



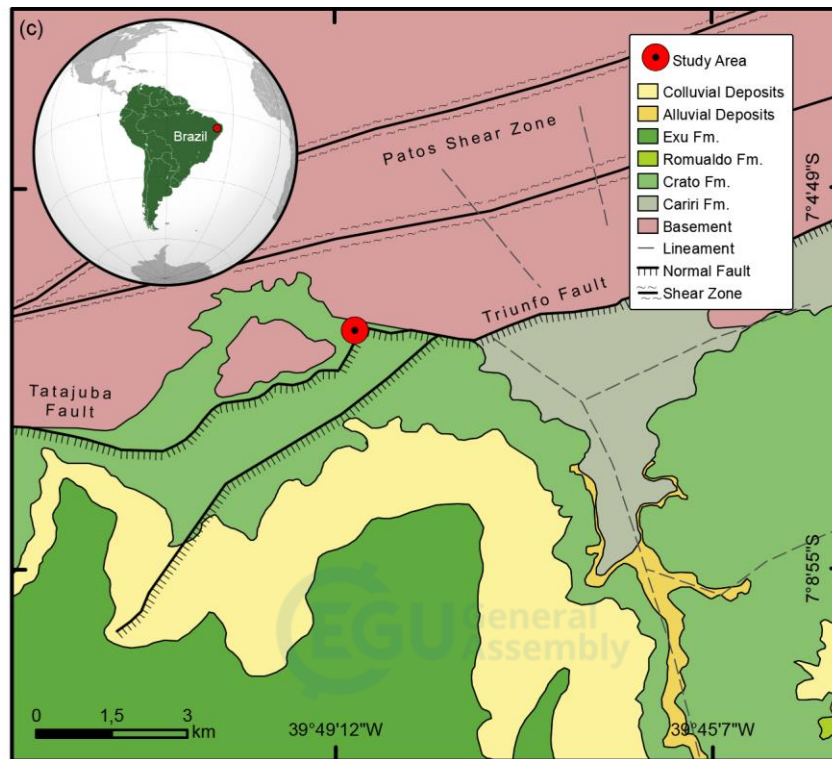
INTERACTION AMONG BIOGENIC, CLIMATE AND TECTONIC PROCESSES INFLUENCES TUFA PRECIPITATION, ARARIPE BASIN, BRAZIL

Jaqueline Lopes Diniz^{1,2}, Francisco Manoel Wohnrath Tognoli^{1,2},
Tiago Siqueira de Miranda^{2,4}, Alcides Nóbrega Sial⁴,
Laís Vieira de Souza², Leonardo Campos Inocencio^{2,3},
Juliano Bonato^{1,2}, Caroline Modica Custódio²,
and Aline Fernanda Spaniol²

- ¹Graduate Program on Geology, Unisinos University, São Leopoldo, Brazil (jaquelineld@edu.unisinos.br)
- ²VizGEO Research Group, Unisinos University, São Leopoldo, Brazil (ftognoli@unisinos.br)
- ³Graduate Program on Applied Computing, Unisinos University, São Leopoldo, Brazil (lcinocencio@unisinos.br)
- ⁴Graduate Program on Geology, Federal University of Pernambuco, Recife, Brazil (tiagogeoufpe@gmail.com)

