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Basin evolution of the northern part of the Northeast German Basin - insights from a 3D structural model

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A 3D structural model for the entire southwestern Baltic Sea and the adjacent onshore areas was created with the purpose to analyze the structural framework and the sediment distribution in the area. The model considers six post-Rotliegend successions: The Upper Permian Zechstein; Lower Triassic; Middle Triassic; Upper Triassic - Jurassic; Cretaceous and Cenozoic. This structural model was the basis for a 3D backstripping approach, considering salt flow as a consequence of spatially changing overburden load distribution, isostatic rebound and sedimentary compaction for each backstripping step in order to reconstruct the subsidence history in the region. This method allows determining of the amount of tectonic subsidence or uplifting as a consequence of the regional stress field acting on the basin and was followed by a correlation with periods of active salt movement. In general, the successions above the highly deformed Zechstein evaporites thicken towards the Glueckstadt Graben and they experienced the highest amount of tectonic subsidence during the Mesozoic and Cenozoic. Two periods of accelerating salt movement in the area has been correlated with the E-W directed extension during the Late Triassic - Early Jurassic and later by the Late Cretaceous - Early Cenozoic inversion, suggesting that the regional stress field plays a key role in halokinesis. The final part of this work dealt with a neotectonic forward modeling in an attempt to predict the future topography when the system is in a tectonic equilibrium. The result reveals that many of the salt structures in the region are still active and that future coastline will run with a WNW-ESE trend, arguing that the compressional stresses related to the Alpine collision are the dominant factor in the present day landscape evolution.This study was carried out in the frame of the DFG Special Research Project 1135.