# Formation of lamination in modern stromatolites from Lagoa Vermelha, Brazil: An example for Precambrian relics?

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Laminated structures constitute some of the oldest evidence for life on Earth, but the pathways of processes forming stromatolitic lamination is still poorly understood. Recent studies conducted on modern Bahamian stromatolites attributed the lamination pattern predominantly to trapping and binding processes and are proposed as a modern analogue for ancient forms. However, the textural component does not necessarily match that of Precambrian stromatolites.

Herein, we report on the first recognized occurrence of stromatolitic structures, associated with Ca-dolomite, growing in a hypersaline coastal lagoon, Lagoa Vermelha, Rio de Janeiro, Brazil. Mineralogical and geochemical characteristics of these living stromatolites indicate the presence of a diverse symbiotic association resulting in calcification. The balance between precipitation and dissolution is controlled by biogeochemical gradients within the uppermost microbial mat, which together with mat accretion and subsequent exo-polymeric substances (EPS) degradation could lead to a defined lamination pattern.

Microscopical and geomicrobiological studies provide information about the biomineralization processes and associated metabolic mechanisms, such as photosynthesis, aerobic and anaerobic respiration, methanogenesis and fermentation. Despite the high microbial diversity detected in the mat, the stable carbon isotope data measured in the biominerals do not reflect the diversity of the metabolisms. These modern examples reveal that the lamination formation is due to a complex slow mechanism.