Improving Geothermal and Thermal Reservoir Property Prediction of Dutch Geothermal Plays

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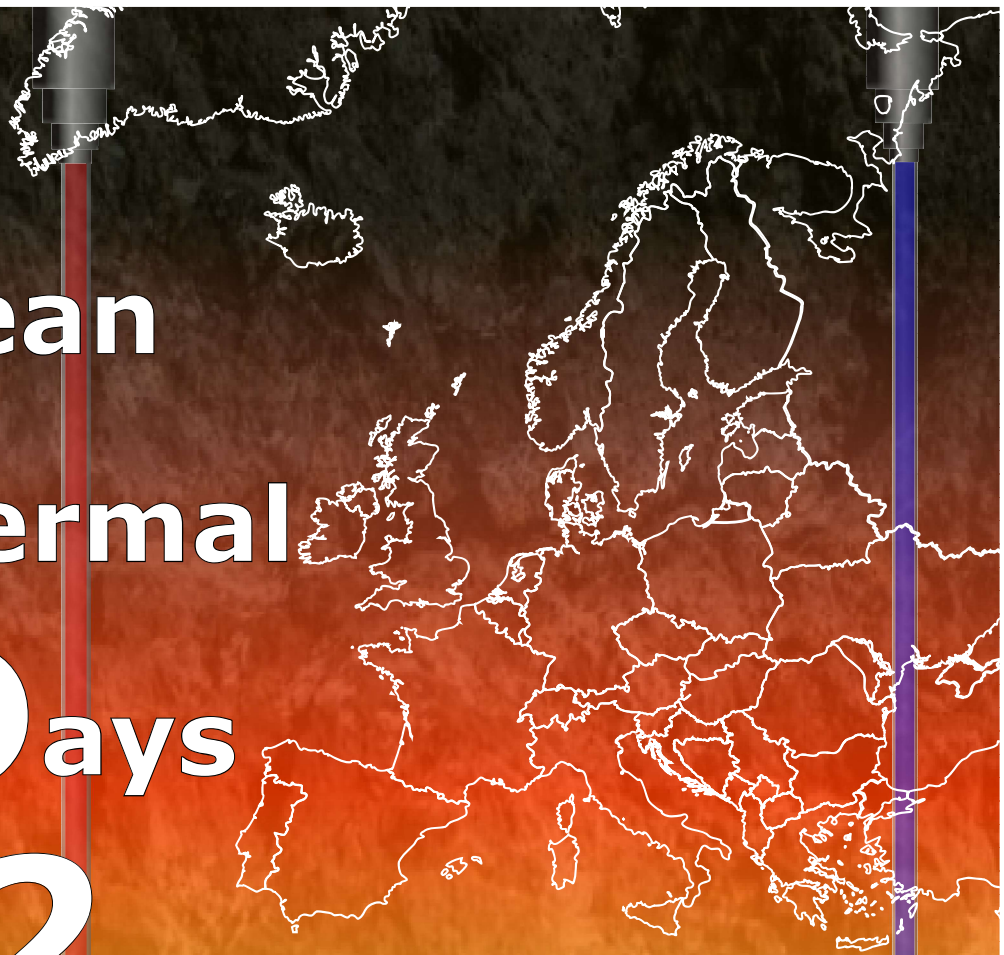
Publication date
2022

Document Version
Final published version

Citation (APA)
Kolah Kaj, P., Abels, H. A., Barnhoorn, A., Vardon, P. J., Kwee, J., Buik, N., de Vries, S., Drury, M., van Eindthoven, W., & More Authors (2022). *Improving Geothermal and Thermal Reservoir Property Prediction of Dutch Geothermal Plays*. 61-61. Abstract from 13th European Geothermal PhD Days - 2022, Aachen, North Rhine-Westphalia, Germany.

13th European Geothermal PhD Days 2022



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Improving Geothermal and Thermal Reservoir Property Prediction of Dutch Geothermal Plays

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The ambition is to significantly enhance the knowledge, mapping, and prediction of the geological character of Dutch geothermal plays, focussing on thermal and geomechanical properties. The aim is to improve fundamental understanding of the geological causes behind rock properties, the understanding and quantification of the conversion of downhole log responses into rock properties, the statistical approaches to study these properties, and the implementation of rock properties into reservoir models. The study aims at leading to lower research costs for geothermal operators, lower uncertainties concerning production prediction and risk assessment, and improved productivity due to more optimal well placement and production strategies. With that, our fully open-access results will be applicable to all geothermal targets in the Netherlands and thereby be able to calibrate reservoirs, geomechanical and thermal reservoir models with the ultimate goal to optimise the exploitation of geothermal heat in the Netherlands in a sustainable and safe way. The project has a measuring component producing data and geological understanding, a correlating component, linking rock properties to petrophysical log data by various innovative means, and an implementation component setting the findings into geomodel application. Novel microstructural scanning data enables to link the nano-scale rock composition to decimetre scale bedding and logs. The focus will be on pore throats, detrital, authigenic, and new-grown cement and their types and how these relate to flow, and in particular thermal, and mechanical properties of the rocks. Next, petrophysical downhole logging data will be analysed using statistical and machine learning techniques to produce a much enhanced methodology to relate petrophysical log responses to different rock properties. Improved correlations will be produced per play investigated and can be applied to clastic geothermal reservoirs in general. This will allow for quick and improved screening of rock properties through different wells and finally beyond those into white spots.