

# Basin Analysis and Characterization of Fingerdjupet Sub-Basin Jurassic Sandstone Reservoir - North Barents Sea, Norway using Petrel (Industry Standard) Computer Modeling Software

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Using geological techniques including wireline log analysis, 2D reflection seismic survey, core sample analysis, and computer modeling, subsurface maps and cross-sections of the North Barents Sea, Norway were developed to identify new hydrocarbon extraction drilling targets, as well as to analyze and characterize the petroleum system elements. The Fingerdjupet Sub-Basin is located in the Bjornoya Ost area and previously drilled wells in the area contain information on the horizons of interest in this data set; the Knurr Fm (Top of the seal), the Hekkingen Fm (Top of the source rock), the Sto / Nordmela Fm (Top of reservoir rock), and the Fruholmen Fm (Top of the source rock). These are known together as The Kapp Toscana Group.

The Kapp Toscana Group is composed of three main formations in the location of interest. The Sto formation is composed mostly of reworked well sorted sandstone with small units of siltstone and shale. This sandstone was most likely deposited during prograding coastal environments. The siltstone and shale were most likely deposited during transgression when the environment of deposition changed from flood-plain to pro-grading coast (Farazani, 2017). The age of this formation is from Pliensbachian to Bajocian. The Nordmela Formation is mostly composed of interbedded siltstones, sandstones, shales, and claystone with some coal stringers, all of which are Sinemurian to Late Pliensbachian in age (Faranzi, 2017.) Most likely deposited in a tidal flat to flood plain environment, with sandstone sequences representing tidal channels and estuarine channels. Composed of shale coarsening upward into interbedded sandstone, shale, and coal (Farazani, 2017, Dalland et al., 1988,). The Fruholmen formation is aged Early Norian to Triassic-Jurassic (Farazani, 2017). It is likely that this Fruholmen Formation served as a source rock due to the lithological variations in the formation with such high amounts of organic content.

The North Barents Sea is a very economically viable area to explore for hydrocarbons and the formations in this data set have very useful associated well log data via drilling and associated background information from the Norwegian Petroleum Directorate that assists greatly in the exploration process. These data in conjunction with past drilling activities have solidified these as the most promising formations in all of the North Sea for hydrocarbon accumulations and production. The proposed drilling targets have a very high likelihood of revealing viable information regarding the extend of fluid flow in the area and whether or not economically significant hydrocarbon accumulations are able to accumulate in described half – graben, rotated fault block traps.

