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Significance of fine-grained microfabrics from a Cretaceous stromatolite bed (Muñecas Fm, late Turonian, Northern Iberian Ranges, Spain)

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A fine-grained stromatolite bed of great lateral continuity (km scale) and small synoptic relief (from 15 cm up to 40 cm) is registered in the Muñecas Formation (Floquet et al., 1982), of the Northern Iberian Ranges. Muñecas Fm is mainly composed of thin-bedded limestones and marls deposited during the late Turonian.

At this time, the Iberian microplate was located in subtropical palaeolatitudes (20ºN-30ºN according Dercourt et al., 2000) and shallow-water carbonate platform facies were deposited in a wide and shallow seaway, along a NW-SE trending, intracratonic basin (Upper Cretaceous Iberian basin), between the emergent areas of the Hesperian massif to the W and the Ebro massif to the NE (Segura et al 2002).

The stromatolite bed (facies 2.1) overlies heterolithic facies (facies 1.1) composed of marls and thin-bedded, massive mudstones with micritic intraclasts, ostracods and reworked sponges, and bearing quartz-silt and bioclastic-rich wavy bands. The coeval facies, laterally equivalent to the stromatolite bed, consist of an oolite-rich, sheet-like deposit (facies 2.2). Packstone and grainstone of radial-fibrous oolites overlie burrowed bioclastic mudstone-wackestones (facies 1.2) with bivalve fragments, gastropods, foraminifers, and sponges. The stromatolite bed is capped by ostracod-rich limestones (facies 3) and marls.

The stromatolite posses a stratiform to LLH macrostructure, and in some places domed bioherms up to 1 m width occur. Internally, mesostructure is composed by planar, wavy to hemispherical stromatoids. They display a broad spectrum of microestructures: dense micrite, peloids (microbial as well as bahamite peloids), clotted microfabrics, irregular micritic-wall tubes and dendroid-arborescent microframeworks (filamentous cyanobacteria?).

The microfacial study of the vertical arrangement of the stromatolite laminae reveals different growth stages probably related with environmental changes. In fact, the whole fine-grained stromatolite accretion reflect a complex mosaic of processes: trapping and binding of quartz-silt grains and bahamites (forming the agglutinated part of some laminae), and microbially induced precipitation (forming the spongiostromic parts) as well as the dendroid microframeworks could resemble to skeletal stromatolitic growth.

References

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