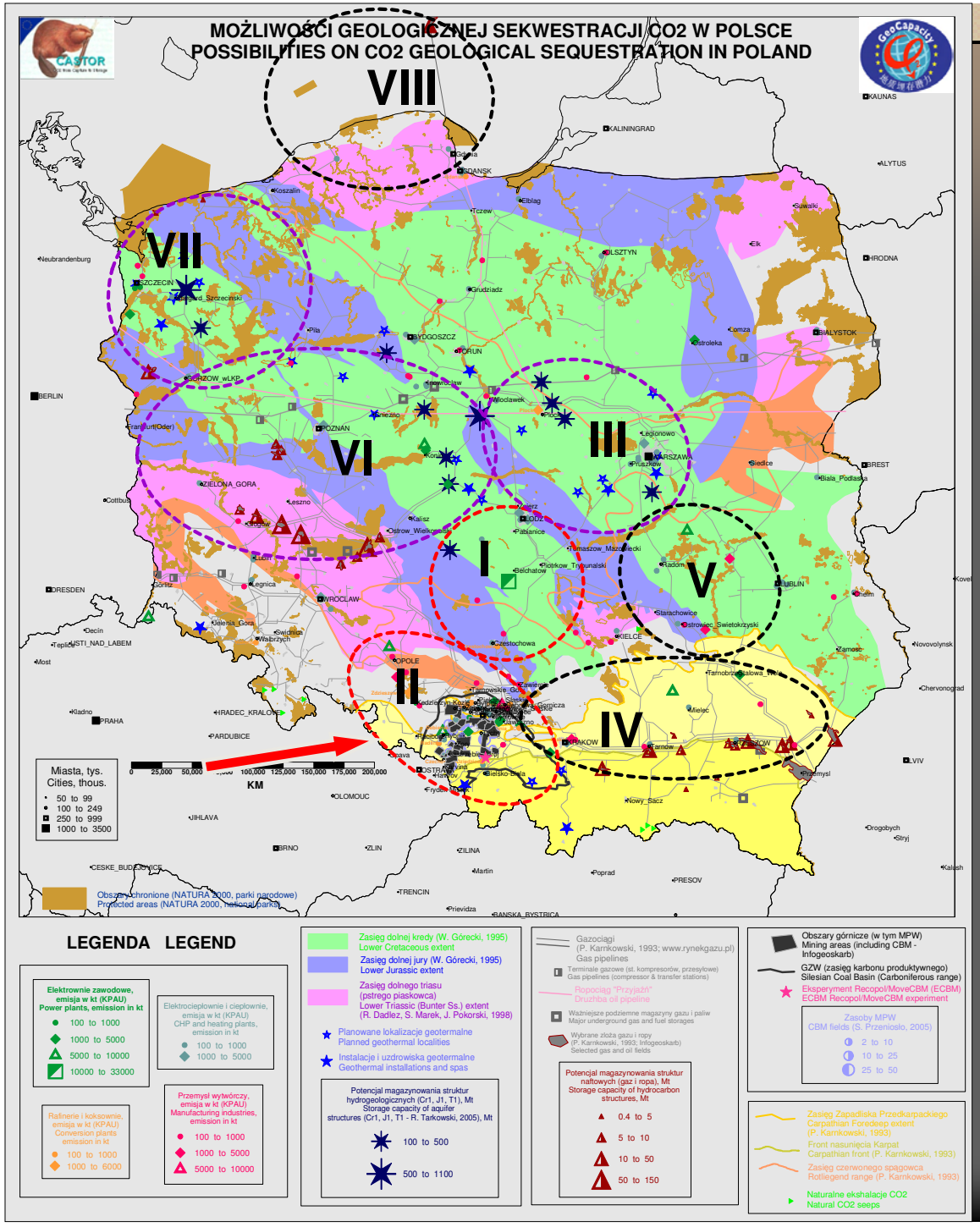
[1] Polish Geological Institute National Research Institute Upper Silesian Branch
[2] Central Mining Institute Katowice

Janusz Jureczka [1], Włodzimierz Krieger [1], Jarosław Chećko [2]

Preliminary characterization of perspective CO_2 storage with enhanced coal bed methane recovery in the Upper Silesian Coal Basin (Poland)



Area II – USCB

Polish Geological Institute
National Research Institute
Upper Silesian Branch in Sosnowie

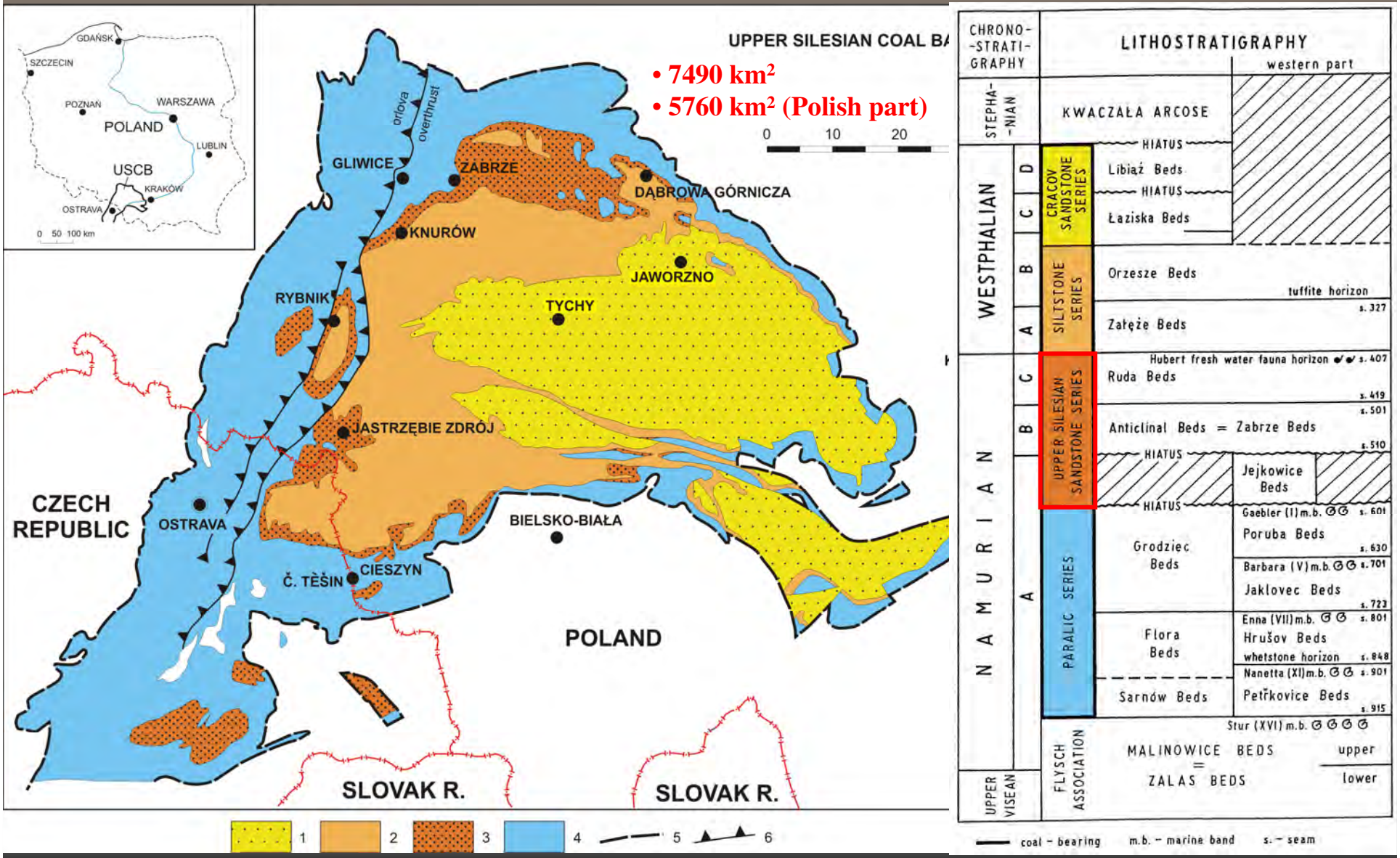
Central Mining Institute
in Katowice

AGH University of Science
And Technology in Krakow

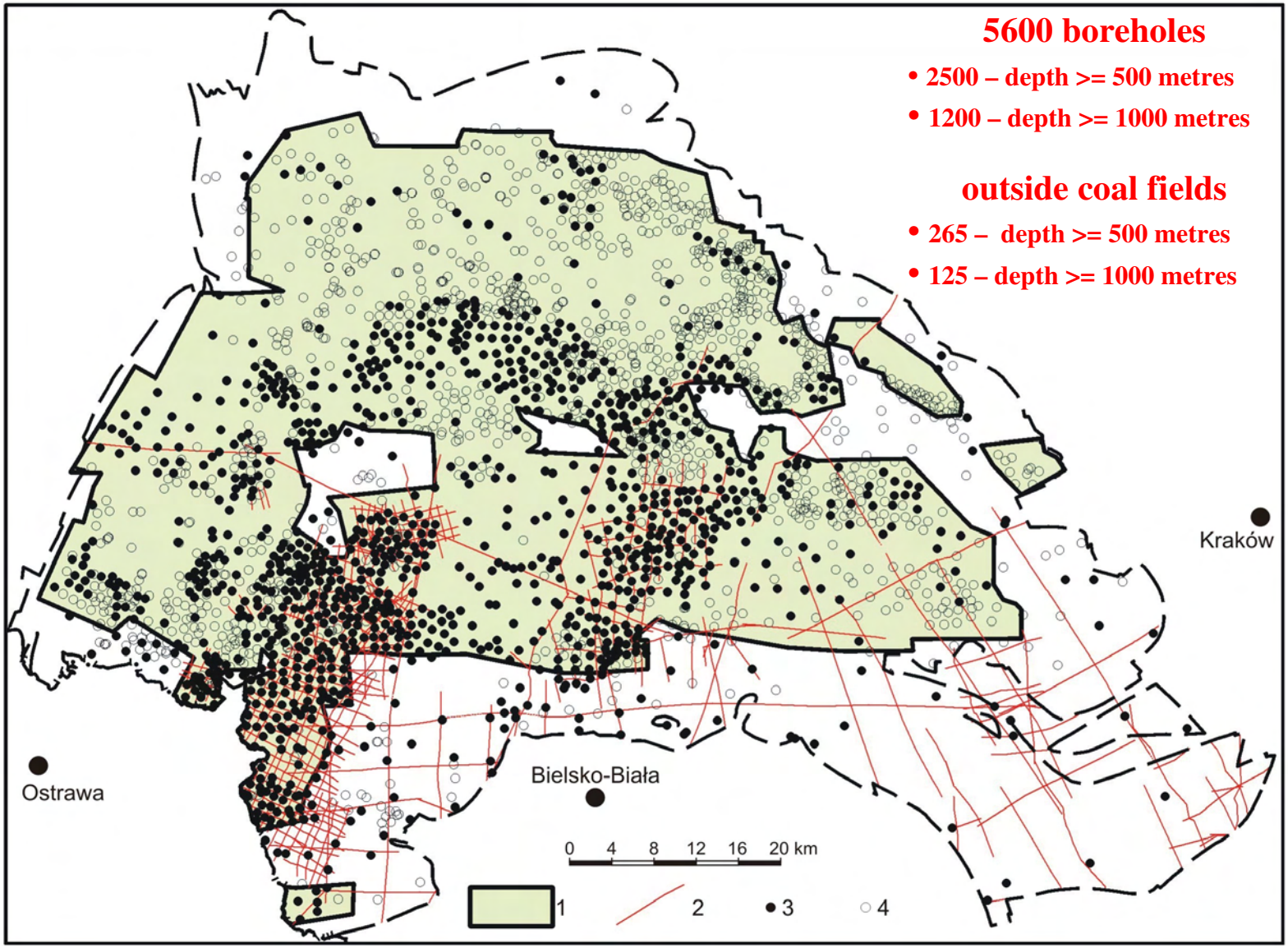
PBG Geophysical
Exploration Ltd.
in Warsaw

