

## Porosity, Permeability, Thermal Properties of clastic rocks. A case study in Stenlille Structure, Denmark.

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The focus of this study is to understand the properties of clastic rocks (Fjerritslev Fm- Gassum Fm) in Stenlille area in order to know if the reservoir is a suitable model for a deep Heat Storage site. The Stenlille Structure is a gas storage facility for Danish natural gas. It became clear in the 1980s that the Stenlille facility could also function as a seasonal heat storage (Laier T., 2012) in shallow layers. Rise of temperature due to the injection of hot water (90°C) influences the properties of reservoir such as Porosity, Permeability, Heat Capacity and Thermal Conductivity.

Properties of rocks are investigated by different methodologies:

- The Porosity is calculated from standard well log interpretation starting from Density and Resistivity log.
- The Permeability is based on Kozeny equation (Kozeny J., 1927) and on core data.
- Thermal Properties (Thermal Conductivity, Heat Capacity) are calculated according well log interpretation and empirical relationship with porosity (Fuchs S., 2014).
- With the aim of Petrel2015 we will be able to calculate volumes of the Sandstones bodies ( Gassum Fm) Shales ( Fjerritslev Fm) and also estimate the distribution of the properties described above in order to recognize patterns between them.

### References:

1. Fuchs, S., Förster, A., 2014. Well-log based prediction of thermal conductivity of sedimentary successions: a case study from the Northern German Basin. *Geophysics Journal International* 196, 291-311.
2. Kozeny, J., 1927. Ueber kapillare Leitung des Wassers im Boden. *Sitzungsberichte der Wiener Akademie der Wissenschaften* 136, 271-306.
3. Laier T., 2012. Results of monitoring groundwater above the natural gas underground storage at Stenlille, Denmark. *Geological Survey of Denmark and Greenland Bulletin* 26, 45-48.