

A MUD ADDITIVE INFLUENCING THE GEOCHEMICAL INTERPRETATIONS OF HYDROCARBON SHOWS

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Oil based mud additives are frequently used during drilling for various purposes. The chemical compositions of these may interfere/overprint the chemical composition of hydrocarbon shows in the well and thereby complicate geochemical interpretations. This is likely to be an increasing problem the more subtle the hydrocarbon findings are.

In a study by Ohm et al. 2006 it was argued for an atypical facies of the Upper Jurassic source rock being developed in the Block 35/1 area on the Norwegian Offshore Continental Shelf (NOCS). The biomarkers of an oil show from well 35/1-1 were instrumental for their arguments. It was later discovered that the mud-additive, Versatrol, had been used during drilling of the well. Versatrol is reported to consist of 100% Gilsonite, which appears in a mineral called Uintaite a solid bitumen that occurs in the Uinta Basin (Utah), in Colorado, Canada and Mexico (Curiale, 1986, Davis et al. 2002). It is mainly composed of NSO compounds and asphaltenes with minor saturated and aromatic hydrocarbons. In the Uinta Basin, Gilsonite occurs like dikes with roots in the Eocene Green River Formation (Fm) (Peters et al. 2005).

We managed to get a sample of both Versatrol and gilsonite, which we analysed. Figure 1 show the fragmentograms of the hopane and sterane fractions of the oil sample, Versatrol and gilsonite. It is for both fractions clearly seen that the Versatrol and gilsonite samples are mirror images of each other proving the genetic relationship between them.

It is also seen that the hopane fraction of the oil show sample has a striking similarity with the mud additive used. The hopanes of the oil show turned out to be completely overprinted by the hopanes of the mud additive and therefore could not be used for any geochemical interpretations. The sterane distribution of the oil sample is contrary to the hopane fraction observed to be quite different from that of the analysed Versatrol and gilsonite samples. When comparing various facies indicators from the m/z 217 and m/z 218 fragmentograms from the oil sample and the mud additive they were found to plot significantly different strongly suggesting that the steranes of the oil sample carries oil specific information and that it is not overprinted by the signature of the mud additive.

Thus, one biomarker fraction from the mud-additive overprinting the one from the oil does not preclude that other biomarker fractions of the oil sample may be oil specific and can be used in geochemical interpretations.

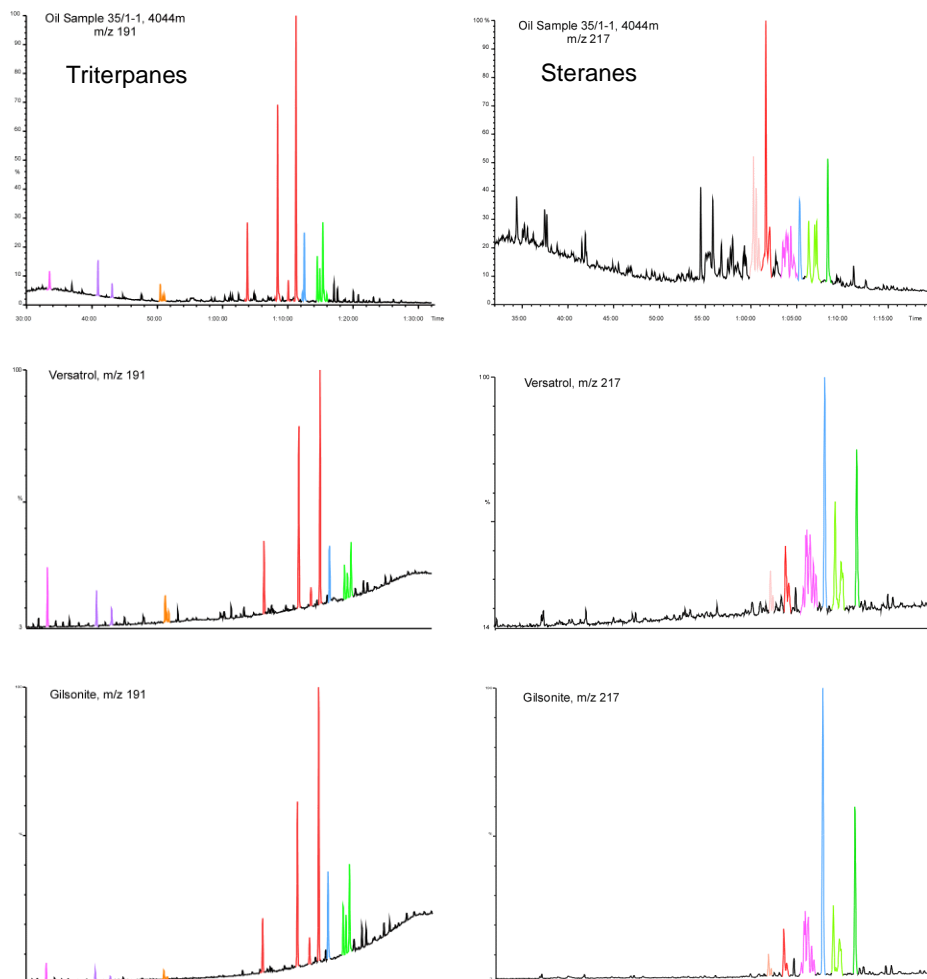


Figure 1. The triterpane and sterane fragmentograms of the analysed oil sample, the mud additive, Versatrol and gilsonite. The colour coding reflects similar peaks in the fragmentograms. There is a striking similarity between the three triterpane fragmentograms suggesting that the oil show sample is completely overprinted by the mud additive. The sterane fragmentogram of the oil sample show, however, clear differences from the mud additive and could be used for geochemical interpretations reflecting the origin of the oil and the maturity of its source rock.

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