



High-pressure serpentinization triggers regional-scale fluxes of high-pressure abiotic methane in subduction zone

Alberto Vitale Brovarone (1), Isabelle Martinez (2), Francesca Piccoli (3), and Dimitri Sverjensky (4)

(1) IMPMC-CNRS, Paris, France (alberto.vitale_brovarone@upmc.fr), (2) IPGP, Paris, France (martinez@ipgp.fr), (3) IMPMC-UPMC, Paris, France (francesca.piccoli@gmail.com), (4) Department of Earth & Planetary Sciences, Johns Hopkins University, Baltimore, USA (sver@jhu.edu)

Serpentinization is known to produce H₂-rich fluids favoring abiotic genesis of hydrocarbons, and is proposed by the DCO as one of the most important reactions that govern transformation and movement of carbon in Earth. These processes are well documented at low-pressure conditions in oceanic settings and in ophiolites on-land. The potential role of serpentinization for high-pressure abiotic genesis of hydrocarbons is, however, still barely known. Our recent study based on the record of high-pressure rocks from subduction zones (Vitale Brovarone et al., 2017) demonstrates that these processes happen in nature. However, natural evidence for such processes is still limited to local manifestations, and potential to produce significant fluxes of abiotic methane can be questioned.

In this contribution we present new data attesting large-scale generation of CH₄-bearing fluids related to serpentinite-rich environments. These results help improving our still limited understanding of the deep cycle of abiotic hydrocarbons, and indicate that deep serpentinization and high-pressure genesis of hydrocarbons can be a key process.