Geothermal energy from deep sedimentary basins: The Valley of Mexico (Central Mexico)

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The geothermal potential of the Valley of Mexico has not been addressed in the past, although volcaniclastic settings in other parts of the world contain promising target reservoir formations. A first assessment of the geothermal potential of the Valley of Mexico is based on thermophysical data gained from outcrop analogues, covering all lithofacies types, and evaluation of groundwater temperature and heat flow values from literature. Furthermore, the volumetric approach of Muffler and Cataldi (1978) leads to a first estimation of ca. 4000 TWh (14.4 EJ) of power generation from Neogene volcanic rocks within the Valley of Mexico. Comparison with data from other sedimentary basins where deep geothermal reservoirs are identified shows the high potential of the Valley of Mexico for future geothermal reservoir utilization. The mainly low permeable lithotypes may be operated as stimulated systems, depending on the fracture porosity in the deeper subsurface. In some areas also auto-convective thermal water circulation might be expected and direct heat use without artificial stimulation becomes reasonable. Thermophysical properties of tuffs and siliciclastic rocks qualify them as promising target horizons (Lenhardt and Götz, 2015). The here presented data serve to identify exploration areas and are valuable attributes for reservoir modelling, contributing to (1) a reliable reservoir prognosis, (2) the decision of potential reservoir stimulation, and (3) the planning of long-term efficient reservoir utilization.

References

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