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Brine migration in relation to young processes: the Schleswig-Holstein example.

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The occurrence of salty waters close to the surface provides severe problems in many basins. For instance, brines protruding toward the aquifers can disturb wells and pollute the freshwater resources. In different regions of the North East German Basin, salty water reaches the near-surface. This long-term phenomenon is manifested by the occurrences of salty springs and brine pools as well as by the growth of seashore salt grass in the inner part of the basin. Numerical models of coupled fluid flow, heat and mass transport have shown that salty waters seated at depth of 4 km can reach the shallow aquifer driven by thermal buoyant forces. However two essential questions remain open: how does this deep-fluid circulation interacts with the shallow aquifer and to which degree do young processes affect the basin (i.e. faults, Quaternary channels, active salt tectonics, anthropogenic impacts)? For investigating these aspects, the Schleswig-Holstein region serves as study area. An excellent database for both shallow and deep geological structures is available. Based on these data a numerical model accounting for the mentioned features is built. Investigations into the potential dynamics governing fluid discharge and recharge in relation to deep fluid-flow and young processes elucidate the key factors controlling the formation and evolution of saline waters within basins. At the same time, this research has an important practical use for water resource management.