



Permian to recent structural evolution of the North German Basin margin – insights from high-resolution reflection seismic data.

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In the course of RV MARIA S. MERIAN expedition MSM52 (BalTec) in March 2016 we imaged the Paleozoic to recent tectonic and sedimentary evolution of the North German Basin margin with unique vertical resolution. The equipment consisted of 8 GI-Guns as a source array and a digital seismic streamer of 2700 m active length. Past seismic experiments in the research area primarily targeted deep crustal structures and the Moho, or they elucidated the Post-Permian strata only. With the BalTec data we close the gap between these data sets in terms of both seismic resolution and depth penetration. Due to the shallow water of a few 10 m strong sea-floor multiples mask all primary reflections. A τ -p domain based multiple attenuation processing sequence allows us gapless imaging of the subsurface from the seafloor down to the base of the Zechstein salt.

In this study we present a profile from the Bay of Mecklenburg to western Pomeranian Bay, representing a geological image running from the basin center across the margin onto the Baltic shield. Emphasis rests upon the stratigraphic development in combination with deformation along the West Pomeranian fault system.

Initial Early Permian to Middle Triassic basin subsidence lead to the deposition of thick Zechstein salt and overlying mostly uniform Lower to Middle Triassic sequences. E-W extension in the basin center changed the regional setting to compressional at the margin. This triggered major salt flow and faulting at the Werre and Prerow system in the Grimmen High area, SW of Rügen island. Lateral shifts in the depocenter allow tracking the direction of salt movement, both in the center and at the basin margin. Tectonic deformation in combination with halokinesis created accommodation space SW of the Agricola fault system forming an Upper Triassic depression. Jurassic North Sea doming interrupted the sedimentation and the accompanying uplift caused erosion. Deposition resumed during the Cretaceous until Late Cretaceous inversion resulted in renewed uplift of the Grimmen High and entire basin. Glacial deformation and sedimentation overprinted the Cenozoic strata. Indications of recent tectonic activity are visible.