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PETROGEOPHYSICAL ASSESSMENT FOR CHARACTERIZATION IN RESERVOIR ROCKS IN THE AMAZON BASIN

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Introduction

The Amazon Basin has a long history in oil exploration, beginning in 1917 with research focused on coal deposits. In 1925, the first oil drillings near Itaituba revealed traces of oil and gas, sparking further exploration. Today, under the Onshore Oil and Gas Exploration Revitalization Program (REATE), exploration has advanced, with increased access to technical data encouraging partnerships and investments. Notably, ENEVA and ATEM acquired exploratory blocks in the Amazon during the December 2023 ANP auction. This study aims to enhance geological knowledge of the region's rock formations, focusing on petrophysical properties to support oil and gas exploration. Its multidisciplinary approach underscores its importance to both academic and industrial sectors.

Method and/or Theory

The project evaluates three wells from the Amazon Basin: 1-AM-5-AM, 1-AM-6A-AM, and 1-AM-8-AM, selected for their proximity to enable data correlation. Available geophysical well logs, seismic data, and rock sample data from ANP's REATE platform were analyzed. The methodology includes three phases: (I) formation evaluation to assess fluid storage potential using logs such as gamma ray, resistivity, neