

## Temperature effects on the solute diffusion process in kaolin clay

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Widespread, below-ground constructions of waste storage, geothermal energy, and infra-structure facilities such as nuclear waste deposits, ground source heat pump systems, and underground subways have lead to local subsurface temperature anomalies. Soil temperature markedly affects solute transport and retardation processes in sediments, including diffusion, adsorption, and desorption. In this study, the effect of temperature on solute diffusion was investigated. The diffusion of KCl in water-saturated kaolin clay with different void ratios was measured at three different temperatures (6, 15, and 40 degree Celcius) using a newly-developed specified volume diffusion apparatus (SVD). The diffusion processes of both Cl<sup>-</sup> ion and K<sup>+</sup> ion in kaolin clay as a function of void ratio and temperature will be discussed in detail, and proxy-functions for predicting the influence of temperature and compaction on the solute diffusion coefficient in kaolin clay will be presented.

Keywords: solute diffusion, temperature, kaolin clay, compaction