

## **3D geological modelling and assessment of geothermal potential in the Wałbrzych region (Poland)**

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To create a map of the shallow geothermal energy potential a knowledge of the subsurface geological structure is essential. For the needs of the GeoPLASMA-CE Project (Interreg Central Europe), in collaboration with the Czech Geological Survey, a common transboundary geological 3D model for the Wałbrzych-Broumov pilot area was constructed. This 3D model was based on digital version of map sheets of the Detailed geological map of Poland (DGMP) in scale 1:50 000 and boreholes data stored in the PGI-NRI's Geological-Engineering Data Base, Central Geological Data Base and Central Hydrogeological Data Base. For the needs of the project, litho-stratigraphical profiles from selected boreholes were reclassified according to the simplified legend containing 32. units. Following similar process the archival cross-sections were reinterpreted accordingly to the new classification and additional cross-section passing through the transboundary area was made. To create 3D model only these boreholes were chosen, in total number of 1019, which were generally deeper than 10 m and had reliable lithological profiles and certainty in terms of location. The base for setting the real, horizontal spreads of the new litho-stratigraphical units were used reclassified data of digital geological maps, geological cross-sections and properly revised borehole logs. On the ground of the collected information, a consecutively litho-stratigraphical units, beginning from the youngest, were modelled with use of the Gocad software. In order to further developments of maps of geothermal potential, top of every unit of the 3D model will be exported as a raster format into the ArcMap software as well as all boreholes profiles with attributes assigned according to a value of thermal conductivity predefined for petrographic type of the rocks. Using the ArcMap software, basing on special algorithms for every point of the pilot area (at the centre of the cell raster in resolution 25 x 25 m) and for the defined depth (40, 70, 100 and 130 m) an average value of thermal conductivity will be computed. Final results of the work will be presented as calculated value of geothermal potential in every raster cell displayed in the dedicated set of maps.