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Vertical distribution of planktonic foraminifera in the southwestern Atlantic

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Planktonic foraminifera were studied in 80 samples collected in the southwestern Atlantic (23°–25° S, 40°–44° W), from depths of between 0 and 100 m. The samples were collected during the austral summer and winter, along transects from the inner shelf to the middle slope. A Multiple Opening-Closing Net (Multi-net) was used to obtain planktonic foraminifera. The equipment has five nets of 64 µm mesh size, and the depth intervals sampled were 0–20 m, 20–40 m, 40–60 m, 60–80 m and 80–100 m. Sea water temperature, salinity and chlorophyll-a data were also measured at each station.

The Brazil Current (BC) flows along the southwestern Atlantic continental margin and it transports Tropical Water (TW, T=25.0°C, S=37.1) at upper levels. In the study area, the BC develops a convoluted pattern of meanders with associated upwelling and downwelling processes. Between November and March, the South Atlantic Central Water (SACW, T= 6–20°C; S= 34.6–36.0) moves toward the coast, keeping the Tropical Water relatively distant from the coastline.

Due to the high proportion of juvenile specimens (unidentified) in the 63–100 µm size fraction, samples were filtered through a sieve of 100 µm mesh size. All specimens of >100 µm were counted, identified and calculated as total individuals per m³ in the samples collected on the summer and winter cruises. However, accurate identification was not possible for the samples collected in the winter, as most of the individuals were juveniles. Foraminiferal standing stock from the multi-nets of the summer and winter cruises attained 4.5 and 1.78 individuals/m³, respectively. In general, for the summer cruise, higher standing stocks were observed at stations located on the middle slope. This pattern was not observed in samples collected in winter due to the low foraminiferal standing stock identified in this season. For this reason, data obtained on the winter cruise will not be presented here.

The optimum conditions of temperature and salinity for the planktonic foraminifera in the study area seem to be around 26°C and 37 psu, respectively. Apparently, levels with high standing stock values show low chlorophyll-a concentration. However, no relation was found between the abundance of the species and chlorophyll-a concentration. The most numerous species identified were *Globigerina bulloides*, *Globigerinoides ruber* (pink), *Globigerinoides ruber* (white), *Globigerinoides sacculifer*, *Globigerinoides siphonifera* and *Globorotalia menardii*. *Globigerinoides ruber* (pink), *Globigerinoides ruber* (white) and *Globigerinoides sacculifer* prefer to live in shallower (0–20 m water depth) and warmer (25°–26°C) waters. They prefer salinity between 36.5 and 37.0. *Globorotalia menardii* prefers deeper waters (0–40 m) and slightly lower temperatures (24°–25°C) and salinities (35.0–36.0). *Globigerina bulloides* and *Globigerinoides siphonifera* seem to be adapted to lower temperatures. *Globigerina bulloides* prefers to live within a temperature range of 17.5°–25°C and *G. siphonifera* was dominant between 18.0°–21°C. In terms of salinity, *G. bulloides* was more abundant between 36.0–37.0 and *G. siphonifera* was more adapted to 36.5. In terms of vertical distribution, *G. bulloides* had a shallower habitat (0–40 m water depth) than *G. siphonifera*, which prefers to live at 40–60 m water depth. Thus, these species can probably be considered as markers of upwelling along the southeastern Brazilian continental margin.