Compaction and Geomechanics testing

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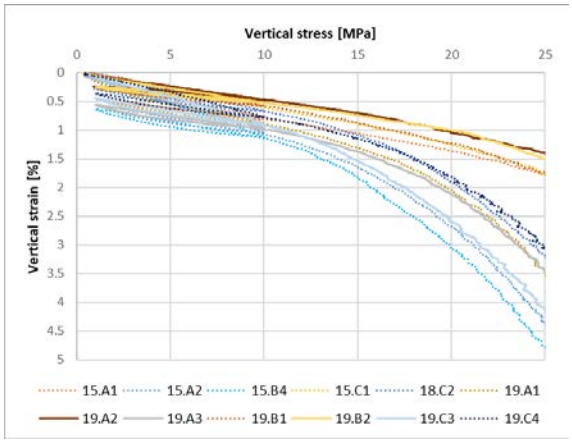
TRD LOCRETA Work package E – Rock Mechanics

The work presented in the poster is part of the on-going Locreta project focusing on Lower Cretaceous formations and has the following working hypothesis: *"Compaction/subsidence is an important contributor to the drive mechanism"*. The study aims to provide compaction multipliers for tested formation using a test program comprising 30 compaction tests on specimens from the Lower Cretaceous Upper Tuxen formation. All test specimens are characterised before testing by, e.g. porosity and permeability and both horizontal and vertical specimens are used. Testing is carried out at ambient temperature, and test conditions are hydrostatic or uniaxial compaction. The pore fluid is light laboratory oil or chalk saturated tap water (full saturation). Ultrasonic shear and compressional velocities are measured in all test phases. The tested core material stems from the *Valdemar* structure and covers the porosity range from 30 to 45%. Further, the dataset will allow a comparison between the geomechanics properties of the Boje and the Valdemar structures.

Examples of stress-strain curves for oil as well as water saturated test specimens are illustrated in Figure 1. The curves show a significant difference in pore collapse stress between oil and water saturated samples with oil saturated samples (warm colours) showing the highest values. Differences between vertically and horizontally oriented test specimens are, undetected at present (Figure 1a). Figure 1b shows measured time-dependent properties, and using the de Waal rate type compaction model, measured properties allow for conversion of laboratory test data to field strain rate.

a)



b)

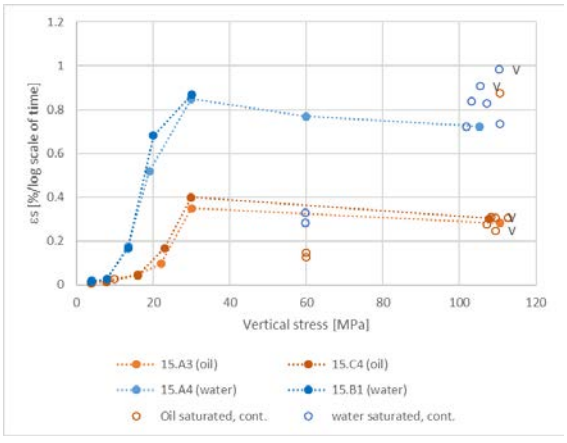


Figure 1. Examples of measured properties from geomechanical compaction tests using oil as well as water saturated specimens. a) Stress-strain curves. b) Time-dependent properties versus stress.

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