source: skladowanie.pgi.gov.pl

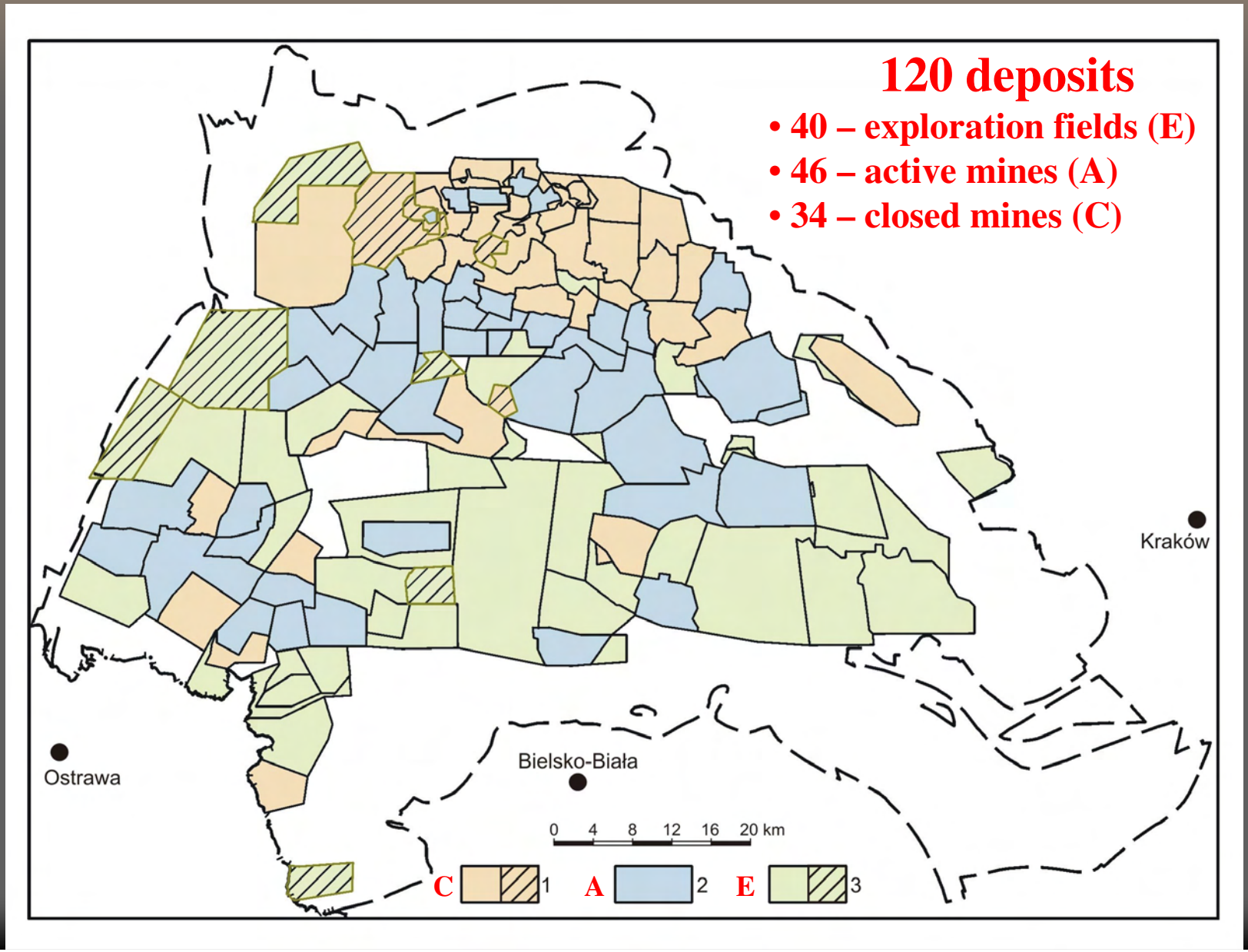
Geological sketch map of the USCB



Geological and mining exploration of USCB



USCB – hard coal deposits



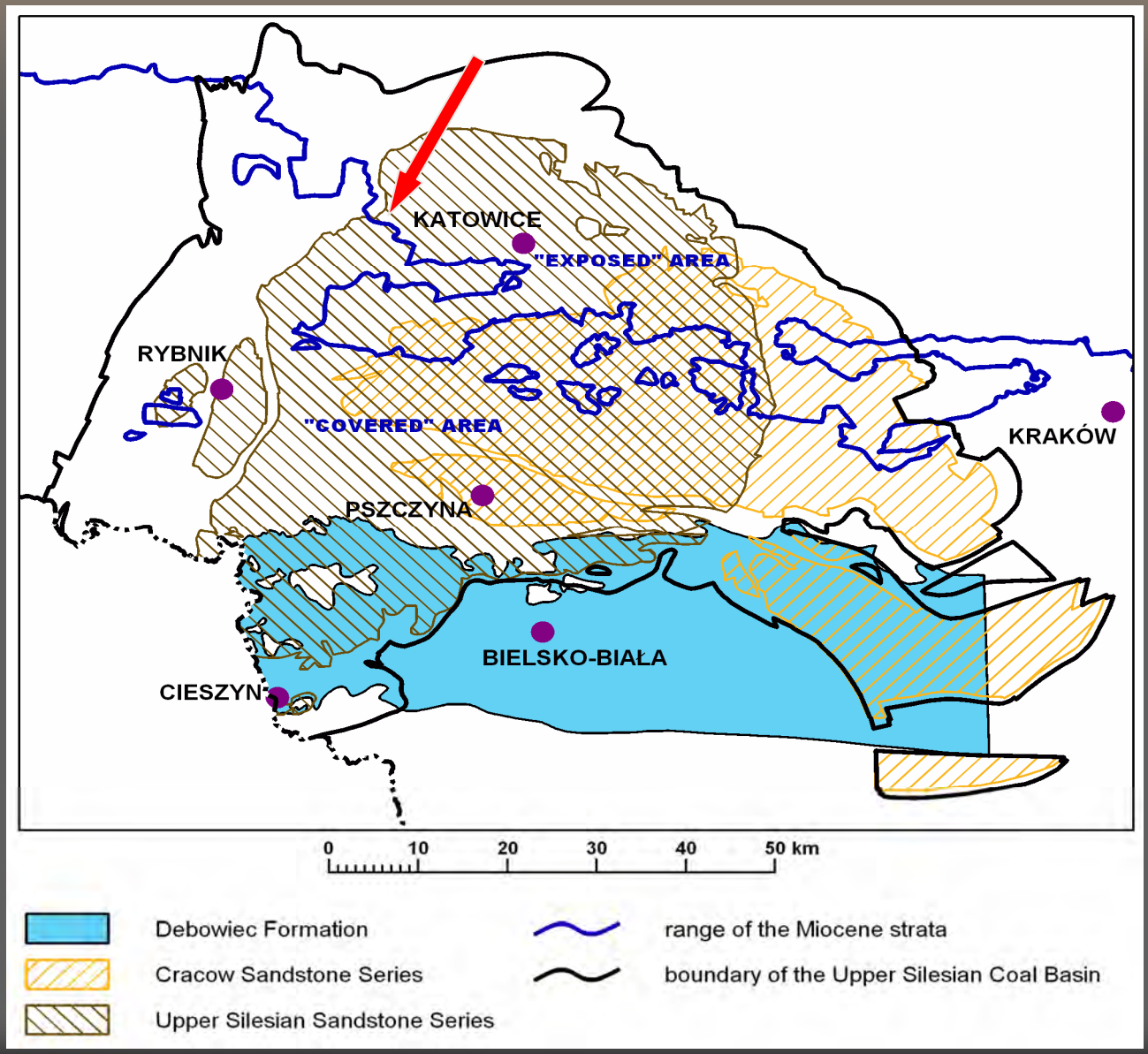
Fundamental parameters of geological structures useful for Carbon Capture and Storage (CCS)

- top of the collector: **at depth beneath 800 metres**
- thickness of sealing deposits: **> 50 metres (the best ≥ 100 m)**
- thickness of collector (reservoir): **≥ 50 metres**
- effective porosity: **up 10% (the best around 20%)**
- permeability: **> 200 – 300 mD**
- mineralisation of subterranean waters: **> 30 g/dm^3**
- capacity of the reservoir: **at least 20–30 Mt**

