Geophysical Research Abstracts
Vol. 12, EGU2010-3062, 2010
EGU General Assembly 2010

Calcium Biomineralization in Sediment of Lake Acigol, an Hypersaline Lake in SW Turkey

Nurgul Celik balci (1), Meryem Menekse (1,2), Seref Sonmez (3), and Nevin Gul Karaguler (2)

(1) Istanbul Technical University (ITU), Department of Geology, istanbul, Turkey (ncelik@itu.edu.tr) , (2) ITU Dr. Orhan Öcalgiray Molecular Biology and Genetic Research Center, istanbul, Turkey, (3) ITU AdnanTekin Applied Research Center for Material Science & Production Technologies, istanbul, Turkey

The study of biomineralization in (hyper) saline environments is important for two reasons, 1-it can extend our knowledge about the earliest microbial life on Earth which may have been halophilic 2-because of the presence of hypersaline conditions on Mars, the analog environments in Earth may have implications for the possibility of life on Mars. We examine calcium biomineralization in Lake Acigol, a unique hypersaline lake in southwest Turkey by integrating geochemical and microbiological approaches. Lake Acigol is a perennial lake with a maximum salinity of about 200 g/L and covers an area of 55-60 $km^2$and is one of the main salt reservoirs of Turkey. Water, sediment and core samples were taken from the lake and salty ponds around the lake during the field excursion. The water chemistry revealed relatively high Na and SO_4 concentrations both in the lake (30 gr/L, 33.36 gr/L), and the ponds (100 mg/L, 123 mg/L). The mineralogical analyses of sediments showed gypsum, halite, carbonate (aragonite, huntite) precipitation in the lake and ponds. We employed culture-dependent (16s rRNA cloning method, enrichment culture), and -independent techniques to study microbial diversity in Lake Acı gol. Sediment samples were used to isolate *Halophilic sp.* (e.g. *salinicoccus roseus* , *Dunella sp*.) under salinities that were similar to those measured in the lake water to further use in the laboratory Ca-precipitation experiments. For the precipitation experiments, liquid and solid culture media with various salinities (6-25 %) in addition to one similar to the lake water were prepared. In order to determine effect of Mg^{2+}/Ca^{2+} molar ratio on mineralogy and the rate of precipitation, media with different $Ca^{2+}$and Mg^{2+} concentrations were also prepared. Our preliminary results indicate that the halophilic bacteria play active role in the precipitation of Ca-minerals but the geochemical conditions are clearly influential. The results also point out that in the Lake Acı gol C, N, P, Ca and Mg cycles may be coupled due to bacterial biomineralization.