A synthesis of hydrogeology of NE-Belgium

K. Vandersteen*, M. Gedeon, B. Leteeme, B. Rogiers
SCK-CEN, Belgian Nuclear Research Centre, Mol, Belgium
*katrijn.vandersteen@sckcen.be

1. Objective and scope

Presentation of the up-to-date knowledge on the hydrogeology of the aquifer systems surrounding the Boom Clay

2 different research programs (as defined by ONDRAF/NIRAS):
1. Geological disposal of high level and/or long-lived radioactive waste in the Boom Clay in NE-Belgium (regional scope - no site)
2. Surface disposal of low-level radioactive waste in Mol-Dessel

2. Geological structure of NE-Belgium

3. Concept of deep and shallow aquifer system

- Boom Clay: effective aquitard
  - Shallow aquifer system:
    - Surface hydrological processes
    - Seasonal head fluctuation
  - Deep aquifer system:
    - Confined
    - Limited groundwater sources
    - Low-rate groundwater flow
    - Decreasing heads due to groundwater extraction

4. Shallow and deep aquifer system characteristics

Boundaries of the aquifer systems

5. Conclusions

Knowledge on shallow and deep systems is on a different level:
- Shallow aquifer system:
  - Base concepts understood
  - Refining models (processes), parameters
  - Reducing uncertainty (transport)
- Deep aquifer system:
  - Some of the concepts and/or processes not sufficiently understood:
    - Boundaries, hydraulic interconnectivity with the shallow aquifer system
    - Importance of density driven flow
    - Considerable parameter uncertainty

References

Baerten, 2011; SCK-CEN-BIL-1078

Acknowledgements: This work is performed in close cooperation with, and with the financial support of NIRAS/ONDRAF, the Belgian Agency for radioactive Waste and Fissile Materials, as part of the programme on geological disposal of high-level/long-lived radioactive waste that is carried out by ONDRAF/NIRAS.

Water quality

Ca HCO₃ type
Na HCO₃ to NaCl type