PROGRESS in WP3

T 3.1. Geological data integration and interpretation (INiG-PIB, IMPERIAL, ICEMR RAS). T 3.2. Development of structural models and 3D models of petrophysical and geomechanical properties (INIG-PIB, IMPERIAL, ICEMR RAS).

- Development of large scale and high resolution 3D structural models depicting tectonic settings, geometry of main structural surfaces and thickness of particular lithological units,
- Construction of large scale parametric models of petrophysical and geomechanical properties.



Work Progress: ✓ 3D model of lithotypes ✓ 3D petrophysical and geomechanical models of the C







Petrophysical large scale models of the C field strata between top surface and 610 CS in the Murcki-Staszic coal mine



Diagram presenting the lithological model (track 1), HRA based lithotypes (coal – marked in pink, sandstones in red, shales in green sandy shales in greenyellow (track 3), input data (GR - Gamma Ray, vp - compressional velocity, vs - shear wave velocity, p - density) (track 4) and calculated static mechanical parameters (UCS –marked with orange dashed line, Young modulus – marked with blue line and Poisson ratio – marked with pink continuous line).





Parametr					A	Shale		Sandy shale			Sandstone			
	Q+III	Conglomerate	Coal	Goaf	Coal shale	Westfal	Namur	Namur	Westfal	Namur	Namur	Westfal	Namur	Namur
		(Jacobsen, 1943)			Malkowski,	Α	С	В	Α	С	В	Α	С	В
					2008	CS 300	CS 400	PCS 500	CS 300	CS 400	CS 500	CS 300	CS 400	CS 500
	0.8		2.08		5	1.424-6.79 av 4.69		3.94-6.89 av. 5.14			4.09-8.18 av 5.73			
E [GPa]	Zhuet	41	WP2	1.77	Malkowski, 2008	(KWK-M-S archival data)		(KWK-M-S archival data)			(KWK-M-S archival data)			
	0.35		0.29		0.28	0.07-0.37 av 0.16		0.06-0.3 av 0.14			0.07-0.2 av 0.12			
PR	Zhu et al., 2019	0.25	WP2	0.27	Malkowski, 2008	(KWK-M-S archival data)		(KWK-M-S archival data)			(KWK-M-S archival data)			
UCS	6.9		24.6		28.78					39-56.3				
[MPa]	Zhu et al., 2019	40	WP2	12.3	Malkowski, 2008	22.6- 51.4	31.7	-61.8	8-31.7	24.8	-47.6	14-36.1	(KWK-M-S a	rchival data)
TENSILE			0.6	1.23	2.88	0.29-4.42 av 1.47		1.23-3.82 av 2.15			1.15-4.55 av 2.82			
A FRANCISCO.	0.69	4	WP2			(KWK-M-S archival data)		(KWK-M-S archival data)			(KWK-M-S archival data)			
DENS	Well log	Well log	WP2	1.14	2.14	Well log	Well log	Well log	Well log	Well log	Well log	Well log	Well log	Well log
PORO	Well log	Well log	WP2	30	Well log	Well log	Well log	Well log	Well log	Well log	Well log	Well log	Well log	Well log
	28	35	22		33.5	46.5	33.5	46.5	37.5	46	37.5	57	53	55.5
FA	(Ortuz, 1986)	(Jacobsen, 1943)	(Szott et al., 2018)	30	(Godula, 1984)	(Godula, 1984)	(Godula, 1984)	(Godula, 1984)	(Godula, 1984)	(Godula, 1984)	(Godula, 1984)	(Godula, 1984)	(Godula, 1984)	(Godula, 1984)
BIOT	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Based on well log data; KWK M-S archival data; WP2 data; Zhu et al., 2019; Ortuz, 1986; Jacobsen, 1942; Szott et al., 2018; Malkowski, 2008; Godula, 1984)



- ✓ Determination of boundary conditions:
- \checkmark Stress regime: normal faulting, $\sigma_v > \sigma_H > \sigma_h$ (Zuberek et al., 1997), $\sigma_{3}/\sigma_{1}=0.17$, σ_H azimuth = 99 deg (Dubinski et al., 2019)
- Calculation of stress and strain field in initial geological conditions prior to the mining activity in the large scale model
- Calculation of stress and strain field in mining conditions affected by the mining activity (large scale model)

Tab 2. Content of solids dissolved in underground water in Carboniferous productive intervals changing with depth (based on Różkowski et al., 1990).

Detph	Average value (mg/dm3)	Pressure gradient	
0-200	3349,45	0,100018008	
200-400	13941,45	0,101077029	
400-600	51836,07	0,104865849	
600-800	76887,38	0,107370556	
800-1000	117377,12	0,111418844	(Rozkowski et al., 1990)





Work Progress:

- Calculation of stress and strain field in initial geological conditions prior to the mining activity in the large scale model (T 3.3)
- Calculation of stress and strain field in mining conditions affected by the mining activity (large scale model)



Work Progress:

- Calculation of stress and strain field in initial geological conditions prior to the mining activity in the large scale model (T 3.3)
- Calculation of stress and strain field in mining conditions affected by the mining activity (large scale model)

