

Lithology and hydrocarbon potential of Lower Oligocene successions in the Alpine Foreland Basin: Model for source rocks in the Paratethys?

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The Lower Oligocene succession in the Paratethys contains many important petroleum source rocks including the Menilite Formation in the Carpathian Foreland (Central Paratethys) and the Maykop Formation in the Eastern Paratethys. In our contribution we present results from a study of the organic-rich, Lower Oligocene deep-water succession in the Alpine Foreland Basin (AFB), based on core analysis, well logs and 3D seismic data. It is shown that the architecture of the Lower Oligocene succession and its source potential are mainly controlled by basin-wide processes. Thus, the Lower Oligocene of the AFB may serve as a model for source rock deposition in the entire Paratethys.

The Lower Oligocene succession in the AFB is about 60 m thick and comprises from bottom to top Schöneck, Dynow, and Eggerding formations. Log patterns, which can be traced over more than 150 km in a W-E direction, emphasize the high lateral continuity of the succession. In contrast, there is a significant vertical variation of both, lithology and source potential. TOC contents in the Lower Oligocene strata vary from 1.5 to more than 10.0 % and HI values ranging from 350 to 600 mgHC/gTOC. Whereas relatively low TOC contents occur in bright marls deposited during NP 23 (Solenovian event), the best source rock potential exists in shales underlying these marls (unit c of the Schöneck Formation).

Major mass movements occurred during the late stages of deposition of the Eggerding Formation at the northern slope of the basin and locally removed the entire Lower Oligocene succession. The eroded material became redeposited at the basin floor, in the area of the present-day oil kitchen. Thus redeposition increased the hydrocarbon potential of the basin!

Investigations in the western Black Sea area (offshore Bulgaria) show that at least the Solenovian event had a similar effect on source rock quality compared to that in the AFB.