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The Rotliegend Reservoir System of the northern Upper Rhine Graben (Germany): From Pores to Production

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The geothermal reservoir potential of the Permian Rotliegend sediments and volcanics of the northern Upper Rhine Graben has been overseen in past studies, which focused mainly on Triassic deposits of the Buntsandstein and Muschelkalk in the southern graben zone. The top of the up to 2.000 m thick clastic succession of Rotliegend deposits is known to be at depths of 1.000 to 3.000 m in the study area, thus expected to have temperatures of more than 100°C sufficient for hydrothermal utilization.

Here, we present poroperm data of the different Rotliegend rock types sampled from outcrops and drill cores from different depth intervals. Facies and depositional environment, diagenetic history and pore types were also studied in detail by thin sections. Additionally, thermal conductivity and thermal diffusivity were measured for making a reliable reservoir prognosis. In a second step, the heat in place and the potential of hydrothermal power generation was calculated including the distinct power efficiency which led to 383 TWh. In comparison to the potential calculated for the Buntsandstein (508 TWh) and Muschelkalk (67 TWh) deposits of the southern Upper Rhine Graben, the here presented data from the Rotliegend of the northern graben zone are very promising with respect to future efficient reservoir utilisation.