

THE 7120/1-3 GOHTA OIL DISCOVERY – OPENING UP A PERMIAN PETROLEUM SYSTEM ON THE LOPPA HIGH, SW BARENTS SEA

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Introduction

The Gohta prospect, located on the Loppa High structure in the SW Barents Sea (Norway), was tested with exploration well 7120/1-3 in 2013 by operator Lundin Norway and partners Det norske and Noreco. The well discovered a 34 m gas column and 75 m oil column in Upper Permian carbonates of the Røye Fm (OWC at 2389 m). The total depth was 2539 mTVD (RKB).

A DST in the Røye Fm produced 683 Sm³ (4300 bbls) of oil and 220000 Sm³ (7.8 Mcf) of gas per day, for the first time proving a working hydrocarbon reservoir in karstified and fractured Permian carbonate rocks on the Norwegian continental shelf.

Core chips, cuttings and fluid samples from well 7120/1-3 were analysed using established geochemical methods; GC EOM/whole oil, MPLC, GC SAT and ARO, GC MS and d¹³C isotope analysis. Age specific biomarkers were also identified. The geochemical data from 7120/1-3 was interpreted and compared with similar data from other oils from the SW Barents Sea area.

Results and discussion

The Gohta-oil is a light, non-biodegraded crude oil with API 39° and contains less than 1wt% sulphur and asphaltenes. Light hydrocarbons, biomarkers and aromatic compounds suggest that the Gohta-oil was expelled from a "peak oil" mature source rock. Biomarkers, GC data and isotopes point to a marine, siliciclastic source rock with low input of terrigenous organic matter.

Other, well known source rocks in the SW Barents Sea are marine mudstones of the Lower to Middle Triassic Klappmyss and Kobbe fms and the Upper Jurassic Hekkingen Fm. Oils from these source rocks are easily distinguished using eg. biomarkers and isotopes. The Gohta-oil, however, appears to represent a source rock facies different from the well-known Triassic and Jurassic source rocks. Age specific biomarkers in the Gohta-oil indicate a pre-Jurassic source, while the presence of gammacerane, not commonly found in oils from the Norwegian continental shelf, suggest a non-Triassic source. Gammacerane is nevertheless identified in extracts of Upper Permian mudstones in eg. wells in the North Sea.

We therefore propose marine mudstones of the Upper Permian Ørret Fm as source rock for the Gohta-oil, thus adding a newcomer to the Barents Sea oil families.

Conclusions

The Gohta-oil is a non-degraded, light oil, low in asphaltenes and sulphur

GC and isotope data indicate that the Gohta-oil was expelled from a marine, siliclastic source rock at peak oil maturity

Age specific biomarkers point to a pre-Jurassic source rock for the Gohta-oil

The biomarker compound gammacerane (uncommon in most Barents Sea oils) is detected in the Gohta-oil, suggesting the presence of an Upper Permian oil source rock in the Loppa High area

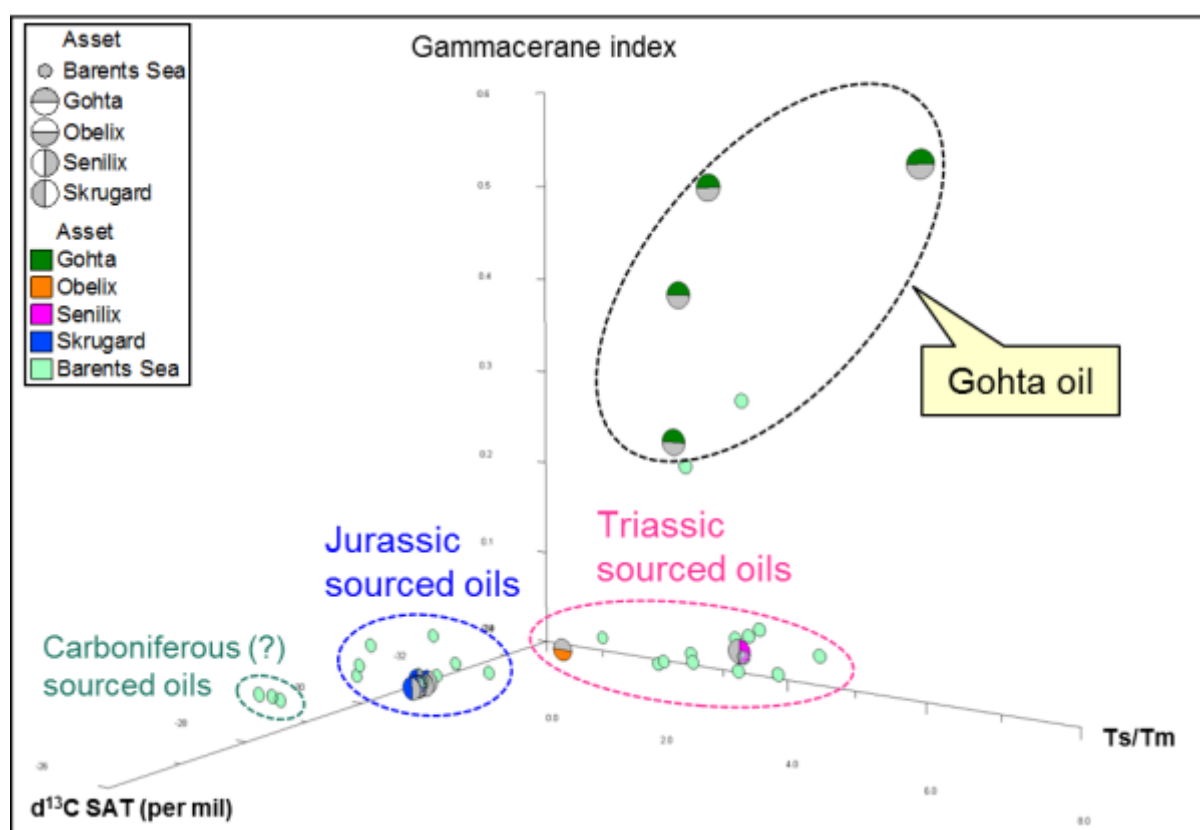


Figure 1 A plot using common geochemical parameters is useful for distinguishing oil families in the SW Barents Sea. The oil from the 7120/1-3 Gohta discovery represents a fourth oil type and may have been expelled from Permian source rocks on the Loppa High.