



## **Interpretation of Chalk Group P-wave velocity structure based on refraction seismic data collected on the Stevns peninsula, Denmark**

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The Chalk Group mainly consists of chalk and lithified chalk of Late Cretaceous - Danian age. A minor part of the group consists of clay, marl, flint, and sandstone. Below the Stevns peninsula in the southeastern part of Sjælland, Denmark, the Chalk Group is about 800-1000 m thick, and its top is located just below the up to 5 m thick Quaternary glacial deposits. The P-wave velocity structure of the Chalk Group is interpreted along a 7.5 km long, north-south-oriented refraction seismic profile line on Stevns. A total of 176 seismic recorders were evenly distributed along the central 6 km long part of the line, and 18 shots (300-500 g of dynamite) were fired along the profile line. Two of the shots were located about 750 m north and south of the recording line end points. Clear arrivals are observed to 6-8 km offset. Distinct refracted and reflected arrivals are observed from within the Chalk Group. We subdivide the group into three different units based on the refraction seismic observations: The uppermost unit has an average thickness of about 300 m and shows velocities of 2.2-2.7 km/s; the second unit is about 300-400 m thick and has velocities of 3.0-3.7 km/s; the lowermost unit shows velocities of around 4.0 km/s. A clear reflection from 800-900 m depth is interpreted as representing the base of the Chalk Group. Compaction and diagenesis during subsidence and burial are the most important factors controlling the seismic velocity structure of the succession, and the presented results provide new information about the burial history and maximum burial depth of the Chalk Group in eastern Denmark. The new data sets challenge the general belief of uniform subsidence during the Late Cretaceous and Paleocene followed by 500-600 m post-Paleocene uplift.