

ORGANIC GEOCHEMISTRY OF SANTOS BASIN OIL, BRAZILLuzia KOIKE¹, Chang Hung KIANG² and Francisco de A.M. REIS^{1*}

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The Santos Basin covers an area of about 275,000 km² along the southeastern Brazil passive margin limited north by the Campos Basin and south by the Pelotas Basin. Previous and preliminary studies reported oils originated from Upper Cretaceous shales deposited in anoxic marine environments (Mello et al., 1988a & b). Since Santos Basin is still in an immature exploratory stage, only a few data are available and even more difficult is the access to samples for geochemical evaluation.

The development of Santos Basin, as for other East Brazilian marginal basins, can be described by the following evolutionary stages: the pre-rift intracratonic stage, the continental rift stage, the evaporite stage, the post evaporite transgressive stage and the post evaporite regressive stage (Schiefelbein et al., 2000). The rift phase in the region of Santos Basin occurred between the Neocomian and Eoaptian, when the lacustrine sediments of the Guaratiba Formation had been accumulated, barely showed in the basin. This package includes successions of thick siliciclastic sediments colored with fragments of basalt, with coquinas associates. The occurrence of anoxic deposits is thought to be characteristic in the distal domains of the basin (Pereira & Feijó, 1994).

GC/MS and GC/MS/MS analyses of 25 oils samples from different offshore fields of Santos Basin were performed. The results showed predominantly unaltered oils of similar maturity with °API ranging from 27 to 46. The criteria used for differentiation of lacustrine from marine oils were those developed by Mello et al. (1995) and pristane/phytane ratio, the proportion of C₂₆ to C₂₅ tricyclic terpanes and steranes to hopane (Schiefelbein et al., 2000). Except for oils AM04, AM05; AM14 and AM15 which could be marine siliciclastic or mixed oils, the whole data support the conclusion that the remaining 21 samples are saline lacustrine oils probably sourced from Guaratiba Formation of the rift-phase, reservoired on Jiquia and Alagoas facies (Aptian). The C₂₆/C₂₅ tricyclic terpanic ratio (see figure) and pristane/phytane >1 are good indicator of the assigned oil origin.

The lack of rock samples from Guaratiba source units prevented oil/rock correlation. As a consequence the knowledge of source rock is based solely on geochemical information

of oil samples. The chromatograms patterns of Santos oil are highly similar to those of unaltered oil of Campos Basin and rock extracts of Lagoa Feia Formation (Guardado et al., 1990) which is the source rock of Campos Basin. By analogy and based on tectono-stratigraphical evolution of both basins one can speculate that Guaratiba Formation has similar characteristics as those described for Lagoa Feia Formation.

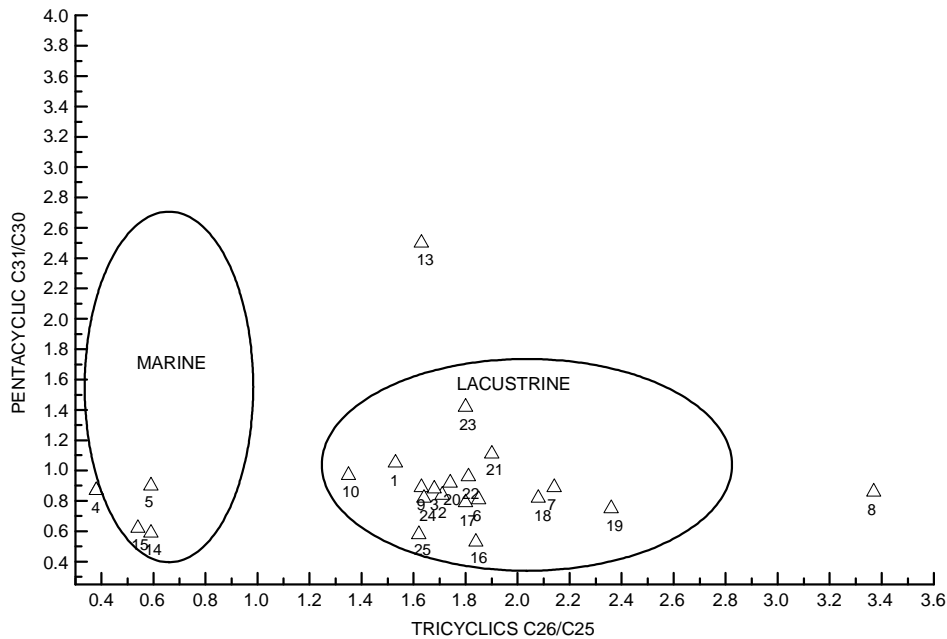


Figure 1. C_{26}/C_{25} tricyclic terpane versus $C_{31}R/C_{30}$ hopane of oils AM01 to AM25 (samples n^o 01 to 25) showing the predominance of saline lacustrine oils.

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