Late Cretaceous Lysing Turbidite Reservoir Characterization of the Dønna Terrace, Norwegian Sea

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ABSTRACT

The Dønna Terrace is located on the Norwegian continental shelf between the Nordland Ridge and the Rås Basin in the Norwegian Sea. Most fields in the area have been producing from Jurassic reservoirs for the past 30 years. Production has since declined in these mature fields, which prompted exploration in the shallower Cretaceous, post-rift stratigraphic succession. Cretaceous-age turbidites have been found in the Norwegian Sea and the Lysing gas condensate discovery made by BP in the year 2000 triggered a new chapter for the Cretaceous exploration.

Turbidite systems are considered the most important clastic accumulations in the deep sea and represent the sediment-transfer system between the hinterland source area and the deep-sea depositional sink. The architecture of these reservoirs is exceedingly complex. In the face of extremely high costs, it is more important than ever before to accurately characterize these reservoirs. In this research, a set of seismically-driven approaches have been chosen to characterize the deepwater turbidite system.

In the research area, 13 wells have been drilled and five of them penetrated the Lysing turbidite sands. Three wells have been cored. Two of them are publicly accessible. Well reports, core images of the target depth range, available GR logs serve as the base for the stratigraphic interpretation and facies mapping. Modern seismic attributes including post-stack inversion, seismic signature classification, as well as others are applied for accurate geometry mapping of the turbidites and to determine primary and secondary turbidities and their provenance area.

The results of the study include a consistent methodology for accurate turbidite identification in a depositional framework based on state-of-art seismic attributes. These results allow a more reliable identification of turbidite-based reservoirs thus improving the success drilling rate.

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