Refine Conceptual Models in A High Enthalpy Geothermal Field

Suherlina, Lily; Bruhn, D.F.; O Saar, Martin ; Brehme, Maren

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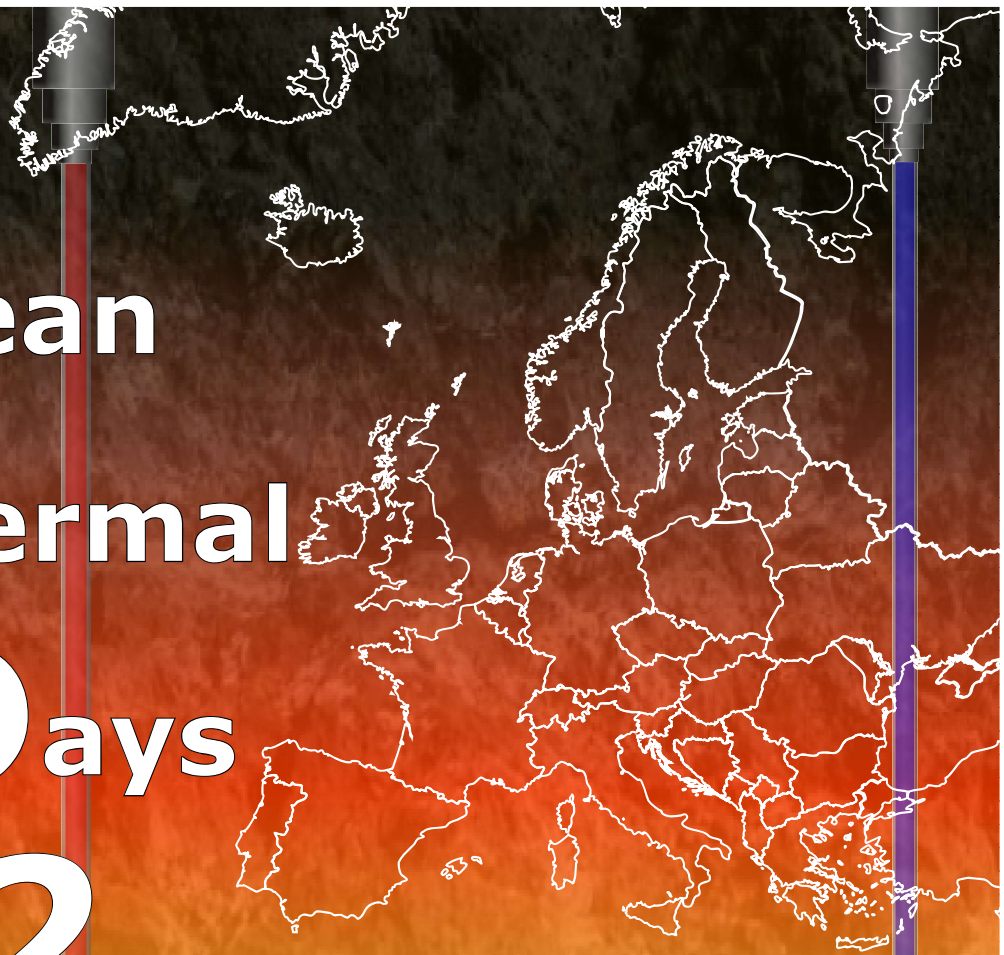

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Refine Conceptual Models in A High Enthalpy Geothermal Field

Lily Suherlina[1]**,** ***David Bruhn***[2]**,** ***Martin O Saar***[1]**,** ***Maren Brehme***[1]

[1] Institute of Geophysics, Geothermal Energy and Geofluids Secretariat, ETH Zurich, Switzerland
[2] Department of Geoscience and Engineering, Reservoir Engineering section, TU Delft, Netherlands

The primary goal of this study is to build new and integrated conceptual models for a high temperature field in Indonesia. Providing new data, combining models, visualizing them in 3D is significant to refine previous 2D traditional models, which are limited for reservoir characterization and well-placement. During field utilization, constantly updating conceptual models helps to verify the pre-existing models and to renew spatial description of the geothermal system.

The new geology models aim to refine the description of subsurface units, the fault models help to renew outdated knowledge on structures, temperature and hydrothermal models aim to eludicate new spatial temperature distribution, and geochemistry models serve to link structures with fluid chemistry. New and pre-exisiting subsurface datasets are investigated, processed in Leapfrog and interpreted integratively. The current geology model confirmed the dominant rock types in the Lahendong reservoir: breccia and andesite with a minor fraction of tuff. Also, it shows the spatial distribution of feed-zones with respect to the geological units. The new fault model revealed that the southern reservoir is more structurally controlled than the northern reservoir. A major thrust fault in the south has a vital role as a fluid pathway because the surrounding rocks have low porosity. The updated temperature models show no changes with respect to the temperature range of 250-350 oC compared to previous studies. However, the current model revealed that the southern reservoir still contains higher temperatures than the northern as evidently manifested by the dome-shape of temperature lines. Recent studies suggested local cooling in the southern reservoir, as suggested by the decline of temperatures around faults. The geochemistry model unveils barrier and conductor structures based on electrical conductivity of fluids

The current models significantly improve the former subsurface knowledge/studies. They also support a better reservoir characterization and visualization in 3D. The models will be a proper basis for the onward numerical models to identify reservoir behavior in future production scenarios/operation.