Evidence for the origin of the West Baram Delta oils: marine versus terrigenous

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Conclusive evidence pertaining to the origin of the West Baram Delta oils were obtained from bulk property data and biological marker studies. Results from the analyses of 31 oils collected from 7 fields in the western part of the Baram Delta indicate that they were generated and expelled from source rocks containing principally land-derived Type III kerogen that were deposited and preserved in oxidising environments. Their general characteristics are as follows :

- sulphur contents < 0.15 wt %
- Pr/Ph ratios: 3.5–7.0 (oxidising depositional environments)
- high occurrence of oleanane
- low to moderate abundance of C_{24}-tetracyclics
- low to moderate abundance of bicadinanes
- low abundance of taraxastane
- the predominance of C_{29} regular steranes relative to their C_{27} and C_{28} counterparts

Some minor contribution from a marine source is reflected by the trace amounts of tricyclics. The trace to low abundance of C_{29} and C_{30} 4-methylsteranes signify only secondary input from either marine algae or freshwater lacustrine dinoflagellates.

Aromatic hydrocarbon-based biological marker maturity parameters, particularly the Methylphenanthrene Index (MPI) and the Triaromatic ratio (TA), proved to be more useful for determining the oil generation window of these oils. Results from these maturity estimations suggest that the West Baram Delta oils were generated from source rocks at peak oil window (VRo 0.8–1.0%) maturities.

In general, the West Baram Delta oils can be considered as light, paraffinic and low to moderately waxy oils with low sulphur contents. However, this general description may change slightly due to the observed differences in their bulk properties. Wide variations in API gravities (19.4° to 45.3°), wax contents (1.8 to 14.8 wt %) and pour point temperatures (–25° to 24°C) are attributed to biodegradational effects. As such, the bulk properties of the West Baram Delta oils are deemed to be primarily the result of in-reservoir bacterial alterations and not due to source facies differences.