

Tracing the influence of Amazon River along the Suriname coastline from the Mid- Miocene to Holocene

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1. ABSTRACT

The Suriname coast is part of the extensive coastline along northeastern South America. This coastline stretches from the Amazon River, Brazil, to the Orinoco River in Venezuela. The continental shelf, located in front of the Guyanas, was a carbonate platform in the period prior to the late Miocene (11 million years ago). This platform received siliciclastic sediments from the crystalline basement in eastern Amazonia. Previous research revealed that since the late Miocene tectonic evolution of the Andes and global sea level changes a bulk of Andean-derived sediments were delivered by the Amazon River that resulted in the onset of the buildup of the Amazon fan, which in turn has affected the Guyana coastline (Figueiredo et al., 2009). Although, the exact age of the onset of the Amazon River is debated, this is an important matter to many scientists because of the global and regional influence of the Amazon River on continental and marine processes (Hoorn et al., 2017; Araujo et al., 2022). To determine the age of onset, and the influence of the Amazon River on the coastal landscape and vegetation of Suriname coast, we must study sediment changes and link these to pollen sources.

2. STUDY AREA



3. RESEARCH METHODS

Methods

- (1) Count and classify the different sporomorph;
- (2) Use light microscopy and scanning electron microscopy;
- (3) Dinoflagellates;

