Basin Modeling and Thermal Maturation in the Rio Muni Basin-Equatorial Guinea Offshore

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The Rio Muni basin (offshore Equatorial Guinea) is a proved petroleum province with hydrocarbons generated in the Aptian-Albian and Cenomanian source rocks with Upper Cretaceous and Lower Tertiary clastic reservoirs.

The overburden and lateral variation of the heat flow control the thermal maturity of the source rock. In the northern sector (Cameroon), a higher overburden produces an overmaturation. In contrast, new wells drilled in Rio Muni (southern area) reveal immature source rocks due to a local low heat flow. Therefore, a north-south trend of maturation and hydrocarbons generation can be observed. In the north, the generation took place during the Late Cretaceous, while in the south, it occurred during the Tertiary.

The main reservoirs show two major sedimentary inputs. The first entry point is in Cameroon (Nkam delta). In this area the sediments are trapped in a wide platform with high accommodation space. In contrast, a second entry point is located in the central Rio Muni basin. Here, the presence of major transform faults (Kribi and Ascencion) has generated a narrow platform with low accommodation space. As a result of this paleogeography, well-defined channels and turbidites were developed during the deposition of the Upper Cretaceous Megasequence.

Therefore, the central portion of Rio Muni Basin is the most prospective area because it combines the development of Upper Cretaceous turbidites with a late generation and expulsion occurred during Tertiary times. This petroleum system was confirmed for several oil accumulations in the area.