

Provenance and Thermal Maturity of Organic Matter of the Orange Basin

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Organic geochemical evaluation of shale samples from 7 stratigraphic sequences of Orange Basin was carried out in order to determine their origin and thermal maturity. The shale samples were analysed for normal alkanes, aliphatic isoprenoid hydrocarbons and biomarkers using gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS). The samples from stratigraphic sequences of Orange Basin based on this study shows marine organic matter deposition in ages between Aptian to Albian and in Coniacian and terrestrial organic matters deposited in oxic depositional conditions in Late Cenomanian to Turonian. Cross plot of Pr/nC17 versus Ph/nC18 showed that bulk of the samples are marine organic matter deposited under reducing conditions with subordinate mixed organic matter and terrestrial organic matter. The oleanane index shows low values in all the samples, an indication of low terrestrial organic matter input in the samples. The abundance of the regular steranes also indicate that most of the samples are of marine and lacustrine origin. The low values of the Ts/(Ts+Tm) in the samples showed that majority samples are thermally immature with few marginally mature. Both C29 $\alpha\beta\beta$ 20/($\alpha\beta\beta$ + $\alpha\alpha\alpha$) and C29 $\alpha\alpha\alpha$ 20S/(20S + 20R) steranes also indicate that a preponderance of the samples are thermally immature.