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Weak zones on volcanic passive margins of Norway. An integrated numerical and analogue modelling approach

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The geometry, segmentation, and a number of sub-basins of the Norwegian margin are controlled by the presence of discontinuities in the lower crust and mantle, that resulted from Caledonian tectonic history. According to their angle of obliquity, various configurations of rifting and/or strain partitioning can develop.

Three D numerical model are developed to study the relation between weak zone and maximum crustal thinning, and implications for rift (a)symmetry.

Analogue models constructed using 4 layers of alternating sand and silicone putties representing the brittle and ductile layers of the crust and mantle respectively. Zones of low resistance are simulated by low-viscosity silicone putty.

Expression of the deformation depends on the depth of the low viscosity bodies. Where discontinuities are located in the mantle, the response of the crust depends on coupling between the mantle and the upper brittle crust through the ductile lower crust. “Lower crust” emplacement locally decreases the ductile strength, of this layer, and modifies the coupling between the “brittle crust” and the high strength “mantle”.