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Bottom up, the North Sea Central Graben in light of crustal structure and tectonic history

Jeroen Smit (1), Manfred Lafosse (1), Jan-Diederik van Wees (2,1)

(1) Utrecht, Earth Sciences, tectonics and structural geoloy groups, Utrecht, Netherlands (j.h.w.smit@uu.nl), (2) TNO Utrecht, the Netherlands

The North Sea Central Graben was long regarded as a classic symmetrical rift basin that initiated during regional Permo-Triassic extension. Since then, a wealth of data has shed new light on the deep crustal structure and geodynamic history. The deep structure for instance was imaged by seismic profiles (MONA-LISA) that show how the Central Graben coincides with the edge of the Baltica craton. Recently published revised models for the crustal structure of the North Sea and for the formation of the long-lived structural grain shed new light on the formation of the North Sea Central Graben.
The Central Graben appears to be strongly controlled by both its inherited Caledonian crustal structure and early Variscan extension. The Central Graben reactivated an older Variscan structure that formed as a sinistral shear zone during the Dinantian supra-subduction extension of the Avalonian micro-plate. This structure accommodated by a lateral shear the transition between distributed and localised extension to its west and east, respectively. The new reconstruction emphasises the direct genetic link between structures associated with the Variscan initiation of the Central Graben and the subsequent Mesozoic – Paleogene formation and evolution of the fault network and sedimentary basins. We currently investigate the consequence of this direct genetic link for the later development of the Central Graben.