University of São Paulo – Centre for Nuclear Energy in Agriculture - CENA/USP

Cold and humid Atlantic Forest in the Late Glacial, Northern Espírito Santo state, Southeastern Brazil

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Introduction

From Northern Espírito Santo to Southern Bahia states, the composition of native Atlantic forests can be related structurally and taxonomically to the Amazon Rainforest [1]. The area was considered as an stable forest during the Pleistocene glacial times, referred as Bahia forest refuge[1] or as the most "historically stable regions of Atlantic forest"[2]. This study aims to reconstitute the vegetation dynamic since ~33,000 yr cal BP, using an interdisciplinary approach as Palynology, Radiocarbon Dating and Carbon and Nitrogen elemental and isotope of organic matter, to infer climatic changes since the Late Glacial at the Atlantic Rainforest.

Study area

The sampling point, known as Brejo do Louro (BL), comprises a bog over an area of grassland surrounded by dense Atlantic dense forest (tabuleiro's forest) and is ~33km far from the current coast line.

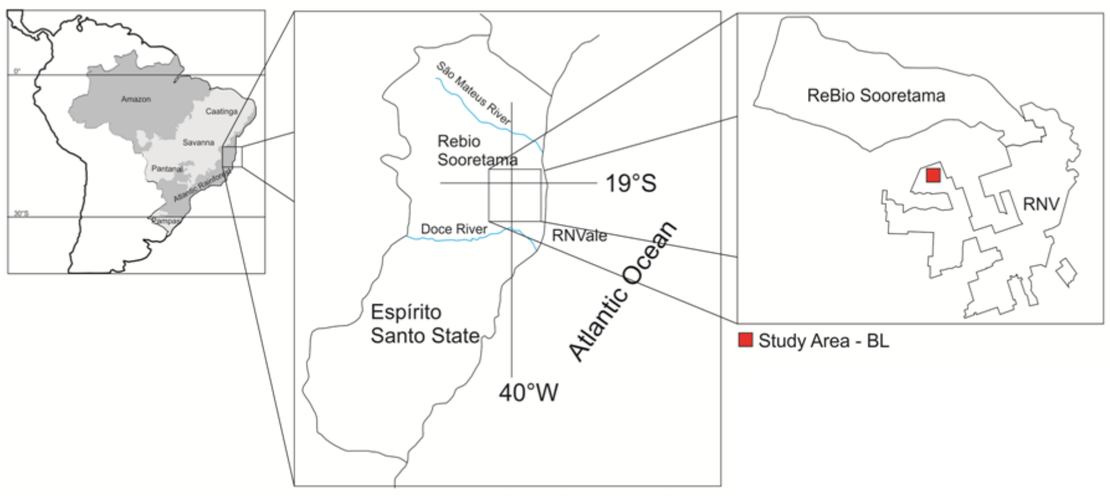

Fig 1:Study area at Espírito Santo, emphasizing the Vale Natural Reserve and Brejo do Louro.

Material and Methods

Carbon and Nitrogen Isotopes:

- A 123 cm long core was collected during the dry season with a vibro-corer system
- Fourteen organic sediment samples were pretreated with Hydrochloric acid 2% for four hours at 60°C [3]and sent to radiocarbon dating by accelerator mass spectrometer (AMS).
- Carbon ($\delta^{13}C$) and Nitrogen ($\delta^{15}N$) analysis of sedimentary organic matter were performed each 2 cm. Contaminant roots were physically removed, sediment samples were dried at 50 °C and sent to an elemental analyzer attached to a mass spectrometer.

Palinology:

- Subsamples of 2 cm^3 were processed using standard methods according to Colinvaux et al. (1999)[4].

Acnowledgements:

