



How does continental crust thin in a young continental margin? Insights from Oman/Socotra conjugate margins in the eastern Gulf of Aden

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The discovery of hyper-thinned continental crust and exhumed mantle on continental margins has raised several key questions, such as how the crust thins until the breakup or what controls the locus of extreme crustal thinning, exhumation and final oceanic spreading. Reflection seismic lines (ENCENS-Sheba, Encens, Marges-Aden cruises) and seismological investigations (YOCMAL ANR project) across conjugate margins of the Oman/Socotra margins allow a detailed study of the crustal and sedimentary structure and a discussion on the structures and the age of the deformation. Structural analysis of new dataset enables mapping the area where the continental extension seems to be coupled to the mantle illustrating the exhumation phase. The crustal thinning is abrupt occurring mostly at the shoreline on both margins and shows along-margin variations. The thinning progressively migrates towards the locus of final breakup, which is interpreted by a progressive weakening of the mantle by lithospheric thinning and serpentization. Then, a stage of uplift and erosion is observed in the proximal margins after the thinning phase. Uplift is usually higher where crustal thinning is more important in the deep basin, which could be interpreted by the onset of small-scale convection driven by the lateral temperature gradients at the necking zone.