



The structure of basement highs at deep-water, hyper-extended rifted margins: the example of the Briançonnais domain in the Alps and present-day examples from the Atlantic and Indian oceans

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The increasing number of high quality refraction and reflection seismic surveys enables to image the crustal structure of hyperextended rift domains buried underneath thick sediments. Of particular interest are basement highs that lie oceanwards of the necking zones, referred to as “residual H Blocks” or “outer highs”. The fact that these blocks are often at deep-water and sealed by thick post-rift sediments makes the study of these highs difficult. As a consequence, only few have been drilled and at present it is not clear how and when these basement highs form and what is the thermal and isostatic evolution of these highs. That’s why we chose to study the Briançonnais domain in the Alps that may be considered as a field analogue of such a basement high and to compare it with examples from the Atlantic and Indian oceans.

A prerequisite to study the Briançonnais domain in the Alps is to understand the Alpine tectonic overprint. Numerous previous studies investigated the Alpine overprint of the Briançonnais domain during its emplacement in the Alpine orogen. However few studies investigated the pre-Alpine structures and the possible inter-relationship of inherited rift structures and Alpine structures? In our study we mapped Alpine and pre-Alpine structures and studied their relationship to the stratigraphic units. The first results show that the major Alpine structures in the Briançonnais domain reactivated mainly pre-Alpine rift-related structures. The structural evolution and the change in vergence across the Briançonnais domain are likely controlled by the crustal architecture of the former rifted margin. The stratigraphic architecture and its relation to basement structures within the Pre-Piemontais/Briançonnais domains suggest the abrupt juxtaposition of crustal domains of different crustal thickness with strong lateral changes of the top basement architecture. The results of these studies will enable to propose restorations of the Briançonnais domain in the Alps that can be compared to the structures imaged across basement highs at hyperextended domains along the Atlantic and Indian margins. This approach will enable to better define and understand the pre-Alpine 3D architecture of the Briançonnais in the Alps as well as to get insights on the structural and stratigraphic architecture of basement highs at present-day rifted margins.