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# Biomineralization of hydrous Mg carbonates in the Salda Lake, SW Turkey: New insights from stable Mg isotopes.

Vasileios Mavromatis (1), Liudmila Shirokova (1), Irina Bundeleva (1), Oleg Pokrovsky (1), Pascale Bénézeth (1), Eric Oelkers (1), and Emmanuelle Gerard (2)

(1) Géosciences Environnement Toulouse (GET), CNRS-UMR 5563, Observatoire Midi-Pyrénées, 14 Avenue Edouard Belin, 31400 Toulouse, France (mavromat@lmtg.obs-mip.fr), (2) Institut de Physique du Globe de Paris, 4 Place Jussieu, 75252 Paris, France

Ultramafic rocks typically contain up to 50% by weight magnesium oxide capable forming insoluble magnesite. As a result these rocks are widely considered as primary candidates for both in-situ and ex-situ mineralogical $CO_2$ sequestration. However at the ambient temperatures occur at earth's surface ecosystems, magnesium initially incorporates in hydrous Mg-carbonates, a process that in some environments is mediated via microbiological activity. To this end and to better understand the processes involved in the precipitation of hydrous Mg-carbonates in natural systems we studied carbonate mineral formation in Lake Salda (SW Turkey). This lake is one of the few modern environments in Earth's surface where hydrous Mg-carbonates formation occurs. Cyanobacterial stromatolites, consisting mainly of hydromagnesite, are abundant in this aquatic ecosystem. Generally it is believed that the stromatolite formation is a biologically-mediated process. However, our work on laboratory precipitated cyanobacteria-induced hydrous Mg-carbonates has shown that although the biological activity may induce mineral formation via a pH increase, it does not affect magnesium isotope fractionation between precipitated solid and liquid phase.

In order to better constrain the Mg-isotopic cycle of the Salda Lake, Mg isotope analyses performed both on natural samples (lake waters and stromatolite/ sediment hydromagnesite) and laboratory bio-precipitates grown in the presence of *Chroococales sp*. cyanobacteria isolated from the lake waters. The obtained results show that the difference between the isotopic composition of stream waters feeding the lake ($\delta^{26}$Mg $\approx$ -1.1 to -1.4 ‰) and the lake water samples ($\delta^{26}$Mg $\approx$ 0.0 to 0.1 ‰) might be explained by the formation of hydromagnesite with $\delta^{26}$Mg $\approx$ -0.8 to -1.1 ‰ relative to DSM-3 international standard. The suggested fractionation factor exhibits similar $\Delta^{26}Mg_{solid-solution}$ to the one observed in our laboratory bio-precipitates.