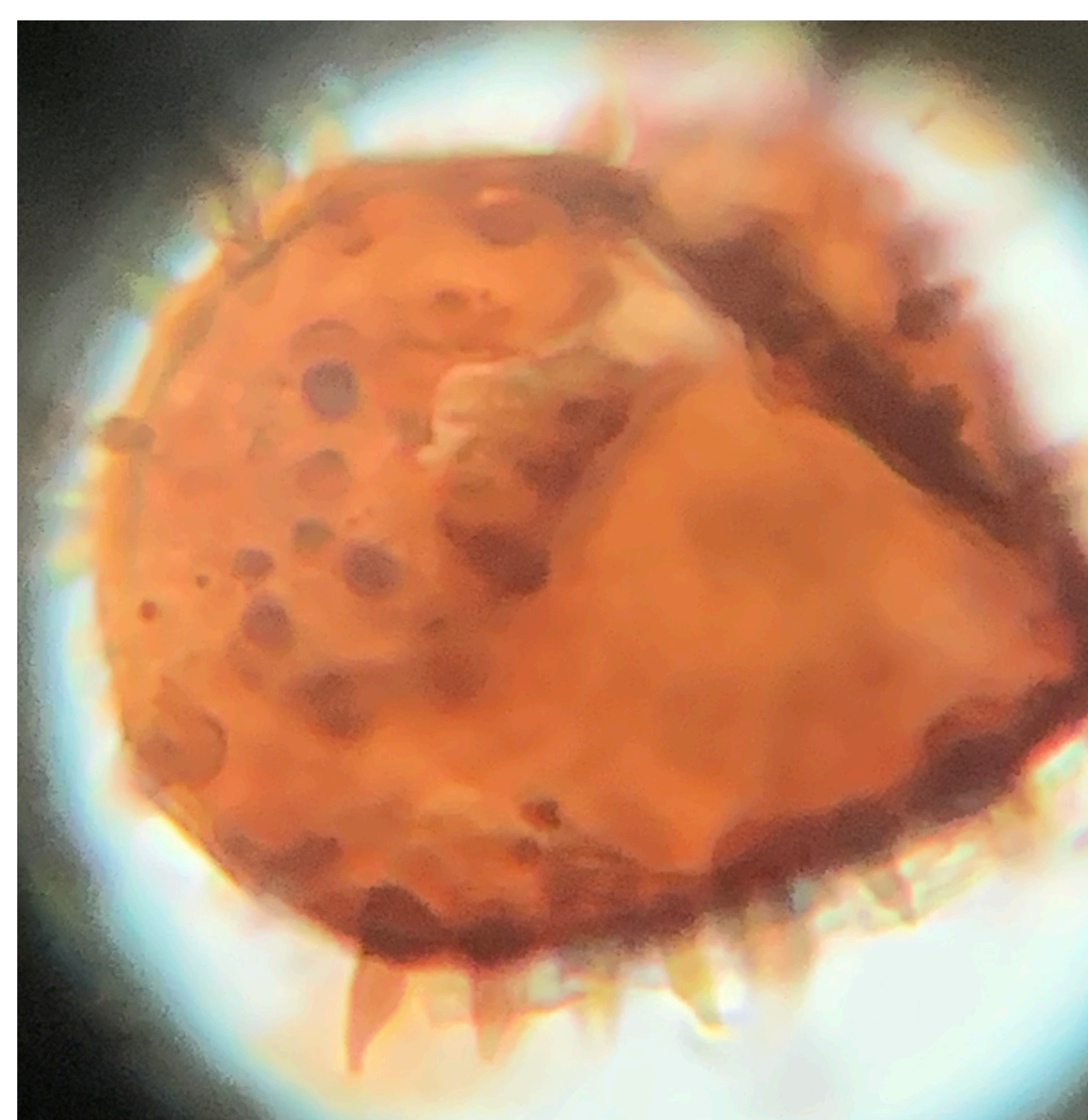


Figure 1: The Mauritia Palm Tree (A) and its pollen (B) seen under the light microscope

REFERENCES

- Araujo, G.S., Rocha, L.A., Lastrucci, N.S., Luiz, O.J., Di Dario, F. and Floeter, S.R., 2022. The Amazon-Orinoco Barrier as a driver of reef-fish speciation in the Western Atlantic through time. *Journal of Biogeography*.
- Figueiredo, J., Hoorn, C., van der Ven, P., Soares, E. Late Miocene onset of the Amazon River and the Amazon deep-sea fan: Evidence from the Foz do Amazonas Basin (2009). *Geology* 2009; 37; 619-622; doi: 10.1130/G25567A. 1.
- Hoorn, C., Bogota-A, G.R., Romero-Baez, M., Lammertsma, E.I., Flantua, S.G.A., Dantas, E.L., do Carmo, D.A., Chemale Jr., F. (2017). The Amazon at sea: Onset and stages of the Amazon River from a marine record, with special reference to Neogene plant turnover in the drainage basin. *Global and planetary change* 153, 51-65; <http://dx.doi.org/10.1016/j.gloplacha.2017.02.005>.
- Hoorn, C., Wesselingh, F.P., Ter Steege, H., Bermudez, M.A., Mora, A., Sevink, J., Sanmartin, I, Sanchez-Meseguer, A., Anderson, C.L., Figueiredo, J.P., Jaramillo, C., Riff, D., Negri, F.R., Hooghiemstra, H., Lundberg, J., Stadler, T., Sarkinen, T., Antonelli, A. (2010). Amazonian through time: Andean uplift, climate change, landscape evolution, and biodiversity. *Science*, 330, 927; doi: 10.1126/science.1194585
- Salamanca Villegas, S., van Soelen, E.E., Teunissen van Manen, M.L., Flantua, S.G.A., Ventura Santos, R., Roddaz, M., Luiz Dantas, E., van Loon, E., Sinninghe Damste, J.S., Kim, J-H., Hoorn, C. (2016). Amazon forest dynamics under changing abiotic conditions in the early Miocene (Colombian Amazonia). *Journal of Biogeography*. doi:10.1111/jbi.12769
- Van de Hammen, T., Wijmstra, T. A. (1964). A palynological study on the Tertiary and Upper Cretaceous of British Guiana. *Leidse Geologische Mededelingen, DL. 30 p.p. 183-241, Preissued 15-12-1964.*

HYPOTHESES

- 1) The onset of the Amazon River and plume (c. 9 million years (Ma), Brazilian Equatorial Margin) is evident in the sedimentary record along the Suriname coastline, and that the coastal vegetation of Suriname has notably changed in the past 25 Ma.
- 2) The developed modern mangrove system coincided with the onset of the muddy estuary (from c. 2.5 Ma), and that prior to 2.5 Ma the mangrove belt was reduced, and the sandy coast was dominated by restinga type vegetation.

Acknowledgements

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