Calcidiscus size variation and correlations with palaeoproductivity and palaeotemperature proxies in the Santos Basin during the last 14,000 years

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This study compared morphometric studies of the coccolithophore genus *Calcidiscus* with sea-surface temperature (SST) and palaeoproductivity proxies, based on coccolithophores and planktonic foraminifera, for the last 14 kyr. Distal shield diameter measurements of 100 *Calcidiscus* specimens were carried out on 42 samples from sediment core KF-02, drilled on the continental slope off the southeastern Brazilian margin. Specimens were selected under a polarised-light microscope and analysed using the software Axio VS40 v.4.8. *Calcidiscus* size groups were designated as small (<5 μm), intermediate (5–8 μm) and large (>8 μm), following Young et al. (2005). The *Calcidiscus* size variation showed a moderate relationship with productivity proxies and a weak, but significant, correlation with SST. No relationship between the size category of *Calcidiscus* and the preservation indices was found. Large *Calcidiscus* specimens showed a positive correlation with productivity, and the highest abundances were during the late deglacial and Early Holocene. Intermediate *Calcidiscus* dominated the studied time interval, increasing in abundance mainly from 9.7 kyr to the Recent, with an increase in SST that was associated with the displacement of the warm and oligotrophic Brazil Current towards the continent. However, during intervals of minimum SST (14–12 kyr and 9–8 kyr), intermediate *Calcidiscus* increased in abundance, while large *Calcidiscus* decreased. Small *Calcidiscus* exhibited the lowest abundances, and had a similar trend as intermediate *Calcidiscus*, increasing in abundance throughout the Holocene. We observed a strong correlation between relative sea-level estimates from benthic oxygen isotopes and *Calcidiscus* size variation. Large *Calcidiscus* showed higher abundances during low relative sea level, possibly related to the influence of nutrient input from coastal waters. Polarising-light microscope analyses were useful for identifying *Calcidiscus* size variations with minimum costs and rapid results. In addition, the size variations allow us to obtain more information than just the abundances of the genera, which, by itself, did not provide any significant correlations with the other proxies.