Contribution ID: **520** Type: **Oral Presentation**

Predicting the long-term thermal performance of EGS reservoirs from tracer tests using ensemble smoother with multiple data assimilation

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The long-term heat extraction from enhanced geothermal systems (EGSs) highly depends on the flow and transport characteristics in the underlying fracture networks connecting injection and production wells. Tracer testing is a powerful diagnostic tool for subsurface fracture characterization. However, interpreting the obtained tracer data for long-term thermal performance prediction is not a trivial task because of the inherent complexities of subsurface fractures and the generally insufficient geological/geophysical knowledge. We explore using a data assimilation approach, ensemble smoother with multiple data assimilation (ESMDA), to interpreting tracer data for long-term thermal performance prediction in EGS reservoirs. There are three major components in the proposed approach: 1) We use principal component analysis (PCA) to reduce the dimensionality of fracture models. 2) We use ESMDA to assimilate various tracer data (conservative and sorptive tracer) jointly and obtain a posterior ensemble of fracture models. 3) The posterior fracture models are used to perform thermal simulation and predict long-term thermal performance. We developed a field-scale EGS model to verify the capability of the proposed approach in fracture characterization and long-term thermal performance prediction. We also applied the approach to a meso-scale field experiment to further demonstrate its potential application in subsurface reservoir characterization. The results indicate that the long-term thermal breakthrough behavior can be appropriately predicted by assimilating conservative and sorptive tracer data simultaneously.

Time Block Preference

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References

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