Geophysical Research Abstracts
Vol. 20, EGU2018-13492, 2018
EGU General Assembly 2018


# Onshore P- and SH-wave seismic surveys on the Chalk Group – a high-resolution study to link internal structures and petrophysics to seismic attributes

Janina Kammann (1), Mattia Tagliavento (2), Lars Stemmerik (2), Alireza Malehmir (3), and Lars Nielsen (1)

(1) Department of Geosciences and Natural Resource Management, University of Copenhagen, Copenhagen, Denmark, (2) Natural History Museum of Denmark, University of Copenhagen, Copenhagen, Denmark, (3) Department of Earth Sciences, Uppsala University, Uppsala, Sweden

The Chalk Group is of special interest because it contains groundwater aquifers onshore Denmark and hydrocarbon reservoirs in the North Sea. The Stevns peninsula, eastern Zealand offers a unique opportunity to study a reservoir analogue. Based on different data types from this area, we examine the influence of rock physical parameters linked to specific facies of the chalk on seismic wave propagation. Excellent outcrops of the 30–40 m high cliffs, exposing Danian as well as upper Maastrichtian chalk successions, in combination with available log and core data as well as well described sedimentary features within the nearby quarry, offer the opportunity for detailed analysis of vertical and horizontal rock variations. Underlying the $\sim$ 5 m of clay till and $\sim$ 15 m thick Danian chalk, the upper Cretaceous chalk group reaches a depth of approximately 900 m in our study area.

P- and SH- wave seismic profiles of 450 m length were acquired subparallel to the cliffs in the vicinity of the chalk quarry, with a close tie to the local borehole. While the P-wave profile was acquired with an accelerated weight-drop impulse source, the compact vibro-seis source Elvis III S8 was used for SH-SH configuration. The upper 200 m are imaged by both, P- and SH-wave seismic profiles and besides differing resolution, also show differences in reflectivity of the occurring chalk intervals. Both acquisition techniques resolve the Cretaceous-Paleogene boundary at 15–25 m depth. With the SH-profile we are able to resolve mound structures within the Danian and upper Maastrichtian successions. The P-wave profile vertically images the full Chalk Group and shows marked reflectivity at the base of the Chalk Group. At different depth intervals occurrences of marl and linked changes in rock physical parameters appear to be important elements for understanding differences in seismic signal.