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Foraminifera as sea-level change indicators, Guaratiba Mangrove, Rio de Janeiro – Brazil

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Relative sea-level changes (RSL) are complex and heterogeneous and can be recognized not only regionally but also locally. Because of its nature the Brazilian coast has many features identifying RSL variations. In general, the majority of the coastline has been inundated until 5,150 years BP, followed by a sea-level fall and lowstand that prevails until now.

RSL decrease has lead to the formation of marine terraces starting at the original barrier island, resulting in coastline progradation. Such an example of this emersion system is the Guaratiba-Sepetiba bay-barrier island complex, located SW of Rio de Janeiro State. The eastern portion of the barrier has a tidal inlet and a flood tidal delta dominated by a mangrove forest. Four evolution models were proposed for the formation of the barrier island. Lamego (1945), proposed that the longshore current was the responsible for the formation of this system; Roncarati & Barrocas (1978) added to Lamego's model the Flandriana Transgression; Ponçano *et al.* (1979) related the formation of the barrier island to the fluvial processes that occurred before the transgression and finally Pereira (1998) proposed that the formation was related to three transgressive events and to three regressive events. Since evolutionary models are quite different and none of them has used foraminifera, the aim of this work is to contribute to the understanding of the Guaratiba-Sepetiba Bay-barrier island complex using foraminiferal assemblages.

In 1996, seven vibracores were collected along a transect in the tidal plain at the edge of the mangrove. Core E, 5,3 m long, was sub-sampled at 20 cm intervals for foraminiferal analysis and every 10 cm for grain-size, carbonate and organic matter content. Two radiocarbon dates were done in core D located 100 m from core E and one in core B located 700 m from core E.

Core E was mainly composed of muddy sand at the base and alternating fine, medium and coarse silt towards the top. Carbonate contents were around 5%, having largest values (20%) between 100-200 cm from top. Organic matter was higher between 0-60 cm, decreasing to around 5% towards the base of the core. Sixty-nine Foraminiferal species were identified in the cores and the most predominant ones were the agglutinated species. The calcareous species, except the *Q. lamarkiana* were restricted to the base of the core and depth of 1.6 m. Cluster analysis based upon the species percentage by a hierachy dendrogran, indicated the existence of 8 assemblages. The ecological features of these assemblages correspond to 8 distintc paleoenvironments. These environments correspond to three regressive events marked by assemblages I, II, III and IV and 3 transgressions marked by assemblages IV, VI, VII and VIII.

Foraminiferal assemblage analysis was used to establish a model to understand how Guaratiba Mangrove evolved since 5.100 BP as a regressive system. The area around 5,100 years BP used to be a bay (Assemblage VIII and VII) that was gradually transformed into an estuary (Assemblage III) around 4,900 BP. A transgressive event around 3,500 years BP probably established a lagoon (Assemblage V) that was followed by a regression that transformed it into an estuary system (Assemblage IV) once more. A more extensive transgression drowned this region until 2,400 years BP (Assemblage V) where the mangrove could have started to develop in this system (Assemblage III, I and II). Foraminiferal assemblage analysis was an efficient methodology that made possible the diagnosis of small magnitude RSL changes during the Holocene at the Guaratiba-Sepetiba complex, despite not being possible to establish precisely the height of these oscillation in the region. These results have good agreement with Pereira's evolutionary models and could also be applied to other areas of Brazilian coastline.

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