

Identification of petroleum systems in a complex geological framework, Moesian Platform and the Getic Basin, Romania

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A complex geological evolution generates complex petroleum systems. This is clearly demonstrated by the contact zone between the Moesian Platform and the Getic Basin, Romania. The two tectonic units have sedimentary formations endowed with moderate to rich source rocks which have generated different types of hydrocarbons being subjected to the same Tertiary tectonic events. Assignment of these hydrocarbons to one specific petroleum system has not succeeded in all cases beyond doubt.

The Getic Basin represents the post-Early Miocene foreland of the South Carpathians. This late foreland basin overrides an earlier, i.e. Late Cretaceous to Early Miocene basin evolution dominated by strike-slip deformations. Sediments of the Getic Basin were inverted and locally detached from their basement and thrust over Moesia during the Mid Miocene.

In the Getic basin and on the Moesian platform, hydrocarbons were discovered generated by source rocks with maturities covering the entire oil and gas window, from biogenic gas to dry gas generated in the last transformation stages of kerogen. Drilling hundreds of wells over a time span of more than 100 years led to the identification of generating sequences deposited during several geological epochs in our study area. Source rocks deposited on Moesia are represented by Ordovician to Upper Carboniferous black shales and bituminous limestones (Tandarei Fm., Vlasin Fm., Calarasi Fm.), Dogger (Bathonian) shales (Bals Fm.) and Mid Miocene marls and shales (Badenian to Sarmatian). Different source rocks are present in the Getic Basin formed by Late Cretaceous, Oligocene and Mid Miocene (Badenian and Sarmatian) shales.

Source rocks from all these sequences are being analyzed in detail along with oil and gas samples in an attempt to establish the potential for hydrocarbon generation and the source to oil/gas families. The presence of typical Tertiary biomarkers along with diamondoids reflects a mixture of oils with different maturities. This still generates discussion about the source of the high maturity diamondoid-bearing oil. Basin modeling for Moesian localities suggest a Paleozoic source but processes like re-migration due to thrusting of the Getic Basin over the Moesian platform and contamination by Tertiary carrier beds and reservoirs complicate a reliable interpretation. Overall, the characteristics of the source rocks and the hydrocarbon accumulations suggest the presence of more than one petroleum system. This presentation introduces the geological setting with details about the source rocks and HC-discoveries and sets the stage for the two following presentations with new geochemical data.