



Extension above shallow crustal decollements at ultra-distal magma-poor rifted margins: role and nature of the decoupling layer

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Recent studies of ultra-distal, magma-poor rifted margins show that extension associated with mantle exhumation is more complex than previously proposed. The observation of intense tectonic deformation affecting both the sediments and the exhumed basement questions previous models implying one single detachment fault. The new observations suggest that ultra-distal domains result from polyphase out-of-sequence faulting. However, the factors controlling localization, locking and stepping of faults as well as the rooting levels of these faults remain unconstrained. In seismic sections from ultra-distal margins a reflective interface can be observed located approximately 1 sec (TWT) below the top of the exhumed basement. This reflective interface is well observed along the Australia-Antarctica margins and is also present along the distal Newfoundland margin. In these examples, faults can be seen either to detach onto this reflection, or this reflection can be exhumed in the footwall of detachment faults. These observations suggest that this reflection may have acted as a rooting layer of normal faults thus representing a major rheological interface. However, the nature of this interface is uncertain: does it represent a serpentinization front, a level of magmatic underplating or magma-infiltration, or a combination of the three? In our presentation, we discuss how and when this reflection may have been created relative to mantle exhumation and magma emplacement and how it interacts with detachment faults and normal faults. Particular attention will be paid to the interaction with magmatic supply as it appears that this interface could represent a boundary where melt can be trapped. Further, we will compare our observations with those made at ultra-slow spreading ridges and ophiolites. We also propose a model in which this interface may control the mode of extension observed at ultra-distal, exhumed mantle domains.