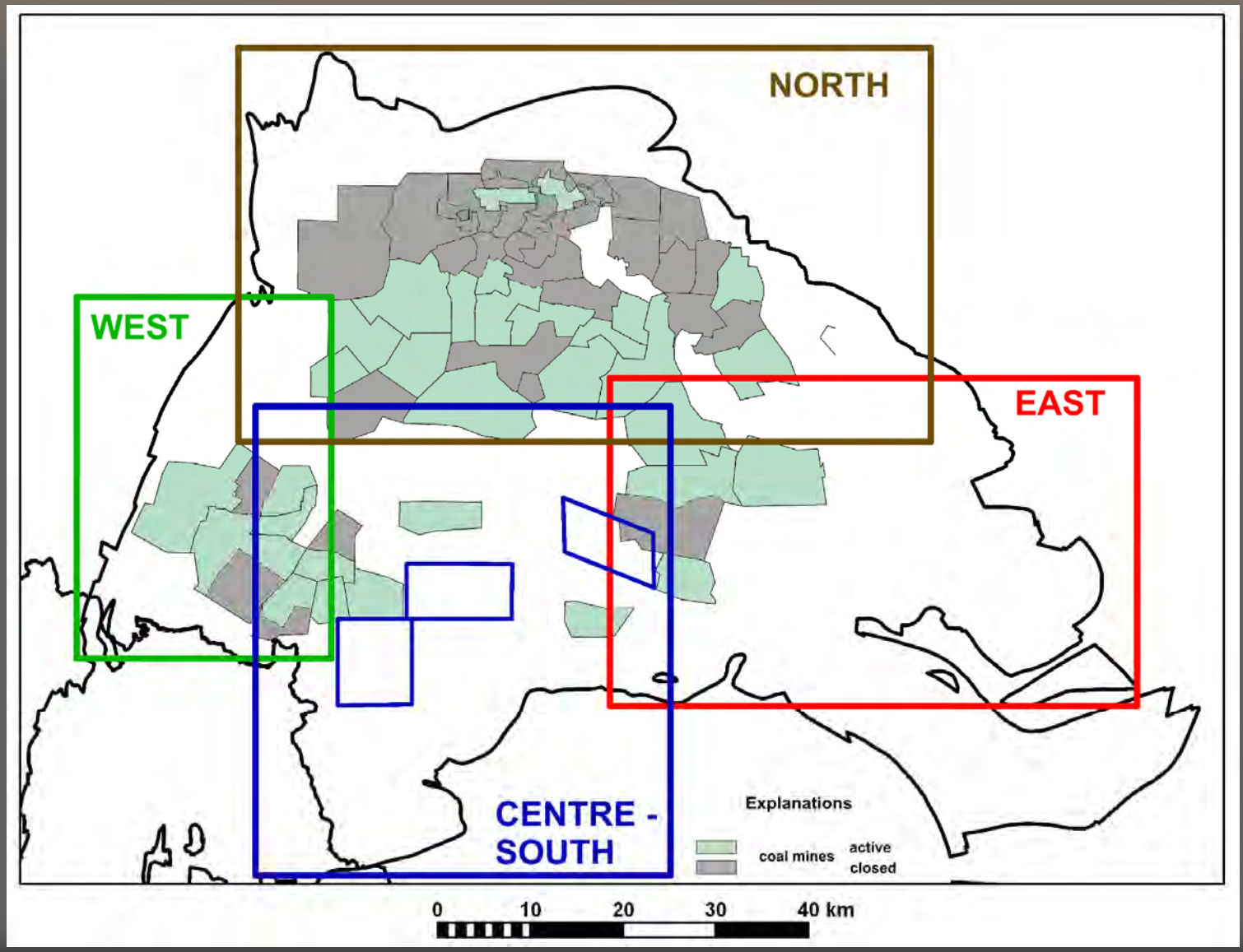
USCB (active hard coal mines):

- beneath current and planned depth of exploitation: **1250/1300 metres**
- the best outside of areas of the active hard coal mines

