

SST variation derived from siliceous microfossils at ODP Site 704 in the Southern Atlantic Ocean for the last 6.3Myrs

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Reconstruction of sea surface temperature (SST) is one of the important keys to estimate paleo CO₂ variation. Because alkenone SST proxy in higher latitude ocean sometime shows uncertainties due to low alkenone concentration in sediment samples, the SST dataset based on another proxies should be prepared. Biogeographical distribution of silicoflagellate and some diatom taxa corresponds to distribution of cold and subtropical water masses. At ODP Site 704 (46.9°S, 7.4°E, annual SST 5.6°C) in the South Atlantic Ocean, latitudinal migration of subpolar and subtropical surface water masses were estimated for the last 9 million years based on silicoflagellate and diatom fossils in the sediment core samples. Although the fossil preservation was poor in the oldest period from 9 Ma to ~6.3Ma, the extinct genus *Bachmannocena* considered as a temperate or cosmopolitan species was observed for the period. Continuous silicoflagellate occurrence was observed from ~6.3Ma to present. The silicoflagellate-derived climatological SST was 9°C for 6Ma. The subtropical genus *Dictyocha* intermittently dominated the assemblage from ~6Ma to 4.6Ma. When the *Dictyocha* events occurred, the estimated SST temporally rose to 11-12°C. The co-occurrence of cold and subtropical water species probably reflect that the subpolar/subtropical boundary is located around the studied site. After the *Dictyocha* events, SST decreased to ~4°C from 4.6Ma to 2.1Ma. The relative abundance of sea ice-related species in the silicoflagellate assemblages increased from 2.2Ma. The minimum SST reaching to ~0°C was recorded at 1.9Ma. The SST after 1.8Ma usually ranged from 2.5 to 7.4°C except for three samples characterized by high dominance of subtropical species. Long-term trend of silicoflagellate SST was similar to SST proxies by alkenone and Mg/Ca of planktic foraminifer test. However, silicoflagellate SST was usually 2-4°C lower than other SST proxies, and this difference may be partially explained by different seasonality of silicoflagellates, planktic foraminifer, and calcareous nannoplankton. Further evaluation on our SST data is required for the reliable SST reconstruction at this site.

Keywords: silicoflagellate, alkenone, foraminifer, South Atlantic Ocean