

## **Testing the Doctrine with Structural Analysis: A New Fault-Framework in the Western Getic Basin of Romania**

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Oil and gas activity in Romania's Carpathian foreland and fold-belt has largely concentrated on Miocene and Palaeogene plays. Romania's onshore blocks are mature, showing flat creaming curves and focus has shifted offshore to the Black Sea in the search for new potential. The recent Burdigalian (Lower Miocene) Totea gas discovery has renewed exploration interest onshore.

The Ticleni Field, located in the Western Getic has produced over 900 mmbbls oil from Burdigalian clastic reservoirs. Similar to structures further east, Ticleni has been interpreted as a thin-skinned thrust-anticline associated with the Peri-Carpathian frontal thrust that marks the separation between the Getic Basin to the North and Moesian Platform to the South. Section balancing showed that a thin-skinned interpretation was unviable. Forward modelling and analysis of Lower- and Mid-Miocene growth strata demonstrated that Ticleni formed by thick-skinned inversion. The notion that pre-Lower Miocene the Peri-Carpathian fault was extensional/transensional was further supported by 901-Ticleni well data that showed Cretaceous units to the north (in the down-thrown block) were of deeper water origin than those to the south (up-thrown block). The new fault framework was extended to check compatibility with other structures in the basin. Targu-Jiu lies 15km to the north of Ticleni and is imaged by 3D seismic reflection data. Oligocene and Lower Miocene units form a sedimentary wedge with a 5 degree taper, thinning to the South. Critical wedge mechanics states that thrusts should develop a southerly vergence but dip domain analysis revealed Targu-Jiu initially grew counter-regionally, to the North. We explain this as a function of the buttressing effects of the initially extensional Peri-Carpathian fault.

This new structural scenario has significant implications to many key hydrocarbon criteria including; burial history, expulsion and migration timing, reservoir quality (porosity and provenance) and trap integrity. Generation of structurally rigorous interpretations and a clear understanding of the basin's tectonic history is vital for further successful exploration.