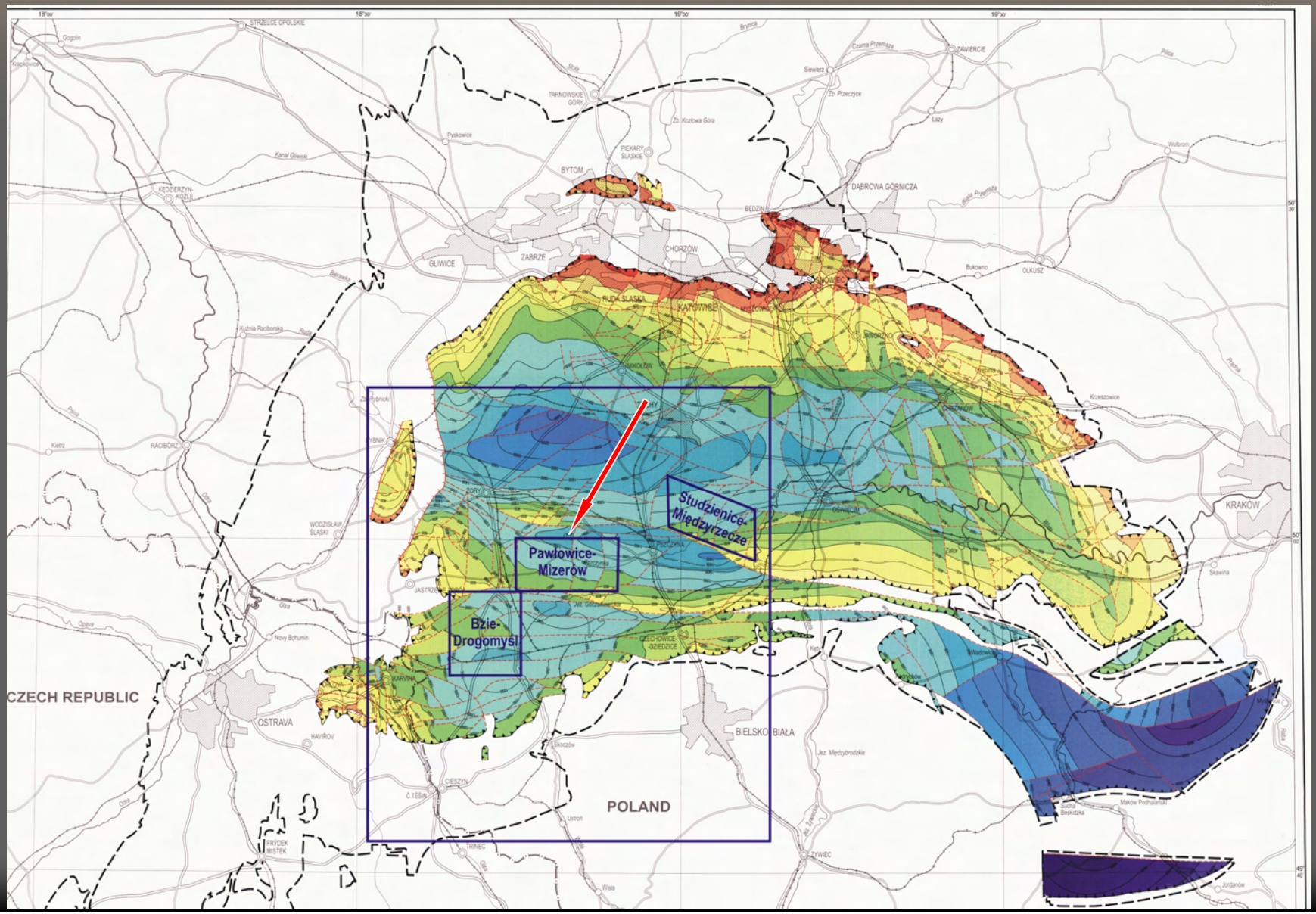
USCB – localization of the study areas



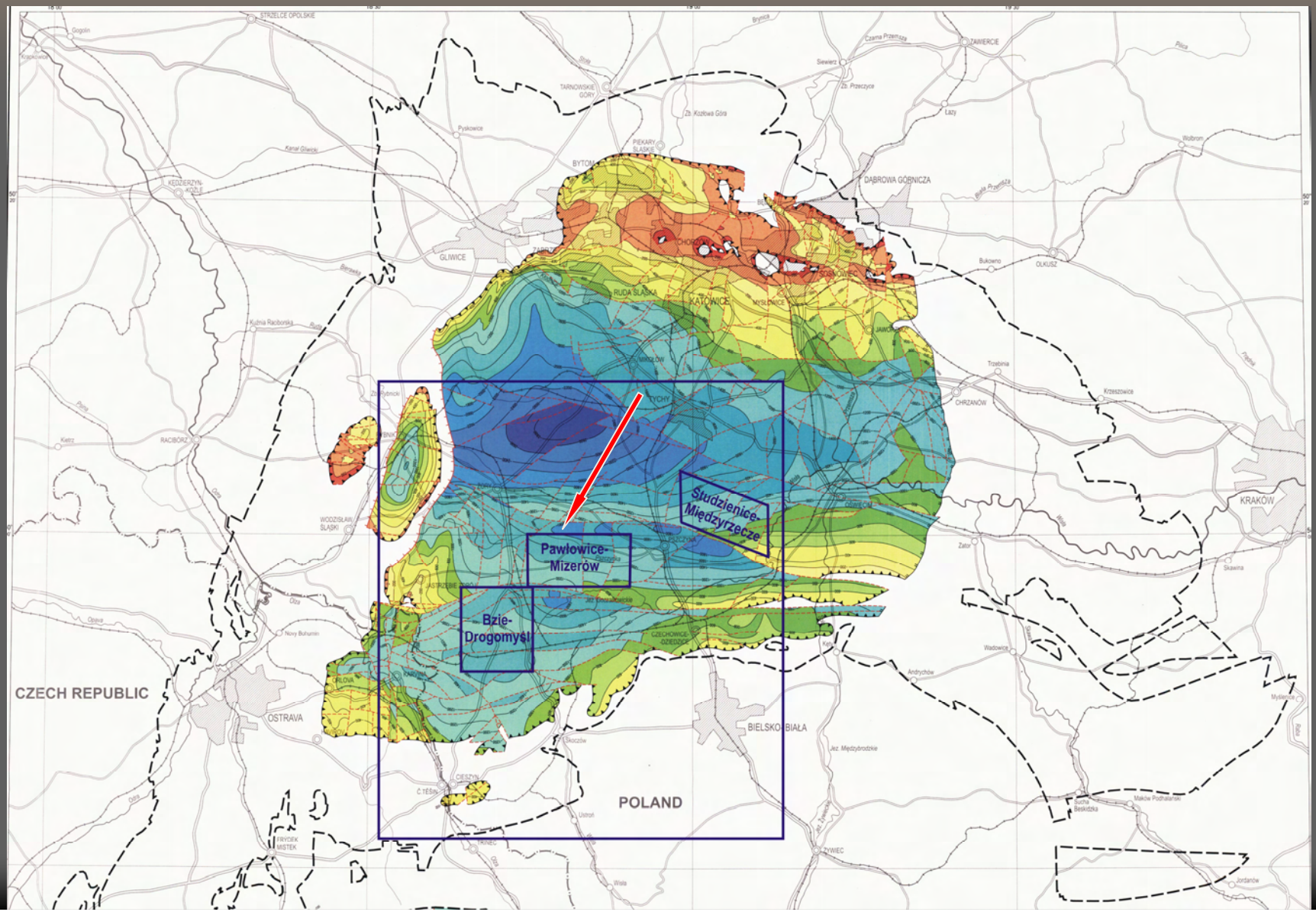
USCB – Location of the study areas



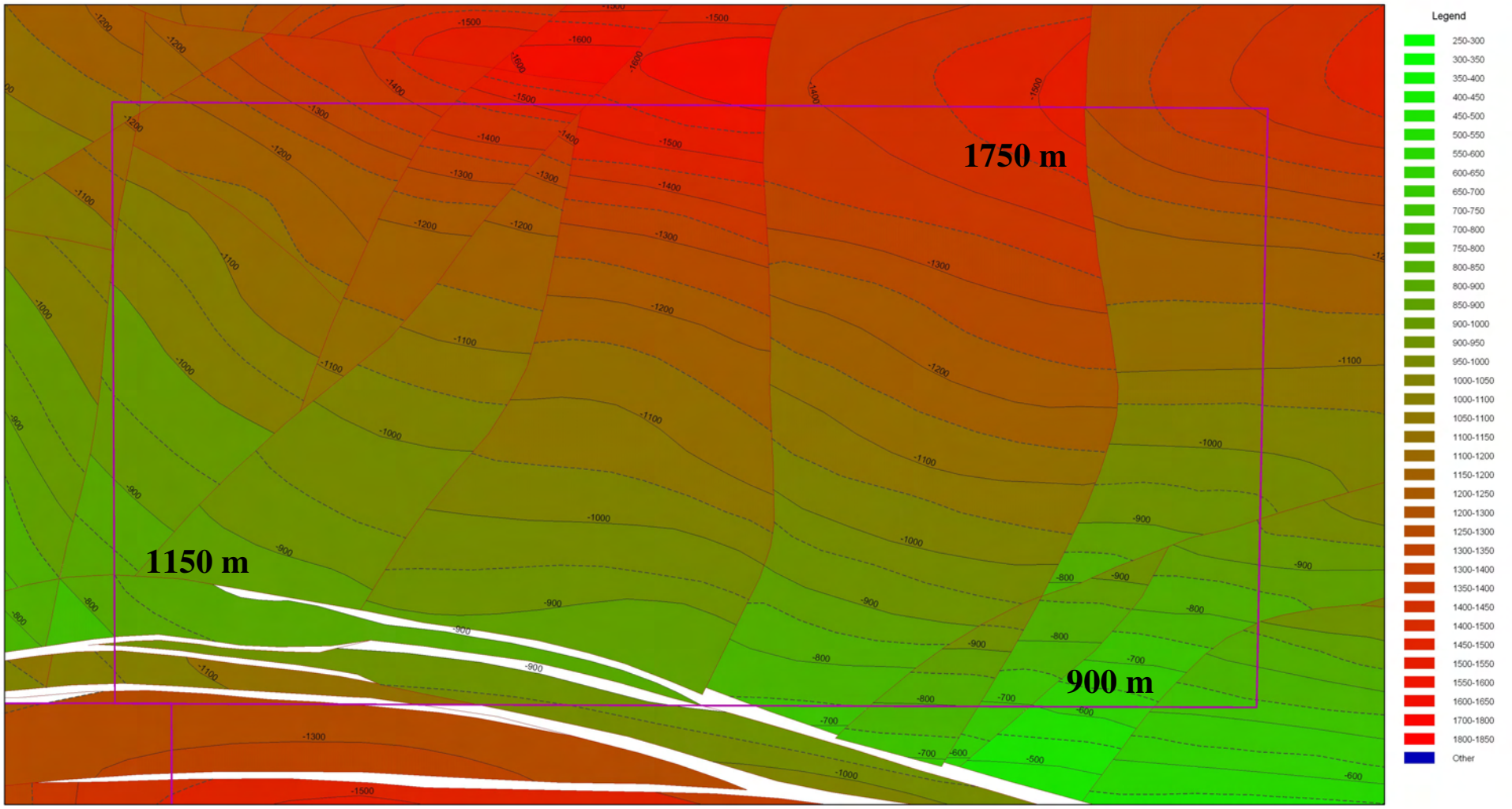
Central and southern region against a background of structural map of the base of the Mudstone Series



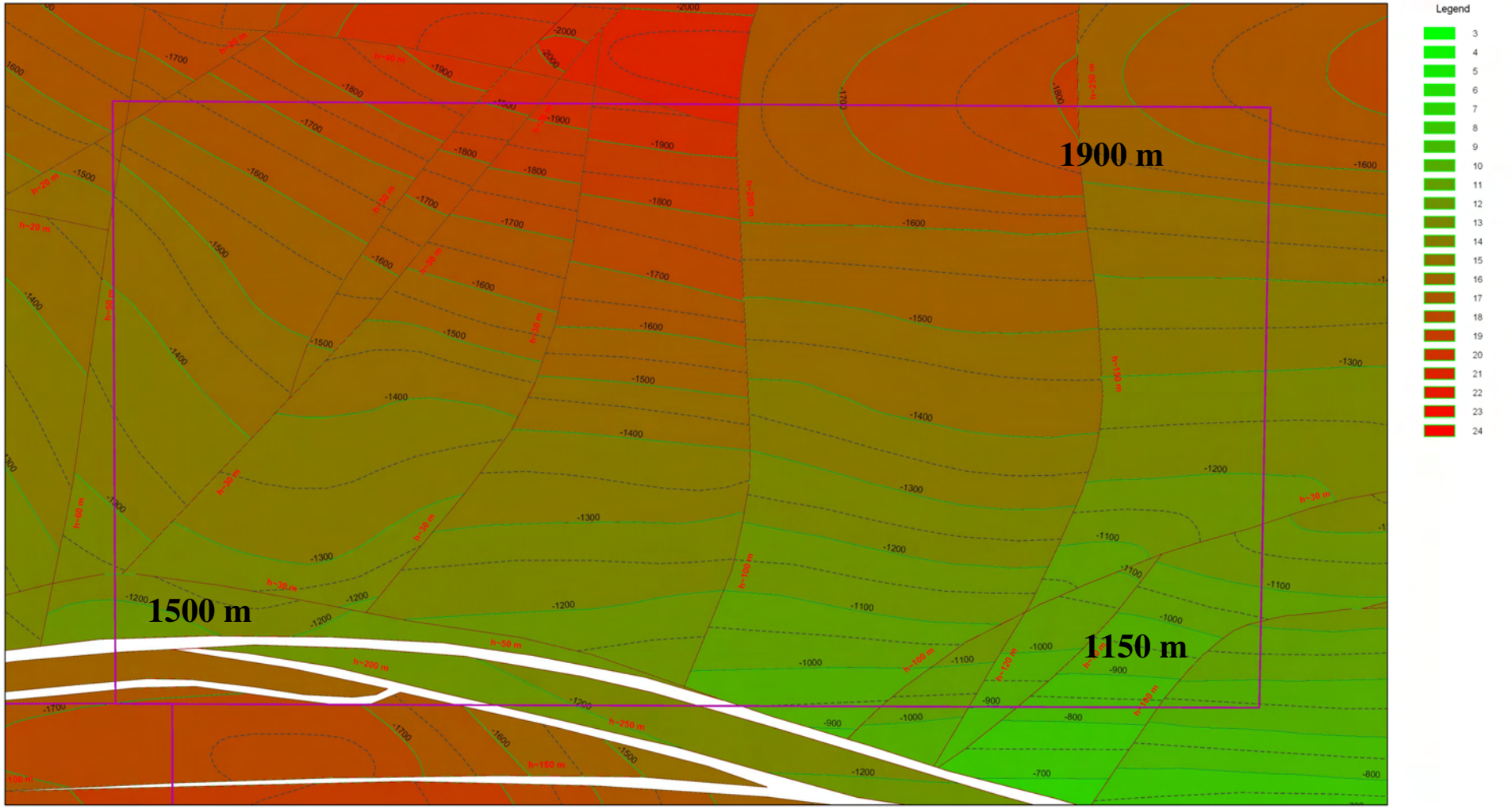
Central and southern region against a background of structural map of the base of the Upper Silesian Sandstone Series



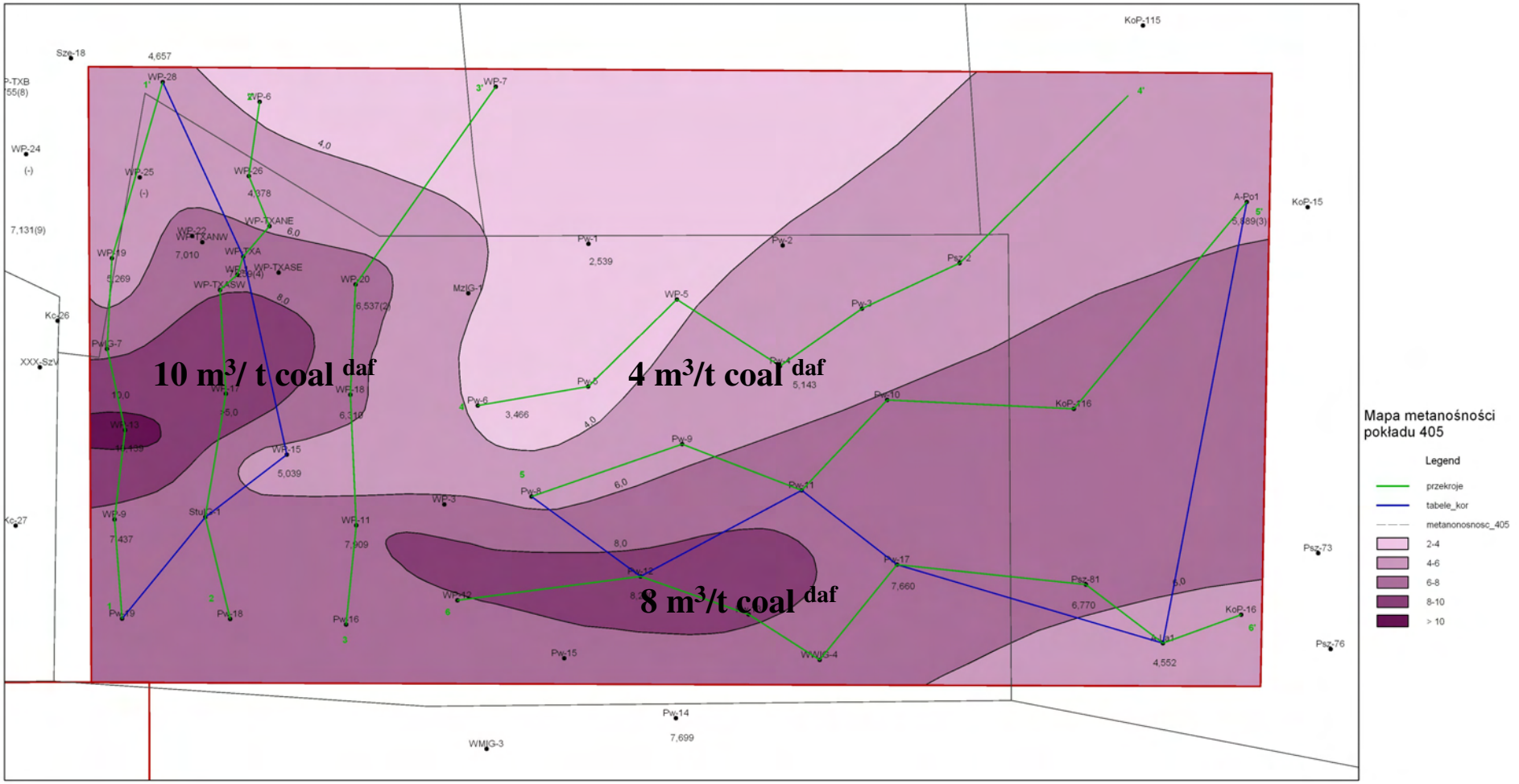
Pawłowice – Mizerów area – structural map of the base of the Mudstone Series (coal seam 405)



