Structural control of “dehydratites” deposition ?

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The name “dehydratites” have been created to distinguish the salts that are precipitating from hydrothermal processes from “evaporites” precipitated by evaporation. Dehydratites illustrates the water consumption by, for example, the reaction of serpentinization. Serpentinization used pure water from seawater, so, the residual fluid is a very concentrate brines. Recently, Debure et al (2019) have demonstrated by thermodynamic calculation that serpentinization could be an alternative process to evaporation and considering the volume involved, could contribute to the deposition of salt giants. These calculations were inspired by the ideas published by Hovland et al (2006, 2018) and Scribano et al. (2017). In these papers, other processes have been also evoked as the demixing of brines by production of supercritical waters in magmatic chambers.

Consequently, in structural domains where mantle rocks are exhumed, such as hyperextension in rifting margins, brines production and salt precipitation could be associated to serpentinization and hydrothermal processes. The period between hyperextension and the lithospheric break-up seems to be a very favorable context for the production of dehydratites. South Atlantic could be a very favorable place for studying this phenomenon. The volume of salt all along the margin is not homogeneous. Despite allochthonous ocean-ward salt motion, we observed thicker depositional salt above exhumed mantle than in proximal domain. Contemporaneous salt to the oldest oceanic crust could be observed on seismic lines.

Dehydratites could be an answer to the occurrence of salt in the distal part of a margin supposed to be, at least, several hundred meters deep. The significant quantity of water used for serpentinization could drop down the relative sea level in a closed basin. This relative low sea level allows also the intense evaporation in proximal domains of margins.

References

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