

## Microbial diversity in the hydromagnesite mineralization

BEDINI, F.<sup>1,2\*</sup>, BOSCHI, C.<sup>2</sup>, MÉNEZ, B.<sup>3</sup>, DI GIUSEPPE, G.<sup>4</sup>,  
PERCHIAZZI, N.<sup>1</sup> AND ZANCHETTA, G.<sup>1</sup>

<sup>1</sup>Dipartimento di Scienze della Terra, Univ. Pisa, Pisa, Italy

<sup>2</sup>Istituto di Geoscienze e Georisorse, CNR, Pisa, Italy

<sup>3</sup>Institut de Physique du Globe de Paris, Paris, France

<sup>4</sup>Dipartimento di Biologia, Univ. Pisa, Pisa, Italy

(\*Correspondence: bedini@dst.unipi.it)

Before the last century, the lithosphere and the biosphere were counted as two distinct entities, naturally in physical contact, but materially independent in their dynamics. Here, we present an example of interaction between microbes and minerals at Montecastelli site (Tuscany, Italy).

Montecastelli serpentinites are characterized by a spontaneous and intense formation of hydrated carbonate crusts, coatings and spherules due to uptake atmospheric CO<sub>2</sub>.

Representative hydrated carbonate samples are collected in three different studied areas and analyzed to investigate the natural process of Montecastelli carbonate precipitation in accordance with their petrographic, isotopic and also biological characteristics.

XRD analysis revealed that the carbonate precipitates are formed of mainly hydromagnesite and variable amount of other metastable carbonate phases (i.e. nesquehonite, pyroaurite, brugnatellite and manasseite), consistently with precipitation in a Mg-rich solution.

Stable carbon and oxygen isotope compositions were determined for about 120 samples using a Gas Bench II to identify the sources of carbon dioxide within these carbonate minerals. Samples of Mg-carbonate crusts are characterized by  $\delta^{13}\text{C}$  values between -14.11 and 10.41 per mil (VPDB),  $\delta^{18}\text{O}$  values between 25.35 and 36.34 per mil (VSMOW).

Investigation of carbonate crusts at confocal laser scanning microscopy (CLSM) combined with Raman spectromicroscopy has allowed to discover the presence of microbes on the carbonate surface and at the serpentine-carbonate interface [1]. Microbial types of bacteria discovered by amplifying, cloning and sequencing 16s DNA genes from Montecastelli carbonates, reveals a large diversity: *Blastococcus* sp., *Sphingobium* sp., *Bacteroides*, *Legionella* sp., *Gamma proteobacterium* and *Acinetobacter* sp.

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