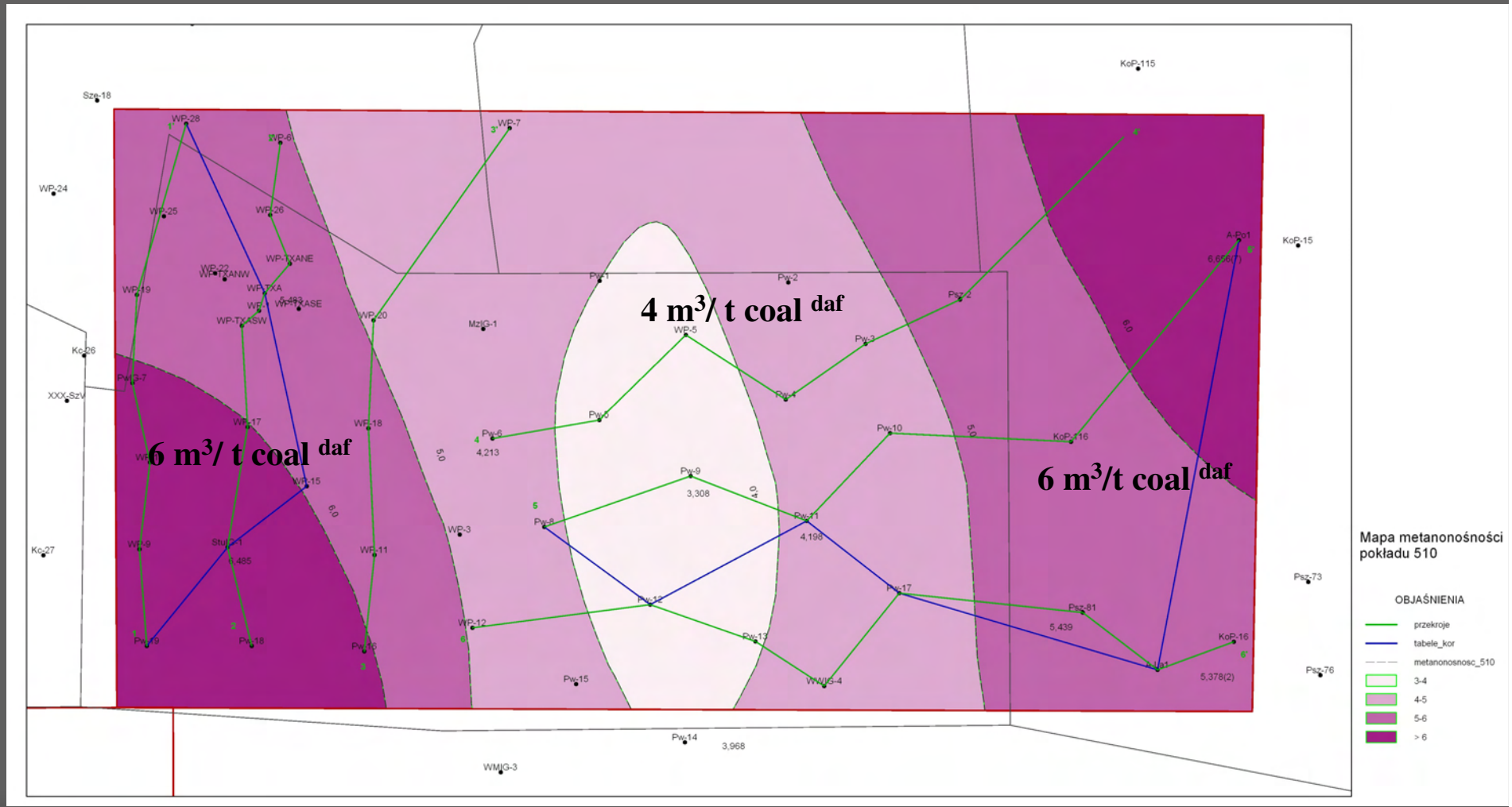
Pawłowice – Mizerów area – structural map of the base of the Upper Silesian Sanstone Series (coal seam 510)



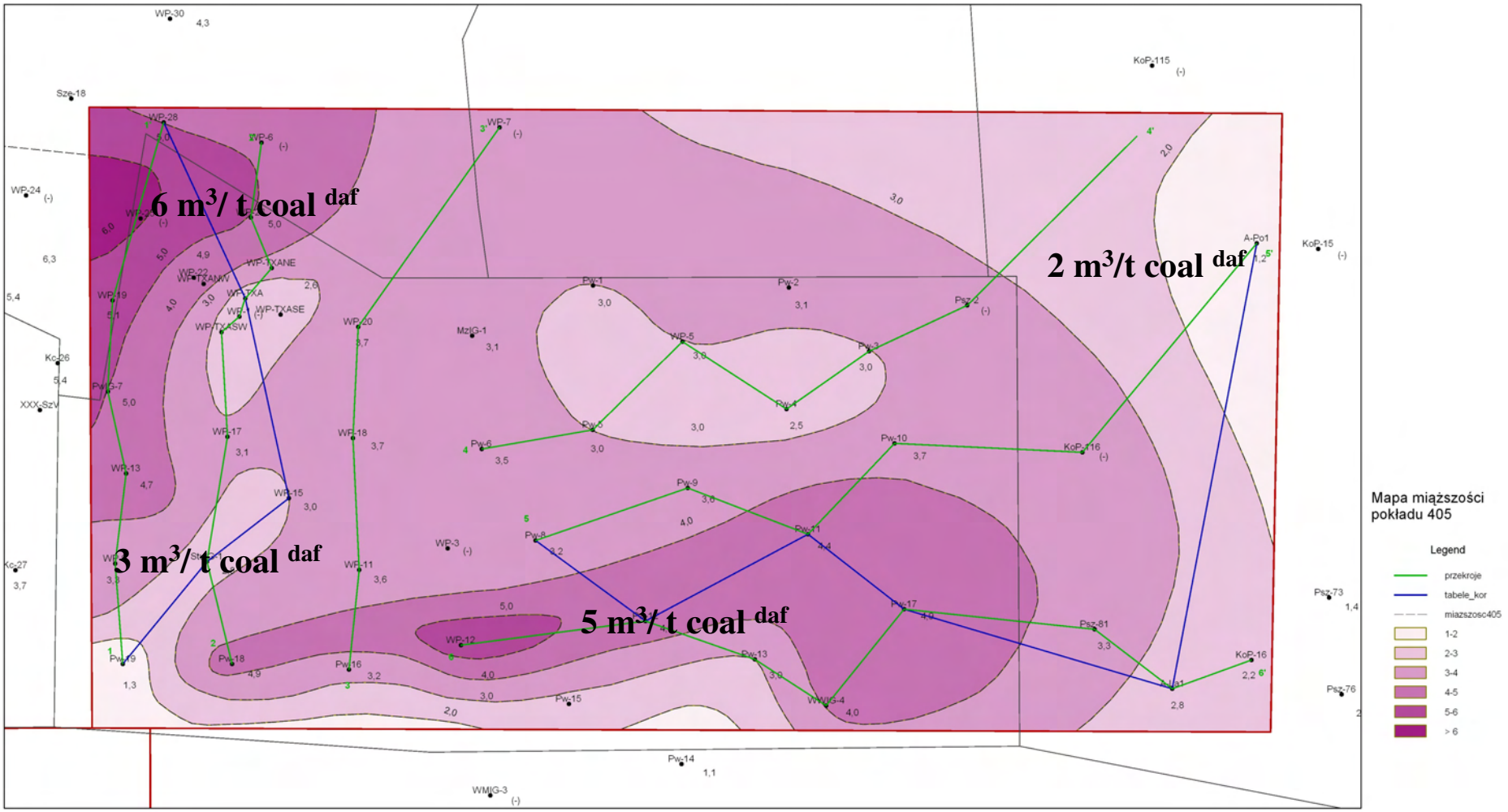
Pawłowice – Mizerów area
Coal seam 405 – coal-bed methane content



