Cenozoic salt remobilization at the Baltic Sea sector of the northeastern North German Basin margin

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In the scope of the “StrucFlow” project, we study salt tectonics at the salt-floored northeastern North German Basin margin, which is part of the Central European Basin System. Salt pillows are located in the Bays of Kiel and Mecklenburg, in the SW Baltic Sea, east of the Glückstadt Graben and west of the Tornquist-Teisseyre Zone. Salt pillow growth initiated in the Late Triassic and rejuvenated in Late Cretaceous to Tertiary times. We combine offshore and nearby onshore wells, shallow seismic surveys and high-resolution seismic sections from the BalTec data to derive a detailed seismo-stratigraphic correlation of Cenozoic units. This allows a more precise analysis of Cenozoic salt movement in the transition zone between the Glückstadt Graben and Tornquist Zone. We present key profiles and time-isochore maps revealing new insights into salt pillow evolution at the northeastern North German Basin margin and discuss active phases of salt movement in the context of the regional tectonic framework.

We associate the Late Cretaceous phase of salt pillow growth with far-field effects of the Africa-Iberia-Europe convergence and the consequent Pyrenean orogeny. The resulting change from extensional to compressional intraplate stress caused graben inversion and thrust faulting in northern Europe. However, Early Cenozoic successions reveal no indications for ongoing salt movement and suggest a phase of salt tectonic quiescence. Within the Eocene, salt was remobilized at the Baltic Sea sector of the North German Basin, leading to renewed salt pillow growth and erosion above pillow crests. We propose that this phase of salt remobilization is controlled by the coeval initiation of the European Cenozoic Rift System, between the rising Alps in the south and the opening North Atlantic Ocean in the northwest. Faulting within Quaternary deposits above a salt wall in the Bay of Kiel could indicate continuous salt movement and was possibly amplified by glacial isostatic adjustment.