

DOLOMITE FROM DEVONIAN VENT FRACTURE SYSTEMS (ANTI-ATLAS, MOROCCO) AS A BY-PRODUCTS OF MICROBIAL CHEMOSYNTHESIS

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The ~350 Ma old vent fracture systems (*neptunian dikes*) crossing the upper part of the Kess-Kess Formation, Anti-Atlas, Morocco, contains a well preserved evidence of chemosynthetic microbial activities (Cavalazzi *et al.*, 2004). The *neptunian dikes*, arranged in different generations, are likely connected to fluid flux associated to hydrothermal and/or hydrocarbon venting related to submarine Hamar Laghdad volcanism, which was active in Devonian time (Belka, 1998; Mounji *et al.*, 1998; Peckmann *et al.*, 1999).

The small-sized, zoned dolomite crystals observed in authomicrotic horizons filling small-scale dikes could be interpreted as the by-product of chemosynthetic bacteria associated to chemical changes connected with the fluid flux. Probably, a Devonian oxygen-poor and sulfate-rich, deep subsurface conditions hosted anaerobic bacteria (sulfate reducing bacteria?, SRBs), that precipitated the dolomite crystals. Methanogenic conditions can also favor the dolomite formation (Mozely and Burns, 1993) and fit the above scenario.

Methods used for investigating the dolomite and its paleoenvironmental setting include optical microscopy, powder x-ray diffraction, electron microprobe analyses, analytical scanning electron microscope, and C-O stable isotope analyses.

The SRBs metabolic strategy and their ability to adapt to extreme chemo-physical conditions enable them to play an important role in global bio-geochemical cycles. SRBs likely represent one of the oldest forms of life on Earth. In the geological record, when reducing conditions predominate, the carbonates can commonly be represented by dolomite. SRBs can significantly influence the anoxic carbonate precipitation and the early diagenesis under specific conditions. The sedimentary dolomite can therefore be considered a biomineral (Vasconcelos and McKenzie, 1997).

References

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