MID-DEPTH BASIN MODEL FOR SUSTAINABLE SUBSURFACE USE: 500+ M THICK SALT, LEGACY OIL AND GAS, HOT-DRY ROCK AND GEOTHERMAL RESOURCES IN POROUS MEDIA ALL IN ONE PLACE – A CASE STUDY FROM NW POLAND

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Mid-depth regional model built for the central-north-west part of Poland (Gorzów block) [1] is an example of stacked resources comprising, from bottom to top:

- Rotliegend (Lower Permian) volcanics presumably considered as hot-dry rock geothermal resources,
- Upper Permian hydrocarbon traps – legacy and under exploitation, offering possible CO2 storage space or other unconventional use,
- Thick Upper Permian (Zechstein) salt in domed but otherwise relatively undisturbed salt pillows for potential storage of heat or energy carriers.
- Mid-temperature Mesozoic geothermal reservoirs down to ca. 2000 m bsl.

Tapping into the high number of legacy oil-and-gas seismic and borehole data offered an opportunity to construct a well-constrained 3D regional model, with added advantage of linking it – within the GeoERA framework – to the Brandenburg state model across the border. The resulting parametric grid allows informed screening for unconventional resources and provides a rigorous starting point for managing use conflicts and synergies.

Planned analytical extensions to web model viewer (https://geo3d.pgi.gov.pl/en/project/3d-geological-model-gorzow-block) will provide tools for more thorough exploration of modelling results, and disseminating raw model files through National Geological Archives ensures efficient re-use of data compliant with FAIR principles.

[1] Szynkaruk E. (red.), 2020. Trójwymiarowy, cyfrowy model pokrywy osadowej bloku Gorzowa – opracowanie końcowe [3D digital model of the Gorzów block – final report]. National Geological Archives, PGI-NRI, Warszawa, Poland.