



Mechanisms driving saline waters in the North East German Basin: results from thermohaline simulations.

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In different areas of the North East German Basin (NEGB) saline waters come close to or even reach the surface. Several mechanisms may be responsible for driving the heavier saline water toward shallow aquifers. The driving forces can be intrinsic to the basin like thermal variations or external (hydraulic head). However, because the topography is rather flat in the NEGB, local effects from a varying hydraulic head can not be the only reason for this process. On the other hand, it is proved that temperature gradients can lead to dissolved salt transport over large spatial scales and significantly shorter migration time scales than compared with diffusion alone. This flow regime is also referred to as thermohaline convection. Based on an extensive data collection, a hydro-geological model of the NEGB has been built. An appropriate fluid density model is also incorporated in which brines are supposed to be pure NaCl solutions. In order to analyse the possible transport mechanisms within the basin thermohaline simulations have been carried out along a profile of the basin. The results point out that the complex pattern of near surface occurrences is probably due to the interaction of hydrostatic and thermal forces (i.e. mixed convection). The potential presence of large-scale convection cells has implications both for the fundamental understanding of basin processes as well as for socio-economic issues.