

**Paleozoic to Miocene Intra-Plate Tectonics and Basin Inversion Along the Teisseyre-Tornquist Zone in Poland and Its Bearing on Hydrocarbon Potential: A Synthesis**

Krzywiec, Piotr<sup>1</sup> (1) Polish Geological Institute, Warsaw, Poland.

The Teisseyre - Tornquist Zone (TTZ) separates East European Craton from the Palaeozoic Platform and could be regarded as one of the most important crustal-scale boundaries in the whole continental Europe. During Palaeozoic to Cenozoic times, this zone controlled development and inversion of sedimentary basins in Poland. Various tectonic structures, formed during several phases of activity of this fault zone and recently reinterpreted using seismic data, could be regarded as one of the best documented multi-phase intra-plate deformation zones in Europe. Lower Paleozoic sedimentary cover that includes thick Silurian succession of primary importance for emerging new shale gas plays in Poland reflects transition from passive margin setting to distal foredeep basin located in front of the Caledonide orogen. Devonian - Carboniferous sedimentary cover that hosts numerous oil and gas fields has been finally shaped by Late Carboniferous inversion tectonics triggered by compressional stresses transferred into the foreland plate of the Variscan orogen. Various structures formed during this tectonic phase point to mechanical decoupling caused by Silurian shales and intra-Devonian evaporites, and strike-slip movements along the TTZ. Ensuing Permian - Mesozoic deposition was related to development of the next sedimentary basin located above the TTZ. Numerous oil and gas fields are related to Rotliegend clastics and Zechstein carbonates formed within this basin. Permian depositional pattern was to a large degree controlled by deeper fault zones. In Late Cretaceous - Paleogene the TTZ was again reactivated in compressional stress field caused by the Carpathian collision, and this led to the next phase of intra-plate inversion tectonics. Inversion tectonics within the central and NW parts of the TTZ was associated with basin-scale salt tectonics. Late Cretaceous - Paleogene inversion was also accompanied by a complex strike-slip movements. In Miocene, during final phases of continental collision within the Outer Carpathians, Carpathian foredeep formed, located partly above the SE segment of the TTZ. Flexural extension of the continental plate combined with compressional stresses transferred into the foreland plate from the collision zone resulted in next phase of reactivation of TTZ faults, including large-scale normal faulting, reverse faulting and strike-slip movements. During this phase, numerous traps for the Miocene biogenic gas fields have been formed.