



Investigation of an Ordovician carbonate mound on Gotland, Sweden, using 3D seismic and well data

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The Swedish island of Gotland is located within the Baltic Basin. During the Ordovician period the region around Gotland, had at times, relatively warm, shallow marine conditions, which allowed carbonate mounds to develop. These mounds form due to the build-up of algae and other creatures on the sea floor and can be seen on seismic profiles as isolated concave upwards structures. The dimensions of these mounds on Gotland can range between 200m to 800m in diameter and 10m-25m in height.

The sedimentary succession on Gotland was intensely investigated in the 1970s and 1980s for its hydrocarbon potential. Traces of oil were reported in old stratigraphic wells drilled by the Geological Survey of Sweden and several oil seeps had been observed in a few Ordovician and Silurian outcrops on the Swedish mainland. Initially, the Ordovician limestone, was only considered as a secondary prospect as it appeared to lack suitable reservoir rocks. Oljeprospektering AB (OPAB), a mainstream oil company, identified several carbonate mounds of Ordovician age from seismic surveys that contained hydrocarbons. They appeared as seismic anomalies in the form of bumps on otherwise relatively sub-horizontal horizons. In 1980, a 3D seismic survey was conducted by Horizon Exploration Ltd using the Mini-SOSIE technique, a low energy source, recording data along a series of parallel lines over the Fardume mound on northern Gotland. To date no results from this 3D data have been published in scientific literature.

In this study, we present results from this 3D seismic survey alongside well data to gain a better knowledge of the geological structure of the mound and to examine its reservoir characteristics. To date, Carbonate mounds on Gotland have mainly been investigated in scientific literature using well data. This 3D seismic survey, therefore, provides a rare opportunity to characterize and investigate the structure of one of the Carbonate mounds on Gotland, in 3D.