1. Objective and scope
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
SSW-NNE geological profile in the Campine according to the Belgian Geological Survey (Walstra and Dusar, 2013). The main geological features are the Diest erosion channel, the dipping of the geological layers towards the north and the presence of younger formations to the north.

3. Overview of 30 years of data acquisition and modelling

- Data acquisitions
- Modelling

Timeline of data acquisitions and modelling analyses performed in the frame of the Belgian programmes related to disposal of radioactive waste (Vandereen et al. 2013).

4. 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
  - Influence of groundwater extraction
  - Decreasing heads

Evolution of the yearly groundwater head in 5 piezometers of the SCK-cen piezometric network for the Neogene Aquifer (shallow aquifer system), the Oligocene Aquifer System and the Lodo-panisian-Brusselian Aquifer System (deep aquifer system) (Vandereen et al., 2013).

Relationship between hydrostratigraphy, hydrology and geomorphology in the eastern Nebeq catchment (Beerten, 2011). The contribution of different stream trajectories to the discharge is indicated by the thickness of the streamlines.

General characteristics of the shallow and deep aquifer system

- Hydraulic parameters: Rather well characterized
- Data scarcity increases with depth
- Boundaries: Well defined
- Uncertain (bottom, E faults)
- Driving forces for groundwater flow: Surficial processes (topography, rivers, infiltration)
- Groundwater extraction (limited sources)
- Groundwater levels: Seasonal variation
- Decreasing heads
- Groundwater flow direction: To NW (from Campine plateau), influence of rivers, groundwater divides
- Water quality: Ca-HCO₃-type
- Na-HCO₃ to NaCl-type

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 are not sufficiently understood:
    - § Boundaries, hydraulic interconnectivity with the shallow aquifer system
    - Parameter uncertainty considerable
    - Processes (density driven flow)

References
Walstra, J. and Dusar, M., 2013. Three geological cross-sections through the Campine Basin Royal Belgian Institute of Natural Sciences, Geological Survey of Belgium.

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