



## **Interpretation and mapping of carbonate mounds within the Ordovician on Gotland, Sweden**

Tegan Levendal, Daniel Sopher, and Christopher Juhlin  
Uppsala University, Uppsala, Sweden (tegan.levendal@geo.uu.se)

Oljeprospektering AB (OPAB), a Swedish state owned company, acquired an extensive data set in the 1970s and 1980s for the purposes of hydrocarbon exploration. This OPAB data set is largely unpublished and consists of over 300 well data reports and logs and over 33000 km of 2D marine seismic data, as well as land seismic data from the island of Gotland. In this study we use processed land seismic profiles from Gotland and well data to interpret the thickness of the Ordovician across the island. As well as gain insight into the internal stratigraphy and structural framework of the Ordovician. The Ordovician sequence is 100-150 m thick consisting of three formations (Fm), informally defined by OPAB, the Bentonitic Limestone Fm, the Kvarne Fm and the Klasen Fm. Carbonate mounds are locally formed from siliciclastic rich muds. In the lower sequences carbonate mounds are present that are observed both in the seismic and well data. These mounds were of great interest during the exploration phase since they are sometimes host to hydrocarbon accumulations. In the present study we place emphasis on mapping the size, distribution and density of the carbonate mounds within the Ordovician. The original driving force for the development of these mounds are related to sea level and climate changes during deposition. Post depositional erosion, biotic factors and basin evolution also played a role in their development. During the Late Ordovician-Early Silurian, Baltica moved northwards towards the equator resulting in a typical depositional environment consisting of proximal coastal areas, and transgressive, lowstand shelf settings conducive to mound development. The mounds act as potential reservoirs, in the form of isolated bodies of limestone capped by tabular and tight argillaceous limestones acting as a cap rock.

To date studies of carbonate mound features have primarily focused on detailed analysis of well log, core and outcrop information. This extensive dataset therefore provides a rare opportunity to map out and characterize an Ordovician carbonate mound system across a wide area in 3D. This will provide valuable information about the size and distribution of these mounds. In addition, the mounds are today of interest as potential reservoirs for energy storage in the form of compressed air or hydrogen. In order to investigate this potential, it is important to map their extent and characterize their reservoir properties.