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Fluids in hyper-extended rifted margins: Examples from the paleomargins in the eastern Alps and west Pyrenees and present-day Iberia rifted continental margin.

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The evolution of deep-water rifted margins is intimately linked with complex and poly-phase fault structures. These structures known as detachment faults are responsible for extreme crustal thinning and mantle exhumation. During the evolution of detachment faults fluid-rock interaction play an important role, changing the chemical and physical properties of rocks with major implications for the strain localization and structural evolution of the margin. The change in rock chemistry and rheology is best indicated by the breakdown of feldspars and olivine into clays and serpentine minerals, and the pervasive cementation and precipitation of quartz within the fault rocks and veins along detachment faults.

Although the chemistry reaction is well known it is still unclear to what extent those reactions can lead to changes in the rheology of the lithosphere and how they can affect the thermal evolution of deep water, hyper-extended rifted margins. Another important question arise about the origin, timing, pathways and composition of these fluids. Are they mantle-derived fluids and/or of marine origin?

In this work we present preliminary results from fossil rift-related detachment faults exposed in the Alps and Pyrenees and discuss the role of fluids during lithospheric thinning. We compare the results obtained from these fossil rifted margins with those from the present-day Iberia rifted continental margin.