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Salt diapir evolution in the German North Sea sector (CORTEC)

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The CORTEC project "Towards a correlation of basement structures and sedimentary basin tectonics" is focused on the geological evolution of the German North Sea sector. CORTEC is part of the priority program SPP 1135 (Dynamics of sedimentary systems under varying stress regimes: The example of the Central European Basin System), which is funded by the DFG - Deutsche Forschungsgemeinschaft.

In this study, we inspected ship-borne high quality reflection seismic data, acquired by TGS NOPEC, Norway in the German North Sea Sector. The seismic sections have a total length of about 3500 km and a record time of 5 sec TWT (two way traveltime). We applied a 2D post-stack depth migration to the lines using TGS NOPEC's original migration velocities. Well data have been used to correlate seismic unconformities and geological and lithological units. In addition, thickness maps of sedimentary units including the Zechstein salt horizons have been created and analyzed.

Enormous deposits of Permian salt sediments (Zechstein series) with a total thickness up to 3500 m provide the basis for salt tectonics in the area of investigation. Sediments in the vicinity of salt diapirs and the salt-sediment interface have been closely inspected with respect to the formation of the complex salt structures. We can identify fault movement by increased sedimentary thickness across the faults. In addition, increased sedimentation in the close vicinity of salt structures can be observed. Lateral moved salt jags, sedimentary wedges and downlaps indicate downbuilding between Late Triassic and Late Jurassic. Toplaps, erosional surfaces and different sediment thickness between the top of salt structures and the surrounding indicate salt diapir growth again beginning in the Cretaceous.

Therefore, the rate of salt structure evolution is not continuous. The evolution pro-

cess rather occurred in phases, which may be related to major tectonic events such as the Triassic extension, the Keuper extension and the Mesozoic/Cenocoic inversion of the North Sea. Therefore, we assume that major tectonic events triggered and highly influenced the salt structure evolution.

The form of the salt structures itself seems to be related to the primordial salt thickness. In areas with increased sedimentary salt thickness diapirs and walls prevail whereas small salt structures are a common feature in areas with a lower salt thickness.