



## Microbialites from Rift and Sag systems: new insights into terminological and classification issues?

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Microbial-related carbonates frequently show high-frequency vertical and lateral variability over centimetre to millimetre scales as a striking feature. Although well-known, generic morphological terms may be used for the dominant facies and facies associations at a given slice of the stratigraphic accumulation, the particular meso- and microscale characteristics of these biosedimentological occurrences do not always easily fit in current terminologies and classification schemes for microbial-related rocks and structures. Recent studies being undertaken over rift and post-rift (sag) carbonate systems from the Santos Basin (Brazil) and analogues clearly call for attention to be paid to these issues.

The initial studies suggest complex controls in microbialite development in a rather unusual, non-marine depositional setting. The main microbialite and microbial-associated facies types commonly occur together or in close alternation, including: a) faintly, very thinly-laminated limestones and marly limestones, that may have microbial laminae but are chiefly made of sedimentary laminations; b) clearly laminated stromatolites, with planar, undulated and crinkled microbial laminae; c) stromatolites with columnar and arborescent structures; d) sphehrulitic dominated limestones; e) intraclastic grainstones/packstones (rarely rudstones) and also grainstones/packstones (more rarely rudstones/floatstones) with diverse and often dark clasts. Some of these facies types may occur with similar aspects but with a highly argillaceous matrix. Ostracods may occur sporadically. Silicification, dolomitisation and recrystallisation are also recognized processes.

All these features may induce significant variability on the porosity distribution. This heterogeneity can be facies controlled, but multi-stage and multi-process diagenesis could also play a significant role.