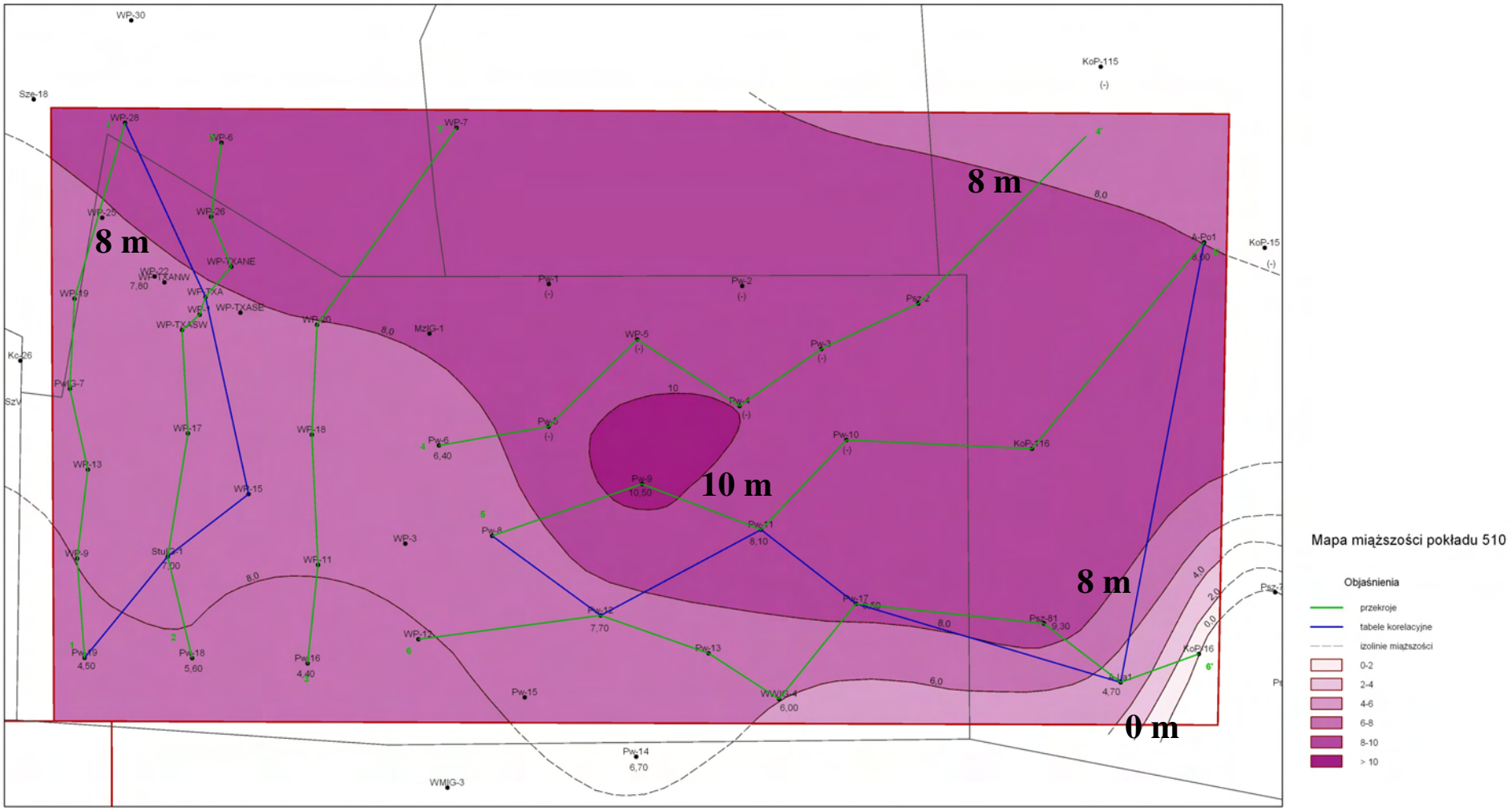
Pawłowice – Mizerów area
Coal seam 510 – coal-bed methane content



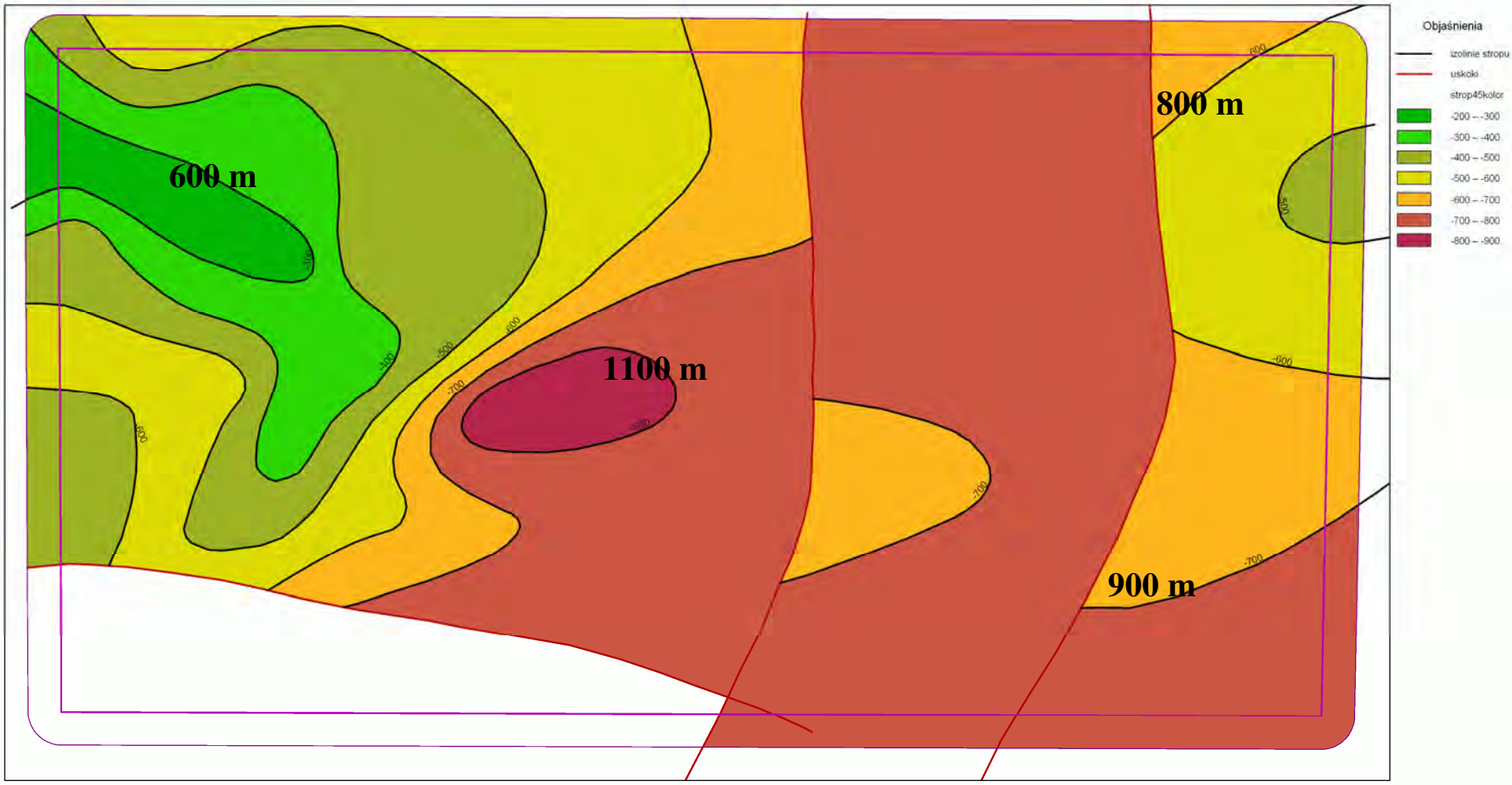
Pawłowice – Mizerów area
Thickness of the coal seam 405



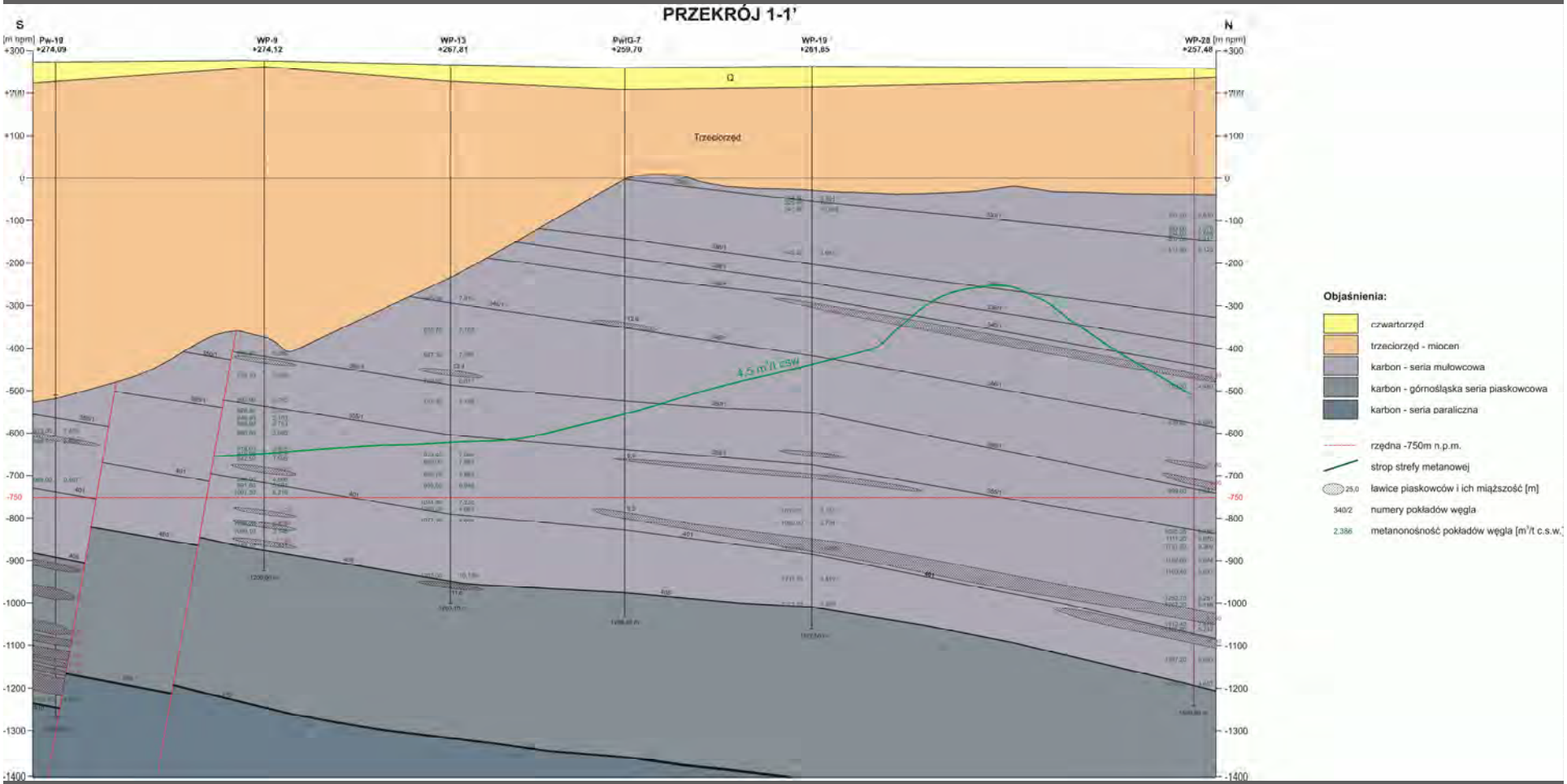
Pawłowice – Mizerów area
Thickness of the coal seam 510



