The effect of the salt viscosity on future evolution of the Gorleben salt diapir, Germany

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Abstract
The Gorleben diapir, which has been targeted for radioactive waste disposal, contains large blocks of anhydrite. Numerical models that depict the geometrical configuration of the Gorleben diapir are used to understand internal structure of diapir caused by movement of the anhydrite blocks for various salt rheologies. It is shown that the rheology of the salt plays a significant role in how and at which rate the anhydrite blocks sink within the diapir. The mobility of anhydrite blocks depends on the effective viscosity of salt which has to be lower than threshold value of around 10^{18}–10^{19} Pa s. Decreasing salt viscosity allows the previously “stationary” anhydrite blocks to sink. If the effective viscosity of salt in post-depositional stage of the Gorleben diapir falls below this threshold value, induced internal flow due to the present anhydrite layer might disturb any repository within the diapir.