



THE EFFECTS OF MID-HOLOCENE FLUVIO-EOLIAN INTERPLAY IN THE FORMATION OF THE BOQUEIRÃO LAKE, NE BRAZIL

Utida, G.¹; Zular, A.¹; Cruz, F. W.¹; Sawakuchi, A. O.¹; Wang, H.²; Bicego, M.³; Giannini, P. C. F.¹; Rodrigues, S. I.⁴; Mendes, V. R.¹; Sifeddine, A.⁵; Zocatelli, R. O.⁶

¹ Instituto de Geociências, Universidade de São Paulo, Rua do Lago 562, São Paulo, 05508-080, Brazil. ² Illinois State Geological Survey, Prairie Research Institute, Champaign, IL, USA. ³ Laboratório de Química Orgânica Marinha, Instituto Oceanográfico, Departamento de Oceanografia Física, Universidade de São Paulo. ⁴ Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo. ⁵ LMI "PALEOTRACES" (URD/UFF/Uantof-Chili), Departamento de Geoquímica - Universidade Federal Fluminense, Niterói-RJ, Brazil, LOCEAN (CNRS, IRD, MNHN, UPMC), Bondy, France. ⁶ Université d'Orléans, CNRS/INSU, BRGM, Orléans, France.

We analyze the Holocene coastal evolution of the northernmost tip of the the Rio Grande do Norte State, NE Brazil, in light of fluvio-eolian interplay. Sedimentological, geochemical and OSL data from stabilized dunes suggest that eolian activity was primarily controlled by episodes of sediment availability during prevalent strong SE trade winds. Rising sea level from 11 to 6 ka under a predominantly humid climate promoted sediment supply for the construction of a transgressive dunefield in the Early Holocene. From Mid-Holocene, a halt in sea level rise benefitted the effects of climate forcings in coastal evolution that enhanced fluvio-eolian interactions. These interactions would promote dune damming or circumventing rivers, depending on river flow competence. To understand the effects of these interactions we analyzed a Boqueirão Lake (Boq) core and seismic transects, that indicate changes in microfossil assemblages, organic geochemistry and grain size data that were synchronous with episodes of gradual fluvial damming because of dune advancements. The wetter period benefited an increase in the Boqueirão River discharge limiting dune advancements from ~11 to 6 ka that thus hindering river damming. The occurrence of sponge spicules associated to high sand concentrations detected in Boq sediment core from ~7.2-4.4 cal ka attested to predominantly fluvial conditions. From ~4.5-4.0 cal ka sponge spicules were interspersed with lake-diatoms signaling cycles of damming and spillovers of the Boqueirão River that are coeval with the regional transition from a wetter to a drier climate. With the onset of a drier climate at ~3.9 ka, sponge spicules were completely replaced by lake-diatoms indicating prevalent damming conditions on the Boq. This change promoted an increase in clay and silt deposition in the Boq coupled with organic additions, creating at least a partially impervious lake bottom hindering margin spillovers. Thus, the formation of the Boq is mainly a result of the regionally drier climate, contrary to the usual interpretation that lake water levels are always associated to periods of enhanced precipitation. This fluvio-eolian interplay suggests a holistic perspective in investigating paleoenvironmental archives and geomorphic evolution rather than examining fluvial or eolian processes alone.

Palavras-chave: Boqueirão Lake, dune, microfossils.

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