Influence of Basement Fault Zones and Basin Inversion on Salt Tectonics – Examples from the Mesozoic Mid-Polish Trough

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Development of salt structures within intracontinental basins is often triggered by thick-skinned faulting of the subsalt basement. During basin extension and subsidence salt pillows start to grow above major basement normal fault zones due to combined effect of basement faulting and differential sedimentation of the supra-salt cover. During later stages of continued extension salt diapirs form, that might extrude onto the basin floor forming salt glaciers. Apart from salt structures formed above basement fault zones also peripheral salt-related structures located at significant distance from the basin centre and detached above salt could form due to mechanical decoupling between sub-salt basement and supra-salt cover. Basin inversion, triggered by regional compressional stresses, could also led to reactivation of salt structures. Compressed salt diapirs enter next phase of growth, their salt wings formed due to salt extrusion could act as detachments and focus development of salt-cored faults.

The Permian to Cretaceous Mid-Polish Trough (MPT) evolved above the Tornquist–Teisseyre Zone (TTZ) – crustalscale boundary between the Precambrian and the Palaeozoic Europe, and was filled with several kilometers of sediments including thick Zechstein salts at its base. Extension along the TTZ resulted in development of complex system of salt structures, which in Late Triassic culminated in diapirism and salt extrusion onto the basin floor. Within both basin flanks peripheral syn-sedimentary grabens detached above Zechstein salt evolved. Jurassic subsidence was connected to relatively minor salt movements, next major phase of salt movements was caused by the Late Cretaceous inversion. Active growth of salt structures resulted in very complex sedimentary pattern in their immediate vicinity. Delamination and folding of the supra-salt sedimentary cover facilitated development of salt wings. Some of salt structures have been subjected to asymmetric thrusting, possibly enhanced by gravitational gliding.