

## Numerical simulation method based on tracer experiments of geothermal reinjection

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The pressure of a thermal reservoir in the uplifted zone of Cangxian county has dropped sharply due to long-term geothermal exploitation. Thus in order to maintain the aforementioned pressure, tracer experiments of geothermal tailwater reinjection were conducted, and comsol was adopted to establish a reliable numerical simulation method. The conclusions are as follows: (1) A one-dimensional equivalent seepage channel model was adopted to fit the test data with the goodness of fit  $R^2=0.9779$ , thus indicating the fitting effect is good. In addition, the parameters received through inversion were used to predict the thermal break of exploration wells, which show that the thermal break may occur at around 10.4a. (2) A three-dimensional geothermal numerical model was established to fit the test data and the fit is as good as the goodness of fit  $R^2=0.9663$ . In this case, the parameters received through inversion show that thermal break is possible to occur at around 9.4a. Compared with the results of the model mentioned we conclude: (1), both models are similar in their degree of vertical dispersion and time of thermal break, hence mutually prove their reliability. (3) The thermal break time predicted by the two models is around 10 a, which is relatively short. Corresponding suggestions to avoid an early thermal break are to appropriately enlarge the distance between the reinjection well and the exploitation well or to set a more reasonable reinjection and exploitation volume.