Precambrian and Phanerozoic microbialites in Brazilian Gondwana

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We are completing an atlas financed by Petrobras (*Rede Petrobras de Sedimentologia e Estratigrafia*) documenting the morphological variety and stratigraphic context of Brazilian microbialites - predominantly stromatolites and oncolites – ranging in age from Paleoproterozoic to the present. Many occurrences of stromatolites provide relevant insights for elucidating paleoenvironmental, paleoclimatic and paleogeographic aspects of West Gondwana prior to, during and following its amalgamation. Among the oldest Brazilian microbialites are closely spaced, columnar stromatolites in bioherms of the 2.1 Ga-old Fecho do Funil Formation (Paleoproterozoic), which post-date thick, intensely mined banded iron-formation of the Quadrilátero Ferrífero in Minas Gerais. Latest Mesoproterozoic to early Neoproterozoic stromatolites (Vazante and Paranoá groups) are scattered along the Brasília fold belt in central Brazil but may be coeval with similar successions in southeast Brazil (Itaiacoca Group) and on the Congo and West African cratons. Typical of this period are unbranched, conically-laminated columnar stromatolites (*Conophyton*) that formed in the deeper photic zone of carbonate ramps and platforms. Most Brazilian occurrences of *Conophyton* exhibit upward shallowing, as indicated by the appearance of branching (= *Jacutophyton*) and changes in laminar form from conical to more gently convex. More proximal settings are indicated by hummocky cross-stratified beds of coated grains (including oncoids and microphytolites) or by extensive stratiform stromatolites. Changes in stromatolite morphology, sediments and sedimentary structures in continuous successions may reflect cyclic variations in sea level at local and possibly global scales. In the Neoproterozoic, Brazilian microbialites either comprise largely monotypical vertical successions (Bambuí Group and Capiru Formation) or exhibit lateral and vertical variation within bioherms (Salitre Formation). Following the Neoproterozoic, great areas of Brazil were subject to denudation or located at very high southern latitudes – conditions clearly unfavourable for the development and preservation of microbialites. Microbialites reappear, however, within mixed carbonate-siliciclastic depositional environments of the intracratonic Paraná and Parnaíba basins in the Permian following Gondwana glaciation, as epeiric seas regressed and desertification of West Gondwana began. Restricted conditions are represented by elongate stromatolites of metric dimensions and containing remains of aquatic mesosaurid reptiles along the northeast margin of the Paraná basin (Passa Dois Group) and in areas of Namibia bathed by the same epicontinental sea. Much smaller stromatolites, however, are more common in the Brazilian Permian, often as complex small bioherms and biostromes. "Microstromatolites" encrusting bivalve shells and intraclasts are locally common in the Paraná basin and represent recurrent opportunistic colonization of available hard substrates in stressful settings. As the Southern Atlantic Ocean began to open, microbialites, now cropping out in northeastern Brazil, developed in Cretaceous hypersaline continental waters. Thickly laminated, pseudocolumnar, often bizarre stromatolites in the Codó Formation may correlate with at least partly microbial carbonates containing vast hydrocarbon reserves in the "Pre-Salt" beds of southeastern Brazil.

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ABSTRACTS BOOK

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