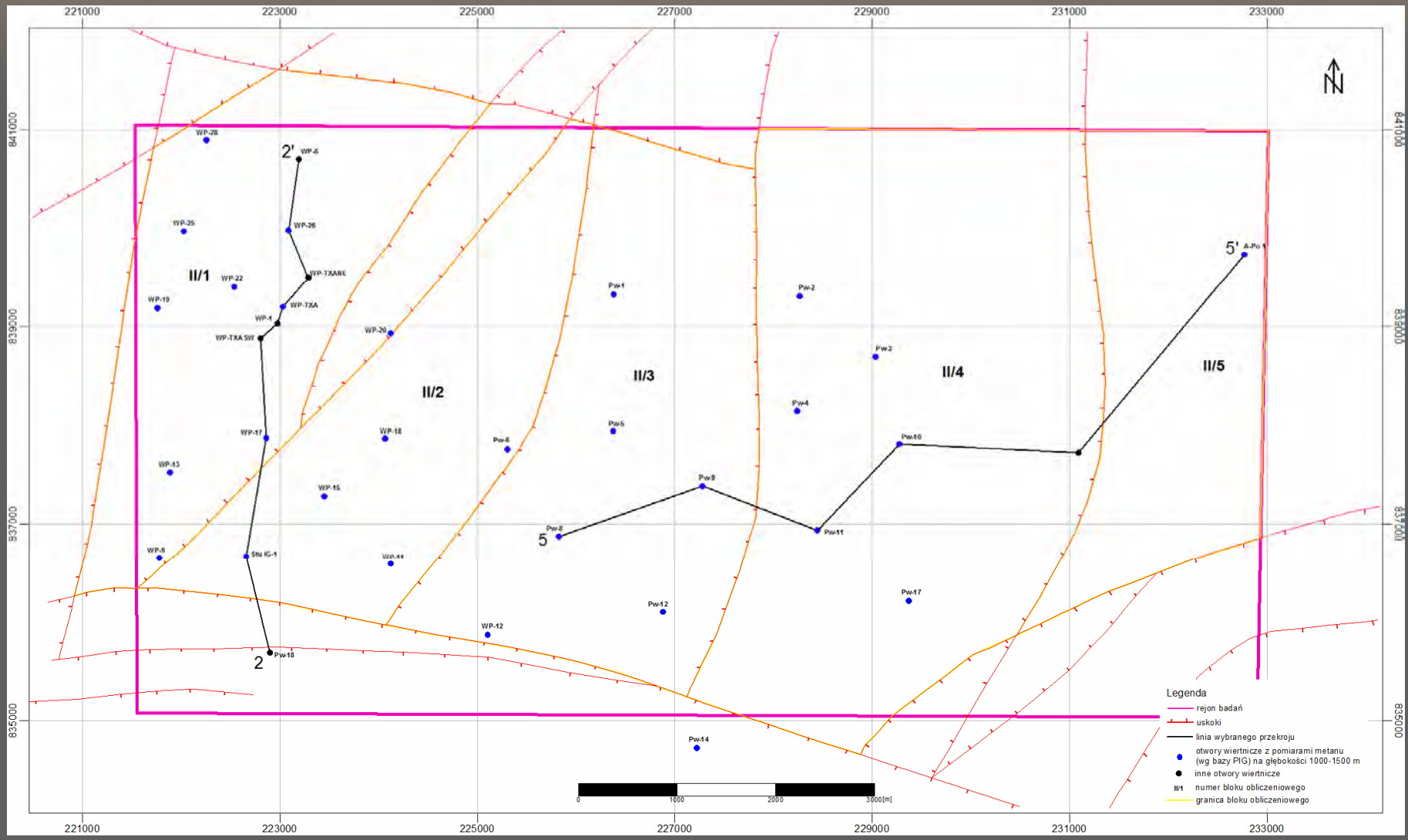
Pawłowice – Mizerów area
Top of the methane content 4,5 m^3/t coal ^{daf}



Pawłowice – Mizerów area
Geological cross-section



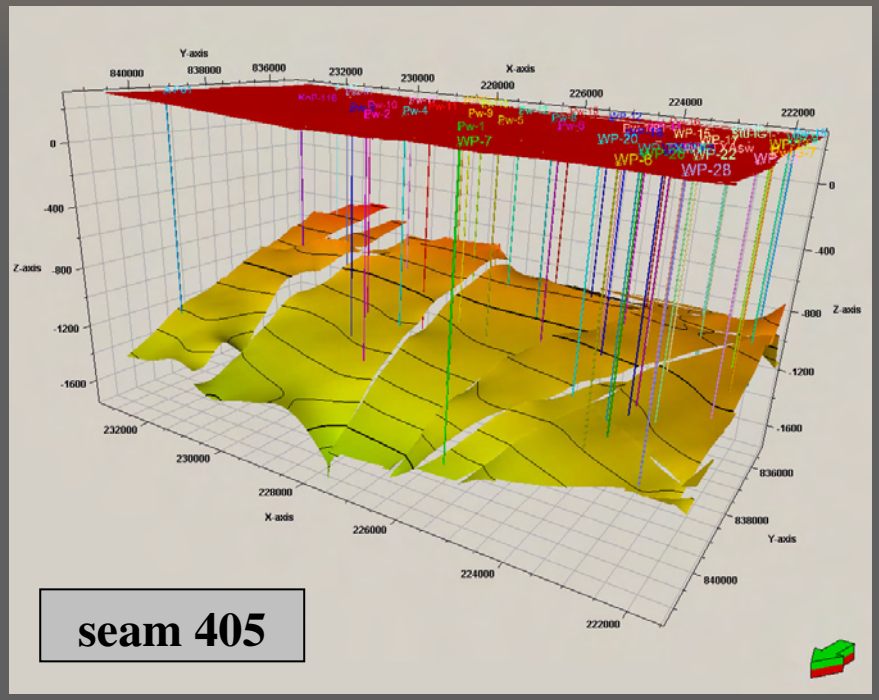
Area II – Pawłowice-Mizerów



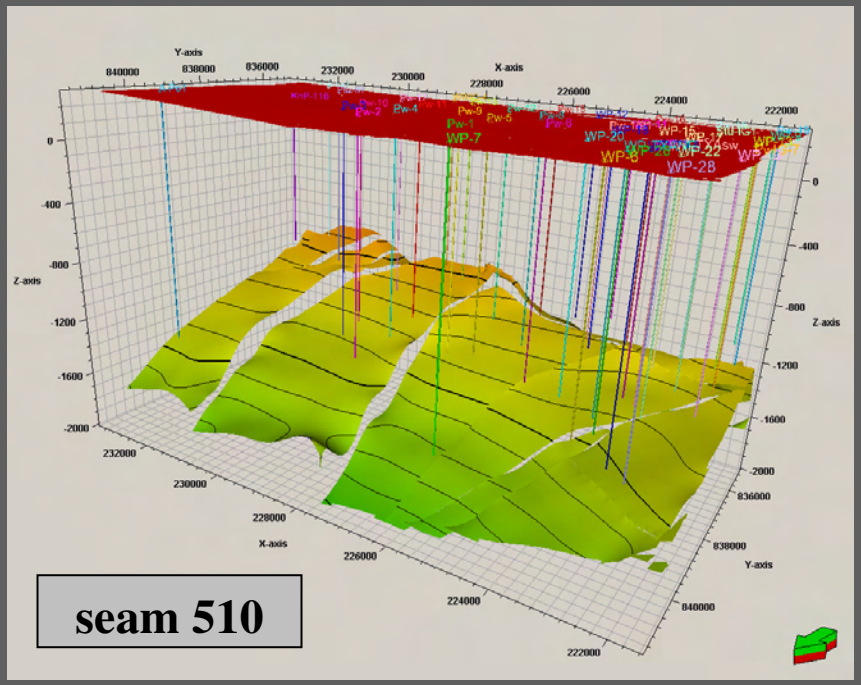
Main parameters of Pawłowice-Mizerów area

Number of block	Average weighted of methane content [m^3/t coal ^{daf}]	Average total thickness of the coal seams [m]	Average weighted of density [Mg/m^3]	Average weighted of ash content [-]	Average weighted of moisture content [-]	Surface [thousand m^2]	Coal-bed methane resources [thousand m^3]	Coefficient of coal-bed methane output	Coefficient of completeness	Coefficient of replacement coal-bed methane with CO^2	CO^2 density [Mg/m^3]	Storage capacity [Mg]
II/1	7.291	21.70	1.35	0.100	0.009	10 740	2 051 575	0.5	0.4	2	0.0019	1 559 197
II/2	6.197	19.90	1.39	0.126	0.008	8 631	1 285 593	0.5	0.4	2	0.0019	977 051
II/3	5.548	27.71	1.43	0.099	0.008	12 300	2 412 237	0.5	0.4	2	0.0019	1 833 300
II/4	4.856	32.47	1.41	0.128	0.008	19 520	3 753 994	0.5	0.4	2	0.0019	2 853 036
II/5	5.748	28.26	1.26	0.078	0.007	7 888	1 477544	0.5	0.4	2	0.0019	1 122 933
Total storage capacity of block II												**8 345 517**

