolith carbonate mass allowed us to estimate the coccolith carbonate contribution to the sedimentation at our site, revealing a close relationship with the paleoproductivity profile, and thus with the vertical displacement of the nutri-thermocline. Good and moderate preservation of the total coccolith content in the sediments infer that variations in the coccolith carbonate content responded to variations in the paleo-production of calcareous nannofossils, rather than dissolution. This strong relationship suggests maxima of productivity during glacial events, when the ITCZ migrated southward and the warm-water regime of the NECC was weakened, giving way to a shoaling of the nutri-thermocline.

Furthermore, the overall pattern of the N ratio reflects a gradual migration to a more oligotrophic setting during the past 130 kyr, particularly stressed during Marine Isotope Stage (MIS) 5, suggesting the influence of an El Niño-like setting, as was earlier stated for the eastern tropical Pacific (Beaufort *et al*., 2001; López-Otálvaro *et al*., 2008).

References

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