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▶ **To cite this version:**

A.P.A. Anjos, Abdel Sifeddine, S.R. Pachineelam, Christian Défarge, Bruno Turcq. Mg-Calcites and dolomite in the Brejo do Espinho lagoon, Rio de Janeiro.. 3rd Latin American Congr. Sedimentology, 2003, Belém, Brazil. hal-00089101

HAL Id: hal-00089101
https://insu.hal.science/hal-00089101

Submitted on 10 Aug 2006

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Mg-CALCITES AND DOLOMITE IN THE BREJO DO ESPINHO LAGOON, RIO DE JANEIRO (BRAZIL).

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The aim of this research is to study the carbonate sedimentation in a hypersaline coastal lagoon (Brejo do Espinho) where dolomite precipitation can be expected. The study allowed to make a general characterization of the sediment and to identify different types of carbonate minerals by mineralogical studies and cryo-scanning electron-microscopy.

Brejo do Espinho lagoon is located near to the Cabo Frio city on the east coast of Rio de Janeiro state. The surface area of the lagoon is approximately 1km^2, formed between two sand ridges as geomorphology closed system, during late Holocene transgression period (7000 BP) (Turcq *et al.*, 1999). The water exchange between the lagoon and other adjacent water bodies including Atlantic ocean can be expected subsurface percolation through the sand ridges. The study area presents a microclimate semiarid with occasional upwelling on the continental shelf. The water column varies between 2 and 20cm with occasional dryness. The deeper area of the lagoon is covered by benthic cyanobacterial mats which are sensible to climatic changes.

For better understanding of the hydrological cycle, we analyzed superficial water monthly during three years (2000-2002). The δO^{18} analyses have showed no seasonal climatic changes, and all the water samples presented higher salinities (50 to 300‰) than the seawater, indicating that the surface water suffered permanent evaporation.

A sediment core sample, approximately 4 meters long, was collected and studied for mineral characterization by x-ray diffractometer. The sedimentary profile revealed three distinct phases. During the older phase the lagoon was open; during the middle phase when the lagoon was semi-closed, and during the third phase the lagoon was completely closed. Carbonate minerals contents of the sediments formed during this latter phase were inversely related to the amounts of organic carbon.

X-ray qualitative analysis of the carbonate minerals have indicated different periods of calcite, high Mg-calcite and dolomite precipitation. In order to understand which precipitation processes are related with the different carbonate minerals, the cryo-scanning electron microscope was used. Thanks to this technique it was possible to reveal different types of carbonate morphologies, and to propose an interpretation for the related precipitation processes: biomineralization, precipitation initiated around bacterial cells and precipitation mediated by organic substrates (organomineralization; Trichet and Défarge, 1995).

The results of the present work showed the importance of micro-sampling, which allows to compare different carbonate mineral textures with different micro-environments of formation.

References

Trichet, J., and Défarge, C., 1995. Non-biologically supported organomineralization. In Allemand, D., and Cuif, J.-P. (eds.) : Proc. 7th Int. Biomineralization Symp., Monaco, 17-20 November 1993. Bull. Inst. Océanogr. Monaco, n° spéc. 14, v. 2, p. 203-236.

Turcq, B; Martin, L; Flexor J-M; Suguio, K; Pierre, C; Tasayco-Ortega, L., 1999. Origem and evolution of the Quaternary coastal plain between Guaratiba and Cabo Frio, State of Rio de Janeiro, Brazil. In: Knoppers, B; Bidone, E.D; Abrão, J.J. Environmental Geochemistry of Coastal Lagoon Systems of Rio de Janeiro, Brazil / Geoquímica Ambiental de Sistemas lagunares do Rio de Janeiro, Brasil. Niterói: UFF / Programa de Geoquímica Ambiental, Rio de Janeiro: FINEP, p. 25-46, (Série Geoquímica Ambiental; 6).