DEPOSITIONAL PALEOENVIRONMENT OF THE UPPER DEVONIAN SECTION OF THE PIMENTEIRAS FORMATION, WEST EDGE OF THE PARNAÍBA BASIN, BRAZIL.

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The Pimenteiras Formation is the main source rock of the Parnaíba basin and was deposited during the Devonian period in the absence of oxygen with the sedimentation of shales rich in organic matter in a period of maximum marine inundation that occurred at the age of Frasnian (RODRIGUES, 1995). The characterization of the organic matter contained in depositional environments is important for several areas of knowledge and uses associated microscopy and geochemistry techniques to determine their facies (MENEZES et al., 2008).

This work aims to characterize the depositional paleoenvironment of the Pimenteiras Formation based on the study of geochemistry and palynofacies. We sampled 13 samples of rocks from the Pimenteiras Formation of the Parnaíba Basin in an outcrop near the city of Aparecida do Rio Negro, Tocantins state, with the stratigraphic aspect of the contact between the Cabeças Formation (above) and the Pimenteiras Formation (bellow) (Figure 1).

Using parameters of the palynofacies, through the identification and quantification of the particulate components of the organic matter and their vertical variation along the section, it was possible to classify the kerogen as type II and III and to evaluate the conservation of organic matter deposited. Were identified components of the groups of Palinomorphs, Phytoclasts and Amorphous Organic Matter (MOA) (Figure 1). Some samples resulted from deposition in an environment with high potential for preservation and low energy with large amount of MOA. In others some samples it was possible to infer that the paleoenvironment, although still of shelf, has suffered a fall of the sea level, allowing the greater influence/contribution of terrestrial/continental organic matter. A considerable number of prasinophytes of the genus *Pterospermella, Cymatosphaera, Durvenaysphaera, Leiosphaeridia, Tasmanites, Hemitrupitia and Maranhites* were identified, indicating flood surfaces possibly from Frasnian.

The Total Organic Carbon TOC (0.21 – 2.0%) results demonstrate low to high potential for hydrocarbon generation. The data of the Rock-Eval pyrolysis suggest that the samples present a low amount of free hydrocarbons (S1), due to the little or no natural generation, due to the thermal immaturity, affirmed by the low values of Tmax. The values of S2 indicated low hydrocarbon potential. The analysis of organic carbon isotopes (δ13C) presented values varying between -25.9 to -29, and saturated biomarkers, with pristane / phytane ratios (1.54 to 2.78%), gamacerane / H30 (1.96 - 12.94%) and the distribution of C27-C28-C29 regular steranes, showed alternation of values characteristic of the marine environment, which is characteristic of terrestrial environment.

The samples studies Pimenteiras Formation presents in general organic matter deposited in the environment of shallow platform, but was possible observed also there are the occurrence of the most important marine entrance of the basin, added to the largest global anoxia event occurred in Frasnian. From the base to the top on the outcrop, there is variation of the deposited components, some samples indicate the increase of the terrestrial contribution of the organic components, characterizing marine regressions and, in other samples, the increase
of the marine input, which characterizes marine ingestion and increase of sea level, with interpretation of a transitional environment in the period of deposition, with oscillations of the sea level (Figure 1).

Corroborating the palynofacies interpretation of depositional alternation conditions, the geochemical analyses showed alternation values that are characteristic of influence of the marine environment and of terrestrial environment.

![Figure 1](https://example.com/figure1.png)

**Figure 1** Graphic of marine (prasinophytes, acritarchs and Amorphour Organic Matter) and terrestrial organic components (phytoclasts and spores) and on the photo the Pimenteiras Formation outcrop. A- acritarch; B- prasinophyte Maranhites sp.; C- Chitinzoan; D- phytoclast and E- Spore.

**References**


