



Criteria for the Biogenicity of Microbial Mat-Induced Sedimentary Structures in Sandy Deposits

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The identification of sedimentary structures as of biological origin is a very difficult task, however of predominant importance for our understanding of early Earth or of extraterrestrial environments. Criteria of biogenicity have been established for microfossils as well as for stromatolites. In my contribution, I like to present the catalogue of criteria we set up for the definition of microbially induced sedimentary structures (MISS) in siliciclastic deposits. The MISS occur in modern sandy settings, but have been found in sandstones of the early Archean age and younger. The six criteria for the biogenicity of MISS include: (i) MISS occur in rocks of less than greenschist metamorphic phase; (ii) in stratigraphic sections, MISS occur at turning points of regression and transgression; (iii), MISS occurrence correlates with the typical depositional facies that enhances microbial mat development and preservation; (iv), the occurrence of MISS is controlled by the hydraulic pattern; (v), the geometries and dimensions of modern MISS correspond to those of the fossil ones; (vi), the MISS include at least one of nine microtextures (e.g., oriented grains; sponge pore fabrics; etc.).