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Potenzial der Speicherqualität im Buntsandstein - abseits von Verwerfungen

Reservoir quality potential in the Buntsandstein - away from faults

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Geothermal exploration and related applications in the Buntsandstein hosted within the Upper Rhine Graben is mostly limited to damage zones surrounding large fault zones. Given the recent public and administrative opposition toward these approaches applied in a tectonically active setting like the Upper Rhine Graben, a re-evaluation of reservoir locations may be necessary. Alternative exploration strategies may consider reservoir quality (porosity and permeability) away from faults.

Recent core based studies highlight additional high reservoir quality intervals related to the initial sandstone composition. These are unaffected by faults and the porosity and permeability development is controlled by the host rock. Reservoir quality in the sandstone matrix is controlled by 1) the initial sediment grain size (larger grain sizes = higher permeability) and 2) porosity loss by compaction (less compaction = higher porosity). Especially the porosity loss by compaction is counteracted by rigid pore filling cementation (quartz and nodular carbonate cements), which have mostly been related to reduce the available pore space. However, they stabilize the grain framework against compactional processes as grain rearrangement. Using this information in conjunction with proper seismic and well log data may indicate suitable high reservoir quality intervals, which may not need further stimulation but different reservoir management and well completions. To achieve the required flow rates may require an extension of production intervals in e.g. horizontal wells to successfully develop geothermal projects in the Upper Rhine Graben.

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