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Integrated Salt Studies

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The growing importance of salt in the energy, subsurface storage, and chemical and food industries also increases the challenges with prediction of geometries, kinematics, stress and transport in salt. This requires an approach, which integrates a broader range of knowledge than is traditionally available in the different scientific and engineering disciplines.
We aim to provide a starting point for a more integrated understanding of salt, by presenting an overview of the state of the art in a wide range of salt-related topics, from (i) the formation and metamorphism of evaporites, (ii) rheology and transport properties, (iii) salt tectonics and basin evolution, (iv) internal structure of evaporites, (v) fluid flow through salt, to (vi) salt engineering.
With selected case studies we show how integration of these domains of knowledge can bring better predictions of (i) sediment architecture and reservoir distribution, (ii) internal structure of salt for optimized drilling and better cavern design, (iii) reliable long-term predictions of deformations and fluid flow in subsurface storage. A fully integrated workflow is based on geomechanical models, which include all laboratory and natural observations and links macro- and micro-scale studies.
We present emerging concepts for (i) the initiation dynamics of halokinesis, (ii) the rheology and deformation of the evaporites by brittle and ductile processes, (iii) the coupling of processes in evaporites and the under- and overburden, and (iv) the impact of the layered evaporite rheology on the structural evolution.