



Significance of the new BAS-06 aeromagnetic survey for a better understanding of salt tectonics and basin structure in the Barents Sea

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A new generation of high resolution aeromagnetic surveys has been initiated in the Barents Sea to update the existing compilation. The BAS-06 magnetic survey provided an original and more detailed magnetic picture that improved our understanding of the geology and structure of the Nordkapp Basin and its surrounding platforms. The new magnetic data combined with gravity and available seismic data have helped significantly in refining our interpretation on both basinal and crustal scales.

Derivatives and advanced normalised filters were used to enhance magnetic features in specific areas like the Bjarmeland Platform, the Nordkapp Basin and the Finnmark Platform. The new magnetic data confirm most of the previous structural elements but new features appear and illustrate the inherent complexity of the Finnmark Platform and Nordkapp Basin. More particularly, onshore-offshore relationships are more clearly defined and new structural trends appeared north of the Varanger Peninsula. They attest a more complex tectonic scenario in which the Caledonian compressive system appears to truncate pre-existing NW-SE trending Timanian structures, acting most likely as a free tectonic border during the Caledonian Orogeny. Regional arcuate anomalies suggest that the main trend of the Caledonian nappes probably swings from a NE-SW trend close to Varanger Peninsula to NW-SE near Nordkapp Basin. This pattern could be part of a larger system involving several nappes and thrusts sheets on a regional scale in the pre-Carboniferous basement of the Barents Sea.

Another result of this survey was the clear demonstration that modern, high-resolution aeromagnetic data provide an efficient and promising tool for mapping diapiric salt

features in the Barents Sea. We show that magnetics can aid and support the interpretation of salt features and basin segmentation in the Nordkapp Basin. Along the graben, the magnetic responses due to salt structures, are usually characterised by small, low-amplitude (<4-5 nT), negative magnetic anomalies. The dimensions of the domes are very similar to those interpreted on gravity and seismics. Also, magnetic lineations around the negative anomalies coincide with sedimentary layers deformed by the rising salt during active and passive diapirism that commenced in Early Triassic time. Consequently, the new survey can add significantly to the qualitative mapping on both a regional and basin scale. NGU and partners including Chevron Norge, Eni Norge, the Norwegian Petroleum Directorate, RWE Dea Norge and StatoilHydro financed the BAS-06 Survey.