Investigation of the key controls on mine-water temperature in legacy coal mine workings in the UK.

Recovering heat from legacy coal mines in the UK could contribute to the decarbonization of residential heating, which today account for ~50% of the energy consumption. However, there is no clear understanding on the controls on mine-water temperature and on the long-term geothermal potential of flooded mines. Using numerical modelling, we investigate the effect of past mining activities on the temperature distribution in a 2D mine of simple geometry. Results suggests long-term perturbations of the geothermal gradient induced by pumping from highly permeable voids that could partly explain the discrepancies between the predicted and observed mine-water temperature in mine-shafts.