Pawłowice-Mizerów – models of spread of the coal seams 405 and 510

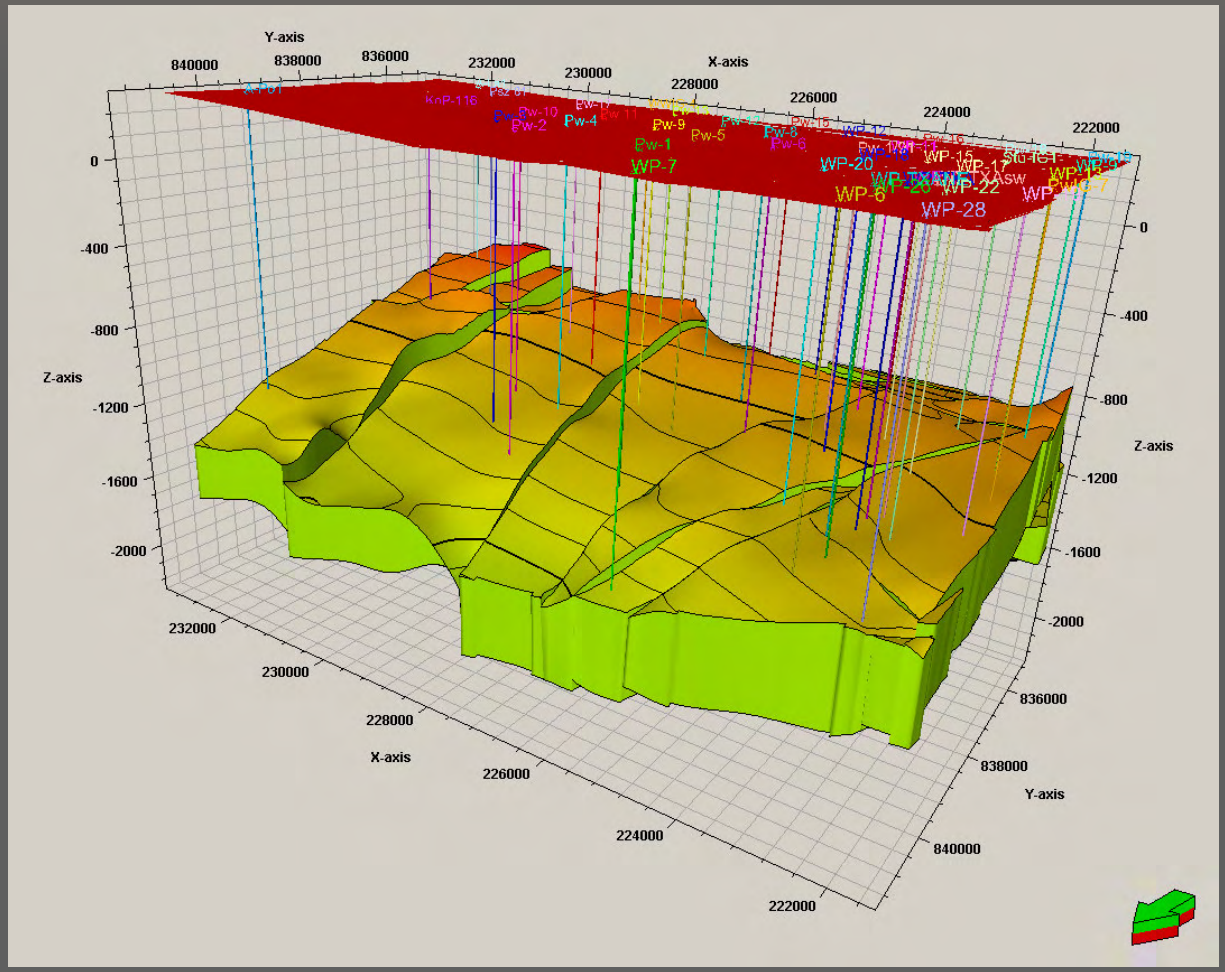


seam 405

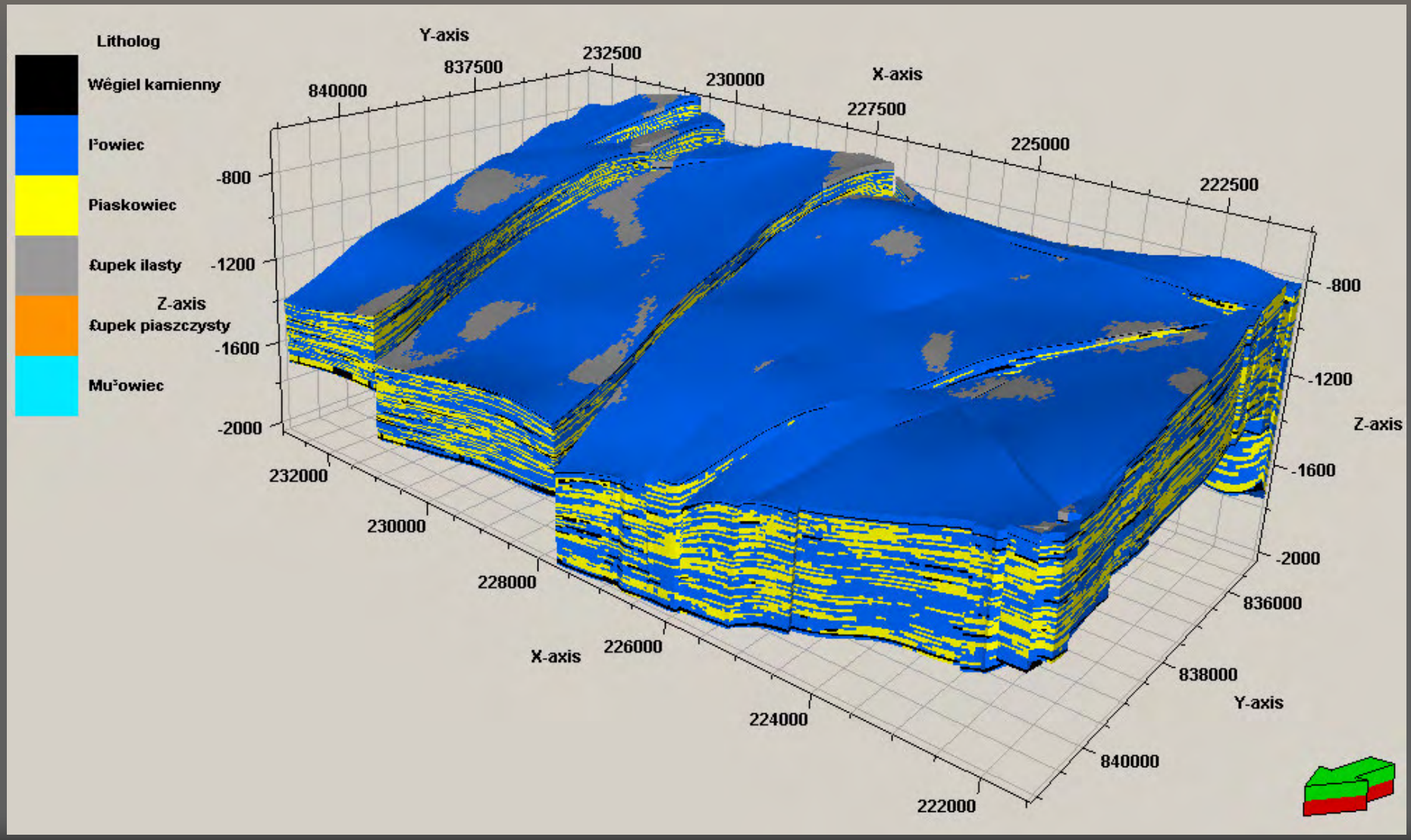


seam 510

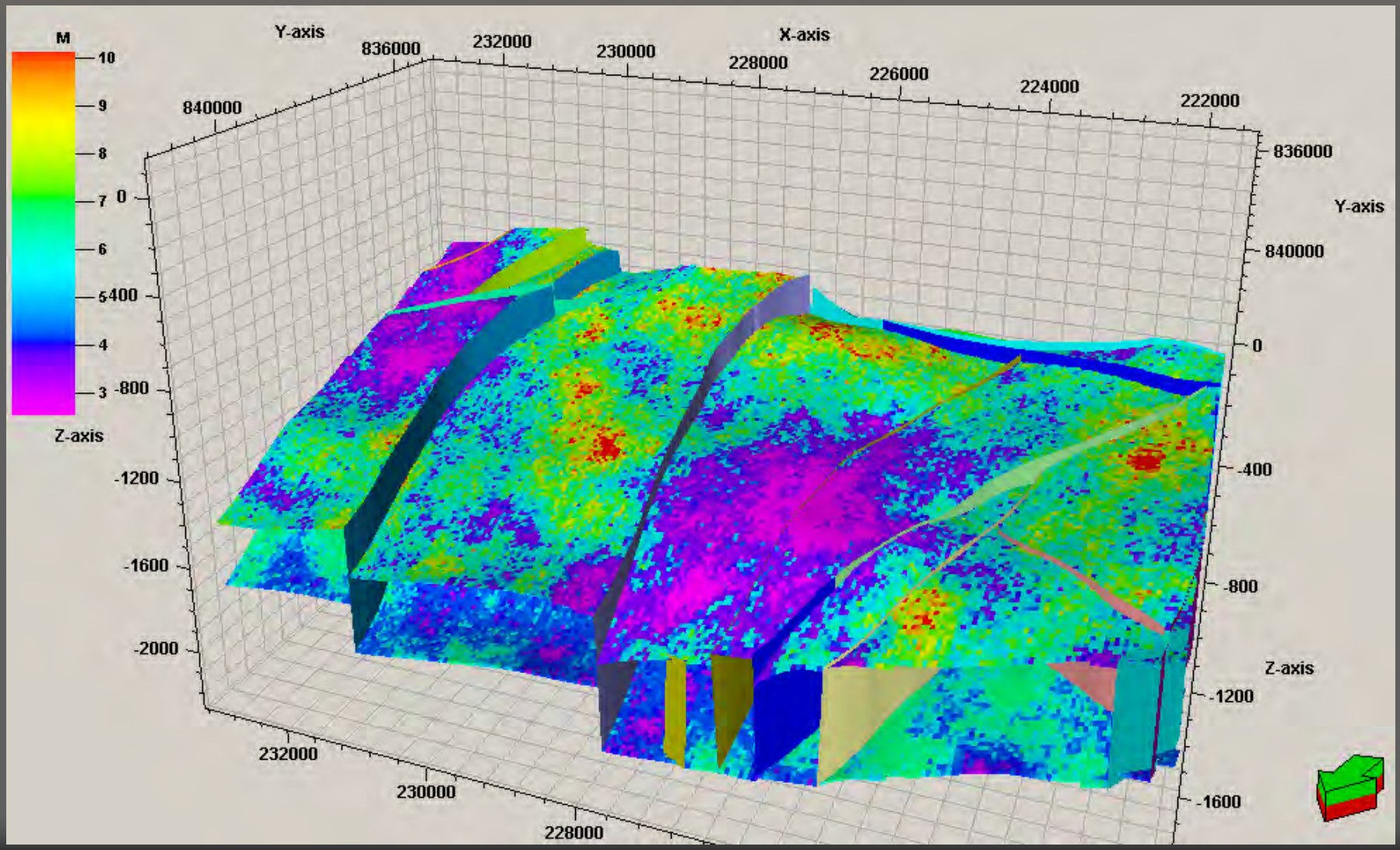
Pawłowice-Mizerów – model of spread of coal seams 405 and 510



Pawłowice-Mizerów - lithology



Pawłowice-Mizerów – methane-bearing capacity



This presentation has been work out as a part of national programme:

„Assessment of formations and structures for safe geological storage of CO_2 including their monitoring program ”

Ordered:

Ministry of the Environment

Funded:

National Fund for Environmental Protection and Water Management

Thank you for your attention!