Results and discussion

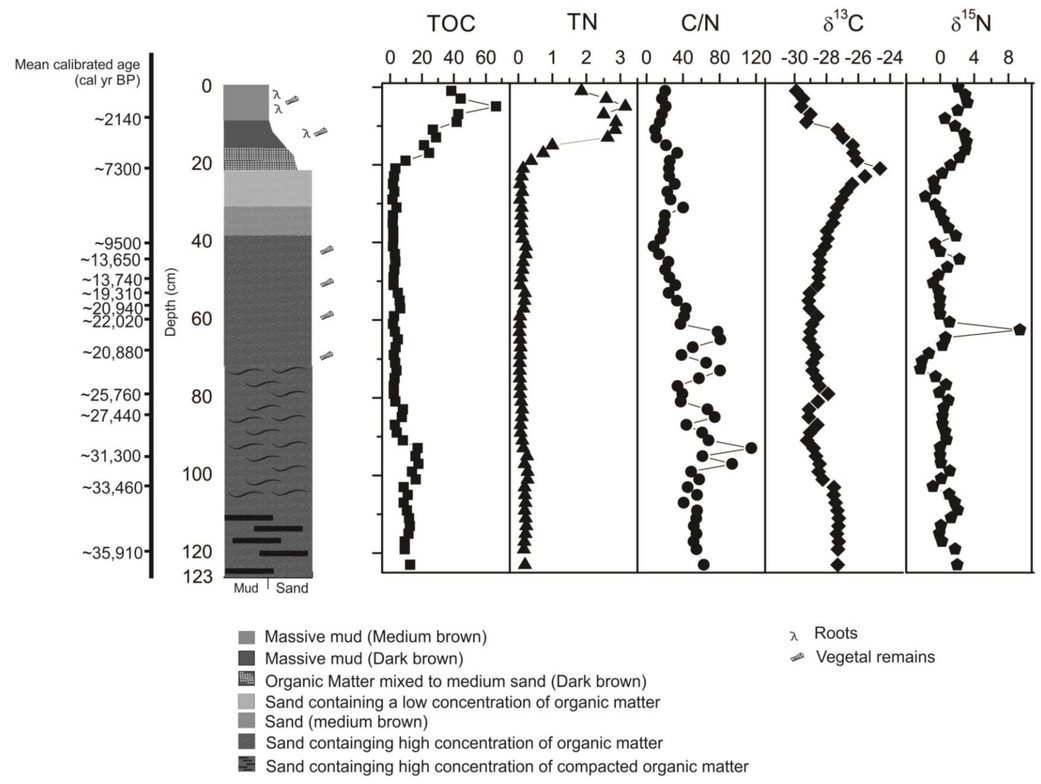

Fig 2: Brejo do Louro litologic description and Elementar and isotopic values (C and N)

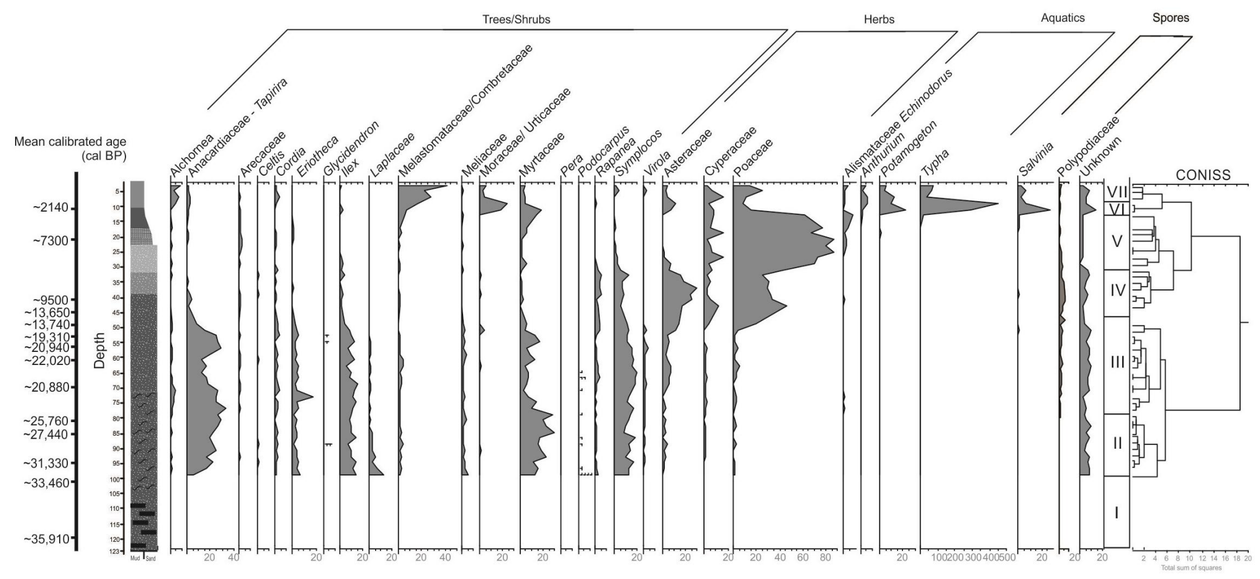

Fig 3: Pollen and spore types and the concentration in percentage. Pollen zones are defined by CONISS.

From ~33,460 to ~13,740 cal yr BP the arboreal/shrub vegetation was dominated by C_3 plants ($\delta^{13}C$ ~-28‰), mainly constituted by *Tapirira*, *Ilex*, *Symplocos* and other species in low percentage as *Podocarpus* and the rare Amazon genera *Glycidendron*, suggesting the dominance of cold and humid forest. From ~13,740 to ~9500 cal yr BP the pollen pattern starts to change with the increase of grasses and decrease of arboreal types. Between ~9500 and ~7300 cal yr BP was observed the dominance of herbaceous C_3 plants with probable presence of C_4 plants ($\delta^{13}C$ ~-24‰), suggesting the a less humid period than the previous one. From ~7300 cal yr BP until present, *Typha* becomes dominant followed by *Melastomataceae*, *Alchornea* and *Moraceae/Urticaceae* and the peat layer initiates its development, possibly due to the sea level rising (transgressive) phase recorded in the region [5,6], which could influence the dynamic of the water table under the bog and the humidity of the site, highly significant for the peat deposition.

References

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