

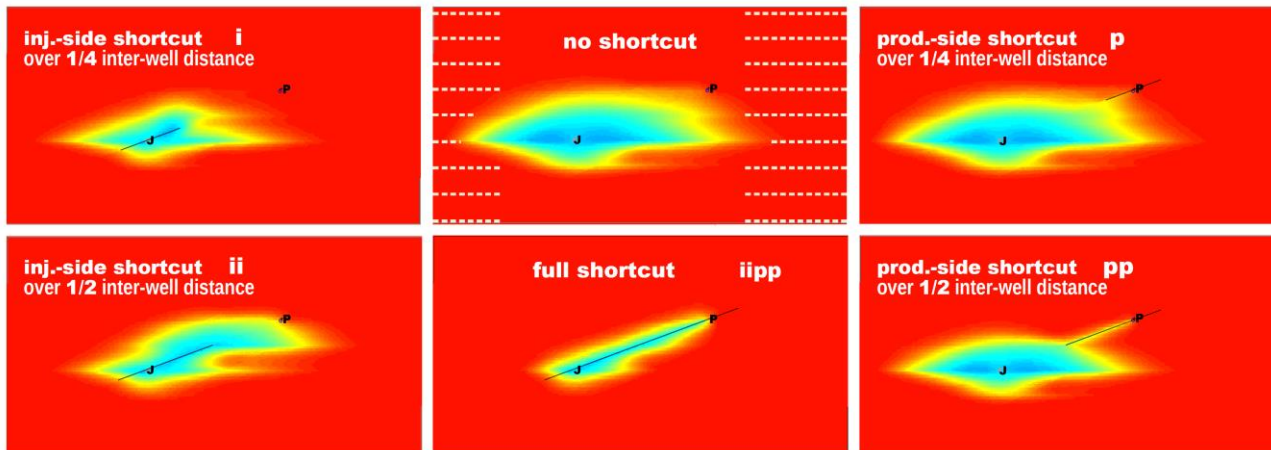
## Premature thermal drawdown: serial two-compartment model for presumed flow-path shortcut, seen by solute tracer test

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We revisit the issue of what was presumed to be 'premature thermal drawdown' in a geothermal well doublet in Southern Germany, and attempt to reproduce the inter-well tracer test findings (update to Behrens et al. 2020[1], 2021[2]) in terms of a simplified, four-parameter model, with due account taken of parameter insensitivity / ambiguity patterns that had been revealed by prior, prospective simulations. The serial two-compartment model approximately mimics figure 2 of Behrens et al. 2020[1], but discards the effects of matrix diffusion on rapid transport along the flow-path shortcut feature; this is legitimate for the short-term transport of a solute or particulate tracer.

Relying on a somewhat 'informed' selection of parameter value ranges, the simplified model enables to pinpoint certain peak and tailing characteristics of the measured (and deconvolved) tracer signal to 'fracture' and 'aquifer layer' properties underlying the four-parameter model.



Thermal drawdown in fractured-porous reservoir: flow-path shortcut scenarios

Feeding the likely values of the latter into an update on heat transport predictions, a significant slowdown of reservoir cooling ('plateau' behavior) can now be expected for the coming decade.

### References:

- [1] Behrens, H., Ghergut, J., Sauter, M., Wagner, B., Wiegand, B., (2020), Premature decline of production temperature – can tracer test tell why?, Stanford Geothermal Program, Stanford University, SGP-TR-216, 195-201
- [2] Behrens, H., Ghergut, J., Sauter, M., (2021), First-order discontinuity in cumulative tracer recovery: need for endo-tracer push-pull, Stanford Geothermal Program, Stanford University, CA, SGP-TR-218, 130-135