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Evolution of the Triassic in the Northern North Sea

Current exploration trends within the mature Northern North Sea hydrocarbon province are now moving away from the Jurassic systems towards deeper but poorly understood Triassic reservoirs. Finds in fields such as Snorre and Alwyn North indicate that Triassic-aged reservoirs have the potential to produce substantial amounts of hydrocarbons. A detailed understanding of the structural evolution of this Triassic system is needed for the evaluation of Triassic hydrocarbon potential. Published models for the structural evolution of the Triassic in the Northern North Sea suggest that it was a precursor to the Late Jurassic rift event, with the same faults having controlled sedimentary thicknesses, dispersal patterns and facies during the older event. This would imply that the structural arrangement of the Triassic was close to that which is seen at the present-day: a symmetrical rift system as a precursor to the North Viking Graben.

However, the use of extensive three-dimensional seismic data coverage and well information demonstrates an entirely different pattern of extensional faulting governed Triassic deposition. Restoration for the effects of Late Jurassic rifting and interpretation of the Triassic at several levels indicates that the structural regime within the Triassic was asymmetric, deepening to the east. It was dominated by a series of north-south trending basement highs, bounded by predominantly westward-downthrowing normal faults, forming depocentres which show facies patterns analogous to those of the modern arid East African Rift basins. These basement highs split the system into two asymmetric areas of distinct sediment provenance; the west sourced from northwest Scotland and the east sourced from western Norway.