Session: Tectonics and sedimentation

Tectonosedimentary variations from Permian to Triassic in the southeastern part of the Central Graben of the Norwegian continental shelf.

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The aim of this study is to explain the differences in distribution, geometry and sedimentological variations of the Triassic Smith Bank and Skagerrak formations with the Permian Rotliegend Group across the Central North Sea on the Norwegian Continental Shelf.

Two fault families interpreted from seismic data show contrasting influence on the thickness variation of the Rotliegend Group deposits and the salt tectonic activity, which ultimately affect the development of minibasins, in which the Triassic sequences were deposited. NW-SE-striking faults in the west were active after the deposition of the Rotliegend Group and did not affect the minibasin geometry. On the other hand, the Hummer fault zone, a NNW-SSE-striking fault located in the eastern part, was coeval with Permian deposition and played a major role creating accommodation space and affecting the geometry of the salt. The shift in fault strike in the eastern sector imprints a change in the shape of the Triassic minibasins, suggesting a tectonic control on sedimentation.

Well log and core data from six wells show significant continental facies variations between the upper Permian and the Triassic in the study area. The Rotliegend Group consists of coarse material and rather uniform sequences, with little evidence of lacustrine deposits and a high gamma-ray marker at the top belonging to the Kupferschiefer Formation, observed in all the wells. Differently, Triassic deposition was restricted to minibasins, making regional correlations challenging. The lithology of the Smith Bank and Skagerrak formations in the cores is mainly fine sandstone to siltstone, but occasionally also conglomerate. The material is interpreted to represent fluvial to lacustrine environments. In addition to seismic, micro faults are observed in sandstone from core samples within the upper Rotliegend Group in the SW. They probably formed shortly after deposition and could represent a mesoscale example of faulting involving upper Permian deposits.

Further analysis from core samples will be completed to understand microscopic variations and provenance. Our preliminary conclusion is that, generally, the upper Permian was more tectonically quiescent and that Triassic minibasins were controlled and shaped locally by salt tectonic activity in low energy conditions.

Poster presentation

Key words: Triassic, Permian, Central Graben, Rotliegend