**Biomineralization evidence in microbialites from crater lake Atexcac, Mexico**

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Lake Atexcac hosts a special case of modern microbialites. The mats overlying the microbialites are composed of a community producing copious mucilage visible to the naked eye and composed of cyanobacteria and eukaryotes that contribute to the mineral deposit, according to the differences in the carbon concentration mechanisms of both groups (CCMs). By classical morphospecies observations, this community is composed of a stratum largely formed by the coccoid cyanobacterium *Chlorogloea lithogenes* as the dominant cyanobacterial species and some filamentous ones, always covered by another stratum dominated by several species of diatoms in which *Epithemia turgida*, *Mastogloia smithii* var. *lacustris* and *M. epillitica* stand out. The composition of the Atexcac microbialites consists of a carbonate mineral phase (mainly aragonite, CaCO3), associated with a poorly crystalline Mg-silicate phase similar to kerolite [Mg3Si4O10(OH)2·*n*H2O]. The organic material and the cells are finely preserved as fossils related to the carbonate and silicate phases. In this fossil material, it is possible to recognize that defined cellular structures coincide with the same morphospecies observed as dominant in the microbial mats.

Geochemical studies and various microscopic methods allow to hypothesize that kerolite may be an initial step in the fossilization processes since there is permineralization of fossil microorganisms. However, we do not know how much the chemical composition of the lake can influence this process and how much microbial activity could influence it. To investigate their respective roles, we have initiated observation of the microbial mats and minerals, especially the fossils that might have been preserved at different lake depths. The main question is whether possible hydrochemical changes in the depth profile would impose modifications on one or the other, the biotic component and the mineral component. In an optimal scenario, we could associate the changes with the possible role of kerolite. The first results indicate that the specific composition of the mat remains intact in the first 5 meters of depth. At greater depths, the cyanobacterial community changes towards the predominance of pseudofilamentous members, mainly Pleurocapsales. In these depths greater than 5 meters, the diatoms persisted, although in lower abundances.