

Upwelling Influence on Biogeochemical Processes in Coastal Lagoons, Rio de Janeiro, Brazil

GABRIELA S. NASCIMENTO¹ TIMOTHY I. EGLINTON¹
ANDRÉ L. BELÉM² ANA LUIZA S. ALBUQUERQUE³
JUDITH A. MCKENZIE¹ CRISOGONO VASCONCELOS¹

¹ ERDW Geological Institute, ETH Zürich, Switzerland
(*correspondence: gabriela.santilli@erdw.ethz.ch)

² Department of Agricultural Engineering and Environment,
UFF, Niterói-RJ, Brazil

³ Department of Geochemistry, UFF, Niterói-RJ, Brazil

The Região dos Lagos, situated along the coast east of Rio de Janeiro, Brazil, is dominated by a semi-arid microclimate attributed to the local coastal upwelling near Cabo Frio. A series of hypersaline lagoons, located along the coast directly west of Cabo Frio, are characterized by the presence of extensive microbial mat growth, stromatolites and dolomite precipitation over the last millenniums [1]. Variations in the intensity of the upwelling affect the hydrology and biogeochemical cycles in the lagoons, which may have direct impact on the microbially induced and/or influenced biomineralization processes. Relevant biogeochemical signals of environmental change are recorded in the associated organic and inorganic compounds. Radiocarbon dating of sediment cores from different coastal lagoons shows that, at around 2.2 kyr BP, a local phenomenon occurred which could be associated with a variation in the upwelling strength [2]. Furthermore, field observations over the last three years suggest that the amount of carbonate precipitation is directly correlated with evaporitic conditions associated with this upwelling [3]. In progress research on paleo-environment and -hydrology proxies, such as hydrogen isotopic values of water and associated organic molecules, is evaluating the hypothesis that microbial dolomite precipitation can be directly or indirectly related to climatic variations.

[1] Vasconcelos & McKenzie (1997) *J Sediment Res* **67** (3), 378-390. [2] Lessa *et al.* (2014) *Mar Micropaleontol* **106**, 55-68. [3] Bahniuk *et al.* (2015) *Geol Soc Lond Spec Publ* **418**, 243-259.