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## Extensional detachments related to extreme crustal thinning and their fate during contractional reactivation: the Le Danois-North Mauléon offshore-onshore examples in north Iberia

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Extensional detachment faults accommodate high degrees of crustal thinning and exhumation, shaping largely the final architecture of magma-poor rifted margins. Great efforts have been directed to study extensional detachments based on offshore seismic surveys and onshore field analogues. However, little is known about the breakaway of these structures as well as their role and evolution during rifting and subsequent contractional reactivation.

In this work, we use the Le Danois-Labourd offshore-onshore natural laboratory (northern Spain) to explore the features characterising major Mesozoic extensional detachment faults and their fate during subsequent Alpine contractional reactivation. Both sites keep evidence of Mesozoic extensional detachment faulting and high degrees of crustal thinning, including exhumed mid-crustal granulites reworked as clasts into Apto-Albian syn-rift sediments, and show mild Alpine reactivation, corresponding at present-day to structural highs. Relying on the interpretation of high quality 2D seismic reflection profiles offshore and on field-based cross-sections onshore, we describe and compare the former rift architecture associated with these major detachment faults and the distribution of contractional structures at the two sites.

This combined study enable us to evidence strong structural similarities between the two sites and to propose that the Le Danois and the North Mauléon extensional detachment systems are major rift structures within the North Iberian rift system. We propose that they were responsible for high degrees of crustal thinning and the exhumation of mid-crustal rocks during the Late Aptian to Albian N-S directed extension. Major thrusts truncated the two extensional detachments during subsequent Alpine reactivation, leading to the uplift and tilting of the Le Danois and the Labourd rift-inherited crustal blocks. We suggest that the location of the two blocks at the termination of offset/overlapped hyperextended rift segments allowed for their preservation as mildly inverted structural highs, including rift-related structures.