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Determination of density in different rocks using a 3D scanner
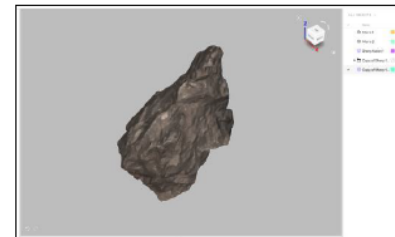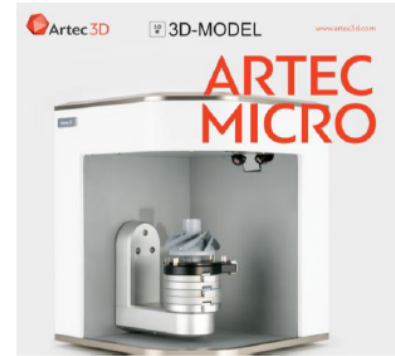
Motivation

Density of sedimentary rocks is essential for modelling and evaluating vertical stresses and compaction and is used to understand mechanical integrity and productivity of deep geothermal reservoirs and gas storage sites. Not all rock types are suited for a density determination via the archimedes principle. Therefore optical volume measurements using a 3D scanner can be quick and easy alternative without maring the sample.

Tasks and requirements:

- testing of the new ArtecMicro 3D Scanner
- elaborating a workflow for measuring samples and processing 3D scans
- comparing different approaches for volume and density measurements of unregular samples

- **requirements:** technical understanding, interest in geology and petrophysics

- **context:** integration of new techniques in the build up process of a density data base

Supervisor:

- Peter Obermeier (peter.obermeier@tum.de)

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Estimation of mineralogic composition of shales and mudstones by using the liquid limit (Casagrande)

Motivation:

Geological seals and barriers are often made up by fine grained sediments with a low permeability. The properties of these horizons are important to understand the thermo-hydraulic processes in a potential reservoir. Mineralogy is one of the key parameters and a comparatively low cost workflow allows an estimated mineralogic composition.

Tasks:

- fieldwork and preparation of shales and mudstones in lab
- testing the elaborated lab workflow by other users
- reproducing results and adding new datasets from other outcrops
- error analysis on workflow and possible improvements

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