Poroelasticity and self-stimulation around geothermal producers in quadruplet versus triplet configurations

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At the real-world site underlying the scoping simulation example, adding a fourth well (second producer) is being endeavored in order to maximize the benefit from an unexpectedly high injectivity at the already existing two injectors, whereas the modest productivity of the existing producer is acting as the turnover-limiting factor in the currently operating triplet. Up-sizing to a quadruplet configuration (two producers instead of one) might thus also, by virtue of competing pressure diffusion and poroelastic effects, improve the productivity of the first producer, so to say as an ‘added bonus’ for up-sizing. In the currently operating triplet regime, injectivity also appears to increase with operation time i. e. with the cumulative volume of fluid turnover, this being attributed to (thermo-)hydrogeochemical rather than hydraulic-poroelastic effects. Scoping poroelastic simulations are complemented by a comparison of fluid residence time distributions and thermal lifetime expectations between the two (quadruplet versus triplet) configurations.