

Basin and Petroleum Systems Modeling of the Olga Basin, Northern Barents Sea

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ABSTRACT

Several rift structures extend from the western margin of the Barents Sea onto the Barents Shelf and form a series of Mesozoic Basins, e.g. Tromsø Basin, Hammerfest Basin. These rift structures continue towards the northeast into older Paleozoic rift structures, e.g. Nordkapp Basin. In the northern Barents Sea it is still an open question how these structures continue. The northern Norwegian part of the Barents Sea covers an area of approximately the same size as the southern Norwegian Barents Sea, where numerous oil and gas reservoirs were found with two of them being currently in production. Seismic, potential field and well data are available in the southern Barents Sea due to the long exploration history there. The northern Barents Sea is exempt from commercial activities, therefore the amount of available data is much less. Nevertheless, the area is studied by academia, research and government institutes. The Olga Basin is situated ~250 km southeast of Svalbard in the northeastern Barents Sea and so far informally classified by the Norwegian Petroleum Directorate as a shallow Cretaceous basin in an overall platform area. Below the Cretaceous basin, an older basin of presumably Paleozoic age is present. We studied this basin with multi-channel reflection seismic data (MCS) and shallow sediment samples. Our MCS data and refraction seismic data from literature are the structural base for a basin and petroleum system model (BPSM). Results from bound gases of seafloor samples together with the BPSM model allow us to speculate about the age of possible source rocks in the basin. Potential Mesozoic as well as Paleozoic source rocks are known from Svalbard and the southern Barents Sea.