MODELING AND HYDRODYNAMIC RECONSTRUCTION OF TIDALLY INFLUENCED STROMATOLITES: YACORAITE FORMATION (MAASTRICHTIAN-DANIAN). JUJUY, ARGENTINA

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The external morphology and the architecture of in intertidal stromatolitic systems are mainly influenced by the hydrodynamic energy of the environment. In the outcrops of the Maimará locality (Jujuy, Northwestern Argentina), the Yacoraite Formation (Maastrichtian-Danian) exhibits a system of three-dimensional preserved intertidal stromatolites. In spite of the fact that modern analogues do occur, the rarity of three-dimensional outcrops in the fossil record limits our understanding of the hydrodynamic factors that influenced stromatolite morphology. That is why the Maimará site, from the Yacoraite Formation, represents a promising study case to characterize the relationship between these microbialite systems and the hydrodynamic factors.

Stromatolite surfaces were studied through in-situ logging, polished sections and thin sections analysis. In addition, digital photogrammetry was used to achieve an overall orthomosaic and a detailed three-dimensional model of the outcrop, to characterize the sedimentary setting.

The obtained data allowed us to infer how the hydrodynamic energy of the deposit has conditioned the stromatolitic growth at several scales. At macroscale, the morphology and architecture were influenced by the wave action, with the spaces among the domes representing first order recharge/discharge water channels for tidal flow. At mesoscale, the hydrodynamic energy influenced the microbial mat growth, causing the domal morphologies and giving rise to columnar structures. The space between the columns is interpreted as second and third order discharge channels according to their dimensions and position within the internal structure.