Biomarker Characterization Of Barreirinha And Curiri Formations, Upper Devonian Of Amazonas Basin

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Introduction

The Amazon basin has been studied since the beginning of the last century. The organic geochemical investigations carried out since 1970 have shown that oil and gas generation occurred in the basin, but few papers have been published related to biomarker characterization of the Upper Devonian section, where the main source rock interval is included. The new data presented here provide elements which may help understand the organic geochemical variations due to a change in depositional environment conditions during Upper Devonian time in the whole Amazonas Basin.

The Barreirinha Formation encompasses three shaly members deposited in a normal marine environment: the radioactive shales of Lower Abacaxis Member, the non-radioactive shales of the Urubus Member and the non-radioactive and high resistivity shales of the Upper Urariá Member. On the other hand, the Curiri Formation is mostly composed of diamictite with sandstone and shales interbedded (Cunha et al. 2007).

Experimental

The Bulk geochemical analyses were carried out in 64 samples of an approximately 230m thick Barreirinha and Curiri Formations derived from one well drilled by Petrobras. Based on the bulk geochemical data, 7 samples were chosen for organic extraction, liquid chromatography and biomarker analysis.

All geochemical analyses were performed in the Chemical Stratigraphy and Organic Geochemistry Laboratory of the State University of Rio de Janeiro using the following equipment: LECO SC 632 for TOC and S analysis, Rock-Eval 6 for pyrolysis analysis and an Agilent system 6890 GC coupled to a 5977 Mass Detector and 7000 GC-MS triple quad for biomarker analysis.

Results and Discussion

The radioactive shales of Barreirinha Formation record a GC and GC-MS trace characterized by a higher relative proportion of low molecular weight n-alkanes (<20) and high hopanes/steranes ratio (Table 01). Between the terpanes, a predominance of C19 and C20 tricyclic terpanes can be observed, as well as a series of C24, C25 and C26 des-e tetracyclic terpanes and high C27(Tm)/C30 hopane ratio, all pointing to a terrestrial organic matter input (Fig.01).

As can be in the Table 01, the Urariá Member of Barreirinha Formation shows a better biomarker correlation to the Curiri Formation, which suggests different lithostratigraphic position for it.

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<th>T</th>
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Table 01: T: tricyclic terpanes; Tm: trisnorhopane; Hop/Est: hopane/sterane ratio; nC17/nC27: ratio of low and higher molecular weight of n-alkanes.

Figure 01. Mass chromatogram of Curiri Formation at the depth of 1189.4 m, showing the series of tetracyclic terpanes from 24 to 26 of carbon number.
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References