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Exploring the deepest roots of serpentinization, in subduction zones

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Serpentinization gathers scientists from a multitude of disciplines spanning geology, biology, planetary sciences, and environmental sciences. Rheology, natural H_2 and abiotic light hydrocarbon production, microbial incubation, and search for life on other planets are some of the key aspects that make serpentinization special. One of the beauties of serpentinization is its possibility to take place under a vast range of conditions, from very low-pressure and temperature to high-pressure and temperature conditions. Despite that, most of our knowledge on serpentinization is limited to the shallowest part of the serpentine stability field, which is well represented at mid-ocean ridges, in ophiolites, and in the shallow part of the forearc mantle of subduction zones. Although the extension of serpentinization to much greater depths at convergent margins has been the subject of geophysical investigations, the petrological and geochemical patterns of the deepest roots of this process remains little studied. In this contribution, I will present recent advances on the characterization of high-pressure, high-temperature serpentinization processes and their implications on deep energy production in subduction zones from multiple case studies and theoretical models.

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