PROCEEDINGS

25TH SALT WATER INTRUSION MEETING

17-22 JUNE 2018

GDAŃSK POLAND

Modeling the efficiency of subsurface water solutions for controlling saltwater intrusion in a chalk aquifer affected by glaciotectonical impact

Per Rasmussen[1], T.O. Sonnenborg[1], S.A.S. Pedersen[2], R. Jakobsen[3] and K. Hinsby[1]
[1]Department of Hydrology, Geological Survey of Denmark and Greenland, Copenhagen, Denmark
[2]Department of Groundwater and Q, Geological Survey of Denmark and Greenland, Copenhagen, Denmark
[3]Department of Geochemistry, Geological Survey of Denmark and Greenland, Copenhagen, Denmark

ABSTRACT

Water supply wells in the glaciotectonially disturbed coastal Chalk aquifer of the Island of Falster, Denmark are affected by salt water intrusion from the Baltic Sea and from deeper saline parts of the Chalk aquifer. We evaluate the efficiency of different combinations and modifications of the Dutch subsurface water solutions "Freshkeeper" and "ASR Coastal" in the disturbed Chalk aquifer on Falster. These subsurface water solutions have demonstrated strong potential for controlling saltwater intrusion in several Dutch studies in sandy aquifers. Tracer and pumping tests, borehole logging and other hydrogeological investigations show that the Chalk aquifer behaves like a single porosity media in some parts of the aquifer, and as a dual porosity fractured media in other. We demonstrate the effect of both types of porosity distributions in two partly different conceptual model setups guided by the conducted field investigations using the modeling packages MODFLOW/MT3D/SEAWAT. Our results demonstrate that the design of efficient measures like the subsurface water solutions "Freshkeeper" and "ASR Coastal" to control salt water intrusion highly depends on the hydraulic characteristics of the system. Hence, these have to be well known before designing efficient measures to control saltwater intrusion in complex aquifer systems like the Chalk glacitectonites of southern Falster, Denmark.