

## Alternative Source Rocks in the Norwegian sea – Potentially Cretaceous sourced hydrocarbons in the Møre and Vøring Basins

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Using geochemical data contained within IGI's Norwegian Sea Geochemical Database (compiled from released data on the Norwegian Petroleum Directorate's website), a regional geochemical interpretation report has been produced which ventures, in part, into the potential for Cretaceous source rocks and generated hydrocarbons in the deeper regions of the Møre and Vøring Basins. Key source rocks in the Norwegian Sea, such as the Jurassic Spekk & Åre Formations are deeply buried in these basins and are likely to be exhausted of any hydrocarbon potential. Recent discoveries such as Ellida and the Ormen Lange gas field have further promoted exploration to the west of the Haltenbanken, with a focus on potential Cretaceous source rocks.

The Shetland and Cromer Knoll groups are shown to contain organic-rich units (Fig.1) with good oil-prone source potential throughout the Norwegian Sea; however, the availability of Cretaceous source rock data from the Møre and Vøring Basins is currently limited, and consequently it is difficult to fully determine source potential in these regions in more detail.

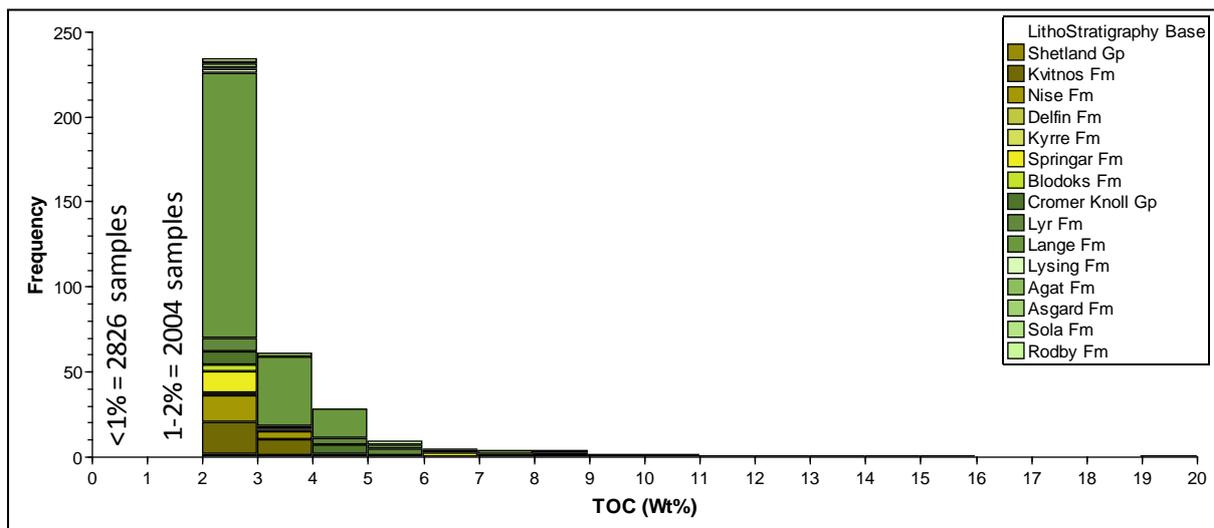


Figure 1: Histogram of Total Organic Carbon content (wt%) of source rock samples from the Lower Cretaceous Cromer Knoll Group and Upper Cretaceous Shetland Group

The nordiacholestane ratio (NDR; using  $C_{26}$  diasteranes) has been successfully used to distinguish between potentially Cretaceous and Jurassic sourced hydrocarbons, with most oils and stains (with available data) from deep water wells being characterised by  $NDR > 0.3$ . The carbon isotope and sterane compositions do not appear to correlate with available Cretaceous source rocks, but rather appear to correlate better with the Jurassic Melke Formation. Similarly, hopane carbon number distribution data correlate these oils with the Åre Formation rather than with Cretaceous source rocks. However, the limited Cretaceous source rock data for these deep water regions makes correlation difficult,

and we currently put our confidence in the age diagnostic biomarker characteristics in the oils rather than a positive correlation with one or more particular Cretaceous source rock intervals.

Cretaceous potential in the Norwegian Sea is currently under evaluated, but the study conducted as part of the regional geochemical evaluation by IGI begins to collate evidence (from available public data) to support the likely presence of alternative hydrocarbon sources within the deeper basins in the west. Further details on regional source rock characterisation, oil grouping and oil-source correlation are available in IGI's multiclient report for this area (IGI Ltd., 2016)