

Unraveling Fossil and Living Microbialite Formation in the Maquinchao Basin (Argentina)

Inès Eymard¹, María del Pilar Alvarez², Andrés Bilmes², Crisogono Vasconcelos³, Anneleen Foubert⁴, Daniel Ariztegui¹

¹ University of Geneva, Geneva, Switzerland

² CENPAT-CONICET, Puerto Madryn, Chubut, Argentina

³ ETH, Geologisches Institut, Zürich, Switzerland

⁴ University of Fribourg, Fribourg, Switzerland

Stromatolites are commonly defined as laminated benthic organosedimentary structures built by the trapping and binding and/or precipitation of minerals via microbial processes. Thus, studying the formation and preservation of individual lamina in modern microbialites can provide key information to fully understand their fossil counterparts. Furthermore, today physico-chemical data provide us with the opportunity to estimate the environmental conditions prevailing during the formation of the fossil microbialites.

The Maquinchao Basin in Northeastern Patagonia, Argentina, contain different types of microbialites: fossil stromatolites, living microbial mats and carbonate laminated crusts. The fossil stromatolites present columnar-like shapes and are located in former highstand shorelines at higher altitude than the riverbed of the present Maquinchao River. Conversely, modern microbial mats and carbonate crusts are found directly in the riverbed, in pounds with clear water and in desiccated areas, respectively (Pacton et al., 2015).

Preliminary laboratory data such as light microscopy, SEM and EDX on selected samples show the same mineralogy (low-Mg calcite) and comparable structure of the laminae encompassing separated organic-rich and more crystalline layers. Ongoing ultra-microscopic examination of selected samples using multiscaled X-ray CT-scanning techniques (tomography) allow to better understand the geometry and relationship between carbonate crystals and organic matter. Combining field data with images analysis and geochemical results will contribute modeling the formation and preservation of these fossil and modern freshwater microbialites.

Pacton M, Hunger G, Martinuzzi V, Cusminsky G, Burdin B, Barmettler K, Vasconcelos C, Ariztegui D, 2015. Organo mineralization processes in freshwater stromatolites: A living example from eastern Patagonia. *The Depositional Record* 1/2: 130–146 (doi: 10.1002/dep2.7).