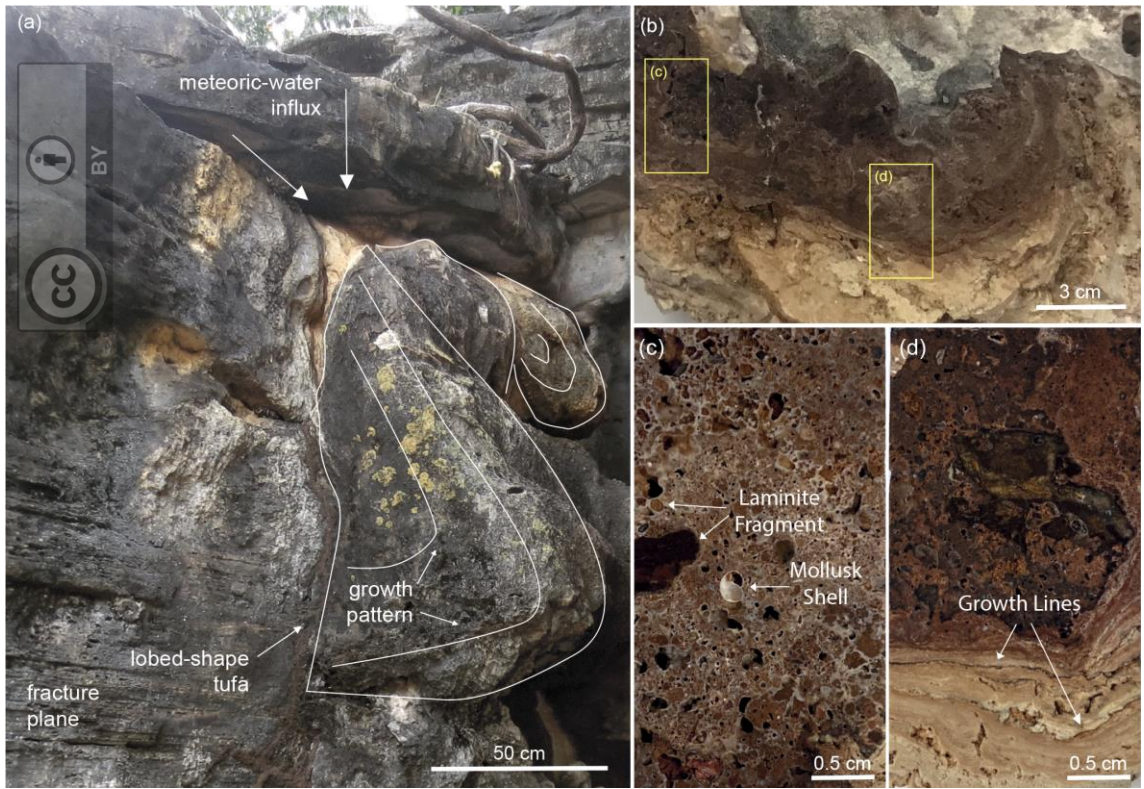


Our examples include two morphotypes resulting from weathering of limestone of the Crato Formation, Araripe Basin, NE Brazil, and precipitated along vugular fractures.



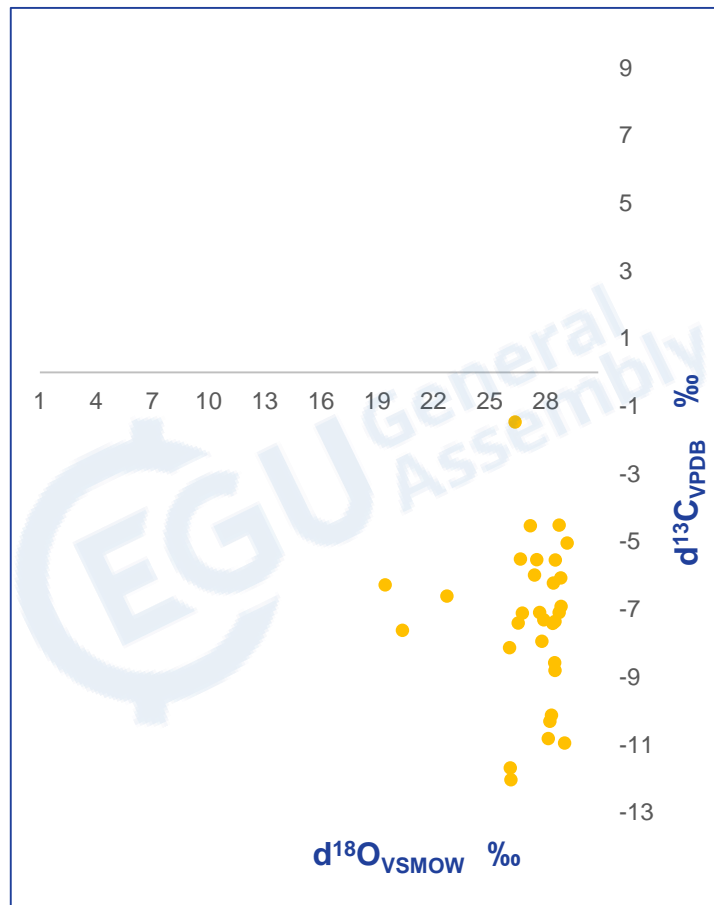


The presence of organic filaments and mollusk shells are recurrent in all samples. Macro and microscopic analysis revealed bryophyte filaments. Moreover, the porosity pattern strongly evidences the presence of these plants in tufa diagenesis.

