

Paper Number: 1345

Unconventional potential of the Lower Paleozoic strata in the Podlasie Basin (eastern Poland)

Kosakowski, P., Papiernik, B., Wróbel, M., Zakrzewski, A., and Górecki, W.

AGH-University of Science and Technology, al. Mickiewicza 30, 30-059 Kraków, Poland; kosak@agh.edu.pl

Poland is undoubtedly a front runner for unconventional gas exploration projects in Europe and



potentially a centre of future shale gas development in the region [1]. Poland's potential shale gas reserves are extensive, stretching along a belt from the northern coastal area called Baltic Basin, eastwards through Podlasie Basin and towards south-east to Lublin Basin. The Podlasie and Lublin basins, are the one of the less recognition of unconventional basins. They are part of a system basins developed on the western edge of the East European Craton. This basins has developed in the area of overlap between the Trans-European Suture Zone (TESZ) [2]. In the Lublin-Podlasie Basin, the main horizons for unconventional hydrocarbons are the Llandovery and Wenlockian claystones and siltstones [3]. They generally reveal fair to good source rock potential [4]. The measured organic

carbon reaches up to 16.1 wt.%, with median of 0.8 wt.%. Similarly, the high variability is observed in the hydrocarbons content. Type-II kerogen is present. The organic matter was deposited in

Figure 1: Location maps of the Polish unconventional basins [1]

anoxic and sub-oxic conditions. The thermal maturity of the Llandovery and Wenlockian strata, determined on Rock-Eval T_{max} and "vitrinite" reflectance data R_o , shown that the maturity of organic matter is in whole range of "oil window", from initial to late phase, with local entry to "gas window" phase. Generally, the maturity increases in south-west direction, to edge of TESZ. The numerical modelling of generation and expulsion of hydrocarbons within the Lower Silurian strata revealed that the source horizons reached the complete generation interval from early to late stage. The degree of the transformation of organic matter is diversified, and increase in a south-west direction as a thermal maturity. The preliminary assessment of the modelling results has allowed us to claim that with positive geochemical indices of the gas productivity (e.g. TOC), potentially productive series reveal moderately favourable prospection properties. Also the small amount of modern input data available at the stage of the paper preparation makes it difficult for us to make an equivocal, statistically significant assessment of the productivity of the Lower Silurian shale gas system in the Lublin-Podlasie basins. The

modelling results for each of the basins should be regarded as preliminary methodological solutions, that allow for careful evaluation of the parameters determining the occurrence of sweet spots.

References:

- [1] Dittrick P (2011) Oil & Gas Journal Online, <http://www.ogj.com>
- [2] Poprawa P and Paczeńska J (2002) Przegląd Geologiczny 50:49-63
- [3] Kiersnowski H and Dyrka I (2007) Przegląd Geologiczny 61:354-373
- [4] Poprawa P (2010) Przegląd Geologiczny 58:226-249