Geophysical Research Abstracts
Vol. 13, EGU2011-5347, 2011
EGU General Assembly 2011

Biosedimentary Signatures: revisiting the Huepac chert from the Tarahumara Formation

Elizabeth Chacon B. (1), Ricardo Rodriguez-Ramirez (1), Augusto Rodriguez (1), and Carlos Gonzalez Leon (2)

(1) Universidad Autonoma de Nuevo León UANL, FACULTAD DE CIENCIAS DE LA TIERRA, Geology, Linares, Mexico (liz@nucleares.unam.mx, 528212142020), (2) 2Estación Regional del Noroeste, Universidad Autónoma de México, UNAM Apdo. Postal No. 1039, Zona Centro, Hermosillo, Sonora, México 83000

The geobiology of stromatolites is one of the main topics in current research that includes microbial-mineral interactions at several scales in both, fossil and recent analogues. The actual astrobiological quest demands a better and detailed characterization of all types of biosignatures in a wide diversity of environments where biomineralization processes are constantly involved. This work presents the case study from the Huepac chert, with special attention to calcifying cyanobacteria in stromatolites, not only due to its major role in the construction of our biosphere but also as the most reliable biosignature of fossil microbial life. The Huepac chert is a highly fossiliferous sediment from the Tarahumara Formation, a complex succession of heterogeneous rock types including andesitic flows, volcanic breccia, tuff, sandstone, siltstone, limestones (some of them stromatolitic) and alternated horizons of black cherty lens in central Sonora, northwestern Mexico. The Tarahumara Formation regionally extends to northern Sonora where it grades laterally into the Campanian-Maastrichtian Cabullona Group, reflecting spectacular but complex topographycal views. The geology on this area that reflects a convergent continental margin during the Mesozoic, followed by arc magmatism of the Laramide orogeny that included batholith emplacement and volcanic successions in marine successions of the Early Cretaceous Bisbee Group and equivalents of the Bisbee basin. Well-exposed outcrops at the Huepac locality suggest that non-marine environments supported a rich plant biota and stromatolites with a complex assemblage of cyanobacteria and diatoms assemblages that grew in shallow, near-shore settings. The fossiliferous chert from Huepac documented one of the earliest records for continental diatoms more than a decade ago, along with some typical stromatolite-builders cyanobacterial microfossils. Since then, other taxa were additionally reported (abundant algal and plant remains preserved by silicification); in spite of the fact that the Huepac chert proved to be quite productive in microfossils, important aspects of the regional geology and geochemical data were open questions, since no data have ever been acquired and therefore all studies have suffered from limited availability of adequate geological, geochemical and stratigraphycal information. The reasons for this may have been the higher degree of structural complexity, the often rugged surface topography resulting in reduced accessibility and simply the lack of geological inspection of the area. This work presents new results on the regional geology including complete descriptions of stromatolites that clear unresolved issues, addressing at the same time, important aspects on the preservation processes of biosignatures.

This work has been supported by research project CONACyT CB-83500 and by Biosignaturas Sedimentarias-PAICyT Project CT1381-2009-UANL.