

The C_{29} $\beta\beta/\alpha\alpha$ sterane ratio infers a somewhat higher maturity (approximately 0.6-0.8%) than is indicated by other maturity parameters. However the increase in this ratio may be due to migration effects. No significant migration is indicated by the C_{29} sterane maturity- migration plot (Figure 4) however Parameter 4 is likely to be increased due to biodegradation effects. The expected value for this parameter at a maturity level of 0.5% equivalent vitrinite reflectance is approximately 0.35. The sample would therefore plot to the right of the maturity curve implying that limited migration of this residual oil may have taken place.

The T_s/T_m ratio (Biomarker Ratio 9, Table 3) has been found to be influenced by changes in organic facies as well as maturity. Even so the ratio indicates a low maturity (approximately 0.45-0.5) which is consistent with the other parameters. A similarly low maturity is indicated by the T_s/C_{30} hopane and C_{30} moretane/hopane ratios.

Equilibration of the C_{32} 22S/22R homohopane ratio takes place in the early stages of oil generation at a value of approximately 1.5. The value obtained for the King-1 residual oil (1.09, Table 3) suggests that this sample has only just entered the main phase of oil generation.

4.2 Source Affinity and Bulk Composition

The King-1 residual oil studied has the C_{12+} bulk composition typical of an aromatic-intermediate oil (Figure 1). However heavy biodegradation has resulted in preferential loss of paraffins implying that the original oil was paraffinic in composition.

The terrestrial source affinity of the residual oil studied is evident from several aspects of its molecular composition. The dominance of the C_{29} homologues of the sterane and diasterane distributions, the presence of tetracyclic terpanes and diterpanes all suggest a terrestrial source affinity for the oil.

4.3 Post-pooling alteration

The almost complete removal of normal and branched hydrocarbons (Figure 2) shows that this oil has been subjected to extensive biodegradation. The remaining saturated hydrocarbons consist largely of naphthenic (cyclic) hydrocarbons. The boiling point distribution of these hydrocarbons suggests that the original oil was a light oil/condensate. The two distinct naphthenic 'humps' seen in the saturates chromatogram (Figure 2) imply at least two phases of oil accumulation and biodegradation may have occurred.

Unaltered terrestrial sourced oils typically have aromatics contents of approximately 15-20%. The relatively low aromatics content of this oil (3.65%, Table 1) implies that it may have undergone some degree of water washing. This process will preferentially remove aromatic and cyclic hydrocarbons relative to branched and normal hydrocarbons.