

---

# Identification and discrimination of forest/savanna ecosystems of Brazil based on phytolith assemblages and indices to understand past vegetation and soil genesis

Marcia Calegari\*<sup>1</sup>

<sup>1</sup>Departamento de Geografia, Universidade Estadual do Oeste do Paraná – Brésil

## Résumé

The current research aims at developing a sound methodology for palaeoenvironmental reconstruction from terrestrial archives, such as soils, in the Neotropics. Truthful reconstruction of vegetation is essential for understanding historical trajectories of climate change, and to address the nature and extent of anthropic impact on ecosystems. Furthermore, soils are ubiquitous terrestrial sediments and represent a major reservoir for climatic proxies, both physico-chemical and biological. Within soils are preserved one of the most durable plant microfossils: phytoliths. Phytoliths from soils and palaeosols have been successfully used to reconstruct past climate and vegetation in tropical regions but only a few examples relate to the Neotropics and even less to Brazil. Here, we focus on a set of interrelated but complementary datasets to clarify the Quaternary evolutionary trajectories of ecoregions and soils of great importance for the climatic history and the agrarian management of Brazil: 1) analysis of phytoliths, 2) soil genesis and evolution, 3) carbon stable isotopes in a temporal framework of radiocarbon dates. Phytolith analysis is approached through the development of modern reference collections from main forest ecosystems of Brazil (both as phytoliths from plants and as assemblages from the A1 soil horizon). Plant samples, litter and soil samples were collected along transects at eight locations in Brazil: Amazon Forest: i) Primary Forest, ii) secondary forest in ADE (Amazonian Dark Earths) area; Atlantic Forest: iii) Ombrophilous Dense Forest (ODF) of *Terras Baixas*, and grassland '*campos nativos*'; iv) *Restinga* and mangrove vegetation; v) Montane Ombrophilous Dense Forest; vi) Semideciduous forest; vii) Cerrado (savannah); viii) Mixed Ombrophilous Forest with *Araucaria*. In total 467 plant samples were collected, which are currently being analyzed. To date we have analyzed about 200 species of the collections of the Amazon Forest, the Forest de Tabuleiro and native (grassland) RNV area and *Cerrado* stricto sensus. Representative species from these biomes are, in general, good phytolith producers. Furthermore, we observed morphotypes with environmental and taxonomic significance. The project results will benefit from models of paleoenvironmental reconstruction and studies of soil genesis. It is also expected that our results will support policy makers in the management of Brazilian biomes, endangered vegetation protection policies, agricultural policies for the preservation of soil and assessment of human impact on natural and anthropic communities.

**Mots-Clés:** palaeovegetation, climate, Neotropic, Forest, Savannah, Biogenic opal

---

\*Intervenant