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An Atlas of Brazilian Microbialites

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In view of the importance that microbialites have assumed as potential reservoirs for hydrocarbon deposits in recent years, an *Atlas of Brazilian Microbialites* is being prepared for publication by the end of 2012 by researchers associated with the newly founded Center for Geosciences Applied to Petroleum (UNESPetro), located on the campus of the São Paulo State University at Rio Claro (UNESP-RC), southeastern Brazil, as part of the project "Carbonates of Brazil", funded by the Sedimentology and Stratigraphy Network of Petrobrás, the Brazilian Petroleum Company. This large format book will amply illustrate stromatolites, thrombolites, oncolites, laminites and other microbial features selected for their diversity, good preservation, stratigraphical-sedimentological significance, and/or paleoenvironmental setting from rock units ranging in age from Paleoproterozoic to the Recent from throughout Brazil. Each occurrence will be described briefly at scales ranging from megascopic observations at outcrops to petrographic analysis of sectioned material.

The volume will be organized into 1) an introductory part dealing with the concept of microbialites, their study, and their distribution through time, together with descriptions of the localities and geological context of the Brazilian microbialites selected for illustration in the volume; 2) a second part comprising the bulk of the volume will consist of plates of field and laboratory photographs characterizing the main morphotypes of Brazilian microbialites from the selected localities; and 3) a final synthesis regarding the stratigraphical, sedimentological, and temporal significance of Brazilian microbialites.

Examples illustrated in the *Atlas* come from the Paleoproterozoic Fecho do Funil Formation (Minas Supergroup, Piracicaba Group, 2100 Ma) of the Quadrilátero Ferrífero near Ouro Preto, Minas Gerais; the uppermost Mesoproterozoic / lower Neoproterozoic Paranoá and Vazante groups and Neoproterozoic Bambuí and Una groups of the Brasília Fold Belt and adjacent cover successions of the São Francisco Craton in the states of Minas Gerais, Bahia, Goiás and the Federal District; the Neoproterozoic Capiru Formation (Açungui Group) of the Ribeira Fold Belt, state of Paraná; the Permian Irati, Teresina, and Rio do Rasto formations (Passa Dois Group) of the Paraná Basin in the states of Paraná and São Paulo; and Recent microbialites from coastal lakes of the state of Rio de Janeiro and an occurrence of calcareous tufa from the state of Bahia. Cretaceous microbialites will be described within a second atlas entitled *Carbonate Rocks of the Cretaceous of Brazil*, also in preparation under the aegis of the "Carbonates of Brazil" project.

One of the most impressive examples described in the volume occurs in the Passa Dois Group (Late Permian, Paraná Basin) near Santa Rosa de Viterbo, São Paulo (Fig. 1). There, a 1.5-2 meter-thick biostrome made up of practically contiguous, loaf-shaped stromatolites up to nearly 2 m wide, 7 m long and 3 m high contains articulated as well as dispersed skeletal remains of mesosaurid aquatic reptiles and extends laterally for 2-3 km with the same NE-SW alignment of individual stromatolites throughout.

More than 20 researchers from UNESP-Rio Claro, the University of São Paulo (at São Paulo - USP), the Federal Universities of Brasília, Bahia, Minas Gerais, and Paraná (UnB, UFBA, UFMG, UFPR), and the National Institute for Space Research (INPE) participated in the field discussions and collecting. In addition, researchers from the University of Edinburgh and ETH, Zurich, contributed chapters on the role of microbialites in reefs through time and modern stromatolites from the state of Rio de Janeiro, respectively.

By-products of the project will include a digital image bank of Brazilian microbialites in both outcrop and laboratory photographs selected from the thousands of available images, as well as brief geological excursion guides to the main outcrops visited in the project. Both will be made available for the academic community. Additionally, collections of samples and thin sections of Brazilian microbialites are being prepared for teaching and reference purposes from the many hundreds of kilograms of samples collected in the project. This material is housed at UNESPetro, Rio Claro, where an exhibit of Brazilian microbialites and large field photographs is available for visitation.

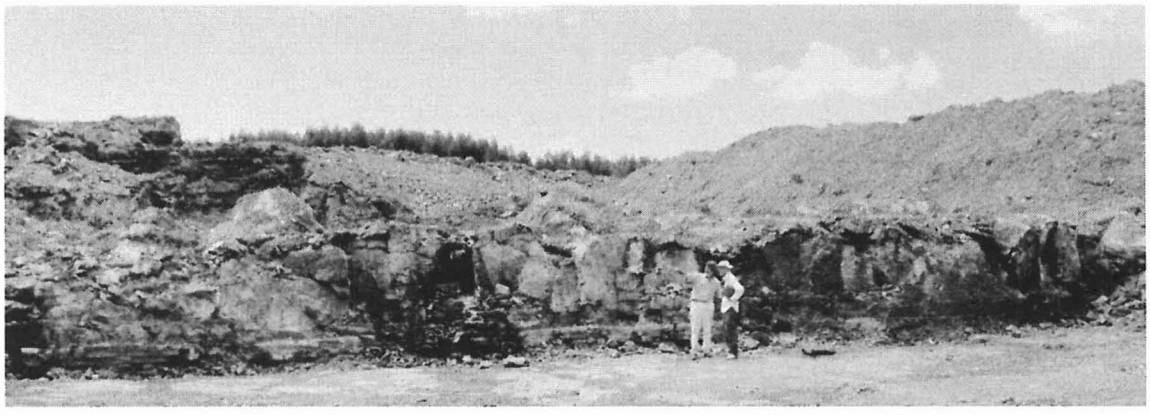

Figure 1. Stromatolitic biostrome made up of NE-SW trending, nearly contiguous, loaf-shaped stromatolites of metric dimensions in the Passa Dois Group (Upper Permian), near Santa Rosa de Viterbo, São Paulo, Brazil. View (photomontage) is perpendicular to the direction of alignment of the stromatolites. Stromatolites developed directly upon calcarenites with low-angle cross-stratification and were smothered by siltstone, visible in the background. Skeletal remains of mesosaurid aquatic reptiles (key evidence for the concept of continental drift) occur within and between individual stromatolites.