Characterization of modern phytolith assemblages from the 'Caatinga' biome, Northeast Brazil

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Résumé

The 'Caatinga', located in Northeastern Brazil, is the fourth largest biome in the country, occupying about 11% of the territory. It is a semi-arid region, which has extreme characteristics among its meteorological parameters, presenting high solar radiation, low cloudiness, high average annual temperature (about 26-27°C in the dry season) and low rates of relative humidity and potential evapotranspiration. These characteristics lead to a strongly seasonal climate with an extremely irregular rainfall system, having a high concentration in the three months from February to May and long dry periods. From Tupi-Guarani origin, the name "caatinga" means "white forest", which perfectly characterizes the appearance of the vegetation during the dry season, when the leaves fall and only the shiny white trunks of the trees and shrubs remain on the dry landscape. The vegetation in the Caatinga consists of small trees and deciduous shrubs that lose their leaves during dry periods and often have thorns or spines. Cactaceae, Bromeliaceae and herbs are quite common. Some annual plants such as Poaceae and other herbs, vegetate during the rainy season. Despite being known as a uniform biome in regard to its vegetation, the Caatinga has several phytogeographical domains or eco-regions. In this study, surface soil samples (0-10 cm deep) from five different vegetation types were analyzed in order to establish modern reference collections (Modern Assemblages - MA) that will enable further environmental reconstruction studies using phytoliths, thus contributing to better knowledge of this biome. Samples were collected in the Northern Sertaneja Depression, in the states of Ceará and Rio Grande do Norte, in the following formations: Caatinga Open Shrubland (MA1), Medium Caatinga Forest (MA2), High Caatinga Forest (MA3), Riparian Forest (MA4) and Caatinga Dense Shrubland (MA5). The analyses of the five modern assemblages indicated a high degree of conservation of phytoliths in the soil, the morphotypes and their amounts varying according to the overlying vegetation and the soil granulometry. The sample that presented the highest quantity of classified phytoliths was MA3 and the lowest percentage was observed in MA1. Regarding phytolith stocks, the largest were found in MA3, MA2 and MA5, and the lowest in MA1 and MA4, respectively. The phytolith morphotypes varied with the vegetal formation, but globular granulate predominated in all the samples, followed by globular echinate and elongate, which is expected

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in predominantly tree and shrub vegetation. The phytolith indexes D/P (0.6 to 15), Bi (50 to 78%), Iph (53 to 87%) and Pa /P (0.1 to 8.9) were calculated, proving compatible with the type of vegetal formation analyzed. Despite some limitations, phytoliths have shown to be promising tools for improving knowledge of the vegetation of this region, as well as for use in paleoenvironmental reconstructions of the biome.