Geophysical Research Abstracts,
Vol. 10, EGU2008-A-00149, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-00149
EGU General Assembly 2008

Impact of anthropogenic activities on brine and heat transport processes in the Schleswig-Holstein region (Germany).

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Previous numerical models of thermohaline flow have been built in order to study how deep-fluid circulation within sedimentary basins interacts with shallow aquifers. Particular attention has been given to the role of young processes (i.e., faults, Quaternary channels, and shallow salt structures) in affecting groundwater flow at basin scale. The results show that beside topography-driven flow, different convective regimes are play a role for extensive solute exchange between shallow and deep aquifers. Furthermore, the young basin features strongly control discharge and recharge processes. At this state, the issue to be solved is the impact of anthropogenic activities such as pumping stations on brine migration and heat transport. Pumping groundwater in saline environment can provide severe problems. For instance, brines up-coning can disturb wells and pollute the freshwater resources. Although the presented studies focus on the Schleswig-Holstein region, Germany, the results are of great interest for many sedimentary basins in which the described features are commonly encountered. Investigations concerning the potential impact of anthropogenic activities on the dynamics of deep and shallow groundwater processes will provide additional knowledge concerning 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.