Seminars of geology

Department of Earth Sciences - Torino

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Wednesday 22 May 2024

4pm (Rome time) - Aula Pognante, *Dip. di Scienze della Terra, Torino*

Or via webex at this LINK

Serpentinization and life on Earth and possibly beyond

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Although it is unknown how it originated, it is widely accepted that life was already present during the Archean eon on Earth. First life used chemical energy, as opposed to sunlight used by photosynthesis as the dominant mode of primary production on Earth today. An absorbing scenario places the origin of life at submarine hydrothermal vents, sites typified by steep redox gradients favoring chemosynthetic primary production. But rather than the vents occurring along oceanic spreading centers with their acidic and sulfidic fluids, alkaline hydrothermal vents associated with lithosphere-hydrosphere interactions in mantle rocks have moved into the focus of the origin-of-life research community. During the serpentinization of peridotite, the synthesis of reduced organic compounds becomes energetically favorable, while abundant molecular hydrogen is produced at the same time. I will argue that the latter is the most likely geofuel (i.e., electron donor sustaining a metabolism) of the first metabolisms on Earth. Today's chemosynthesis-based ecosystems sustained by serpentinization, found at submarine hydrothermal vents and subaerial springs, are appealing analogs for life on an early Earth and other celestial bodies in our solar system.

The Speaker

Jörn Peckmann is Professor of Geology at the Department of Earth Sciences of the University of Hamburg since 2015. Jörn is an internationally leading scientist in the fields of geobiology, biosedimentology, mineral authigenesis and the geomicrobiology of ancient extreme environments. He obtained his Doctoral Degree in Geology at the University of Göttingen in 2000. He is particularly interested in ancient and modern microbialites, methane seep deposits, and hypersaline environments.