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Extension, Inversion, Strike-Slip Movements and Syn-Tectonic Sedimentation within the Miocene Carpathian Foredeep (SE Poland) - 3D Seismic Imaging of Complex Tectonosedimentary System

Miocene Carpathian Foredeep basin (CFb) developed in front of the Carpathian orogenic wedge, at the junction area between the East European (Precambrian) and Palaeozoic Platforms. Its development was to a large degree controlled by structure of the foreland plate, especially by reactivated NW-SE trending basement faults related to Mesozoic history of the Mid-Polish Trough. Numerous gas fields of biogenic origin have been discovered within the CFb infill. Various genetically linked extensional and compressional features are present both within the basement as well as sedimentary infill of the E CFb. Systems of normal faults of total offset in range of 2.5km dominate in the most eastern part of the basin, that are associated with subduction and flexural extension of the foreland plate beneath the Carpathians. Within the hangingwall, compressional deformations (hangingwall - vergent backthrusts) related to slight inversion of basement extensional system caused by Carpathian collision formed. Towards the NW extensional features are replaced by strike-slip related basement pop-up structures. Basement wrenching resulted from the Miocene reactivation of inherited Mesozoic fault zones, obliquely oriented in respect to the advancing Carpathians. Localised basement uplift led to formation of complex fault zones within the Miocene sedimentary infill. Such a linked extensional - compressional tectonic activity resulted in development of numerous hydrocarbon traps controlled by basement structures present within the Miocene sedimentary infill. 3D seismic data enabled to map spatial distribution of fault populations, and to precisely define fault overlap zones possibly related to syn-tectonic sedimentation.