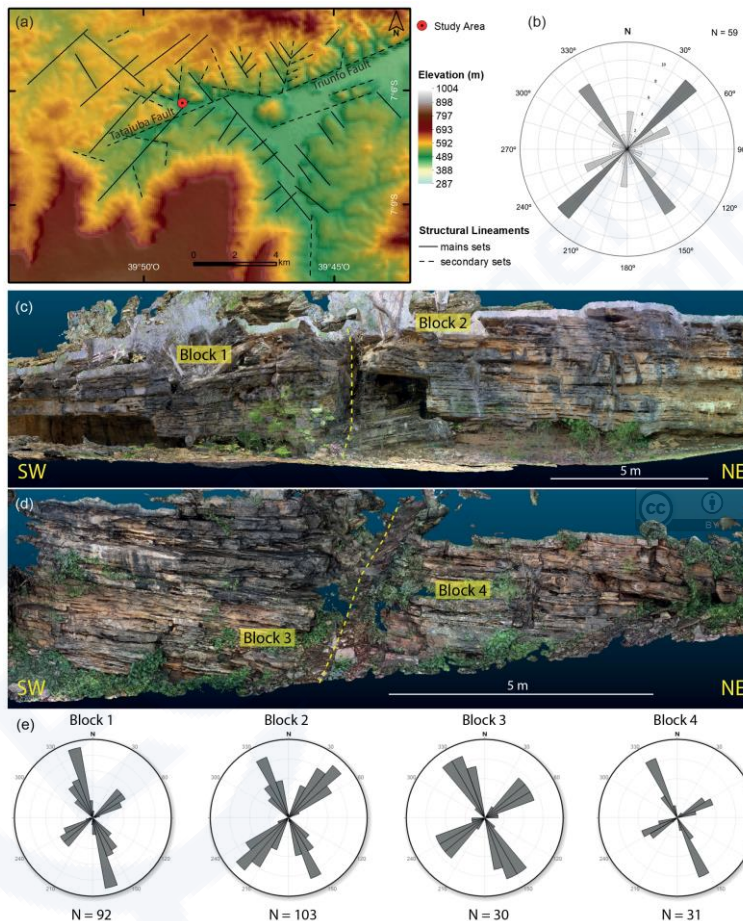




Isotopic values measured on 32 samples indicate $\delta^{18}\text{O}$ VPDB between $-11,4\text{‰}$ and $-1,7\text{‰}$ and $\delta^{13}\text{C}$ VPDB between $-12,1\text{‰}$ and $-5,1\text{‰}$. The enrichment of ^{16}O reveals the composition of meteoric water, responsible by the limestone dissolution and tufa precipitation. Organic fractioning induced by photosynthesis of the C4 plants result in ^{12}C enrichment in the tufas.



Our tufas are always associated with joints and faults in the northern boundary of the basin. The block where tufas occur has a dip angle between 5° and 30° , which differs from the regional average of 0° to 3° . The tufas fill vuggy steep fractures with preferential planes oriented N50E and N30W. The close association of these rocks with the boundary faults suggests a relationship with climate denudation processes.





The Araripe Basin is part of a set of continental rift basins in the Brazilian Northeast affected by uplifting. Thus, there are two stages recognized; the first one corresponds to the exhumation and reworking of the basement, probably in the early Cenozoic; and in the second stage a more intense weathering under semi-arid climate during Oligocene, or later.



Acknowledgment

We would like to thank PETROBRAS (GEOTEC/CENPES/PDEP - project n° 2017/00057-3) for the financial support to this project.

