

Facies and sedimentation of the Menilite Formation (Lower Oligocene), Skole Nappe, Polish Outer Carpathians

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The Menilite Formation (MF) is a very specific and economically important lithostratigraphic unit of the Outer Carpathians. It is composed of black and brown shale, chert, marl, diatomite, sandstone, breccia and conglomerate occurring in variable proportions. The deposits are both good source rocks and reservoir rocks for hydrocarbons. In the Polish Carpathians, the MF occurs mainly in the outer nappes (Dukla, Silesian, Sub-Silesian and Skole). The deposits show variable sedimentary features making their origin controversial. Clastic deposits of the MF have many specific features not common or rare in other parts of the flysch succession in the Polish Outer Carpathians.

Processes and conditions of sedimentation of the MF deposits and their relationship to the conditions of sedimentation dominant in flysch of the Polish Carpathians have not been precisely explained, yet.

The flysch of the Polish Outer Carpathians is generally considered as deep-water deposit. In contrast, the MF deposits of a marginal part of the Skole Nappe, being the outermost nappe of the Polish Outer Carpathians, are interpreted by some authors as basin slope and shelf deposits. Structures corresponding to hummocky cross-stratification, wave-ripple lamination and wavy to lenticular bedding are indicated to evidence such origination (Jankowski & Probulski, 2011). Anyway, such sedimentary structures can also be developed by hyperpycnal flows. Furthermore, in some parts of the Skole Nappe, diatomite occurs within the MF. It suggests sedimentation in very shallow water (Kotlarczyk & Leśniak, 1990).

Similar deposits were described in Romania. Sedimentation of the MF deposits from the inner part of Tarcău Nappe was interpreted there to have occurred during deepening of the basin (Puglisi et al. 2006). These from marginal part of the flysch zone were considered there as resulting from sedimentation by hyperpycnal flows formed in delta systems during catastrophic flood events (Miclăuș et al., 2009).

The author is currently investigating the MF deposits in several sections located in the south-eastern part of the Skole Nappe in the Polish Outer Carpathians (Fig.1).

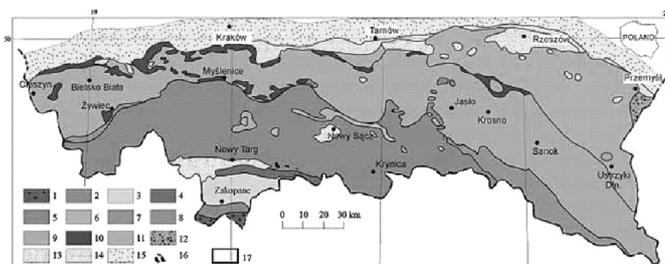


Fig. 1.: Geological sketch – map of the Polish Outer Carpathians with the study area (grey circle, to the right)

The unit is built there of thin-bedded black and brown shale, chert and marl and thin- to thick-bedded, mainly massive sandstone. Some parts of the succession are built of heteroliths displaying wavy and lenticular bedding. Some thick sandstone beds show plane-parallel lamination and ripple cross-lamination in their top parts.

The preliminary data suggest that the thick-bedded sandstones are mass-gravity flow deposits, laid down mainly by high-density turbidity currents, whereas the wavy and lenticularly bedded heterolithic deposits are hyperpycnites. Location of the study area in the inner part of the nappe, together with the thick-bedded mass-gravity flow sandstone, suggest deep-water sedimentation of the entire succession. Occurrence of hyperpycnites implies location of the area in the reach of a big river mouth. Further investigations should significantly improve the interpretations concerning both the sedimentary processes and the nature of depositional system.

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