
Paleoenvironmental reconstruction of land use and vegetation cover in the Macacu and Caceribu river basins, Rio de Janeiro, Brazil

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Résumé

The Macacu and Caceribu river basins (Rio de Janeiro, Brazil) are located in the eastern portion of the Guanabara Bay, under great anthropic influence. They constitute an under-studied area regarding the evolution of vegetation and landscapes. This study aims at contributing to the reconstruction of vegetation and land use changes in these basins over the Quaternary. Phytoliths were chosen as proxies because they brought positive results in several paleoenvironmental studies conducted in coastal areas devoid of unoxidized sediments. In addition, as paleoenvironmental reconstructions are more complete and accurate when multiproxy approaches are followed, we used stable isotope analysis ($\delta^{13}C$), grain size analysis, and ^{14}C -AMS dating. Twenty-seven predominant plants were collected, representing the current vegetation of the study area, in order to compare the phytoliths found in these plants with those observed in surface and deep sediments. The sediment samples were collected in the mangrove forest at the mouth of the Caceribu river, named Testimony 1 (T1). Additional drilling was conducted in a swamp near the Caceribu riverside, and called T2 (Testimony 2). A soil profile (Gleysol) was collected in Magé. Seven reference samples were also collected. They are modern surface assemblages MA1 (herbaceous marsh), MA2 (hillside forest), MA3 (banana plantation), MA4 (sugar cane plantation), MA5 (low mountain forest), MA6 (low mountain forest with bamboo) and MA7 (pasture). We also collected 3 samples from points along the banks of the river Caceribu. In T1 we have a mangrove swamp that serves as a sedimentary deposit and which presented a mixture of grass (MA 7) and wood (MA 2 and MA 5) phytoliths. In T2, the presence of the sandy grain-size fractions is characteristic of the proximity of the river (MA 1). At points 1, 2 and 3, the D/P index indicated a more humid environment, like at MA 2 and MA 5. The isotopic values from the soil profile are -27.15 and -28.67. The D/P index is relatively low but C3 plants dominate. From the studied points, no major changes in the type of vegetation have been identified that would suggest a change in bioclimatic conditions throughout the Quaternary. However, it is possible to infer, from the isotopic values (-28.67 and 21.64) and phytolith indexes, that throughout the analyzed area, the environment was predominantly humid with a vegetation cover made of C3 plants. Changes in tree cover appear to be linked to local factors such as the type of sediment, the topographic position and the proximity to rivers or to sea.

Mots-Clés: vegetation reconstruction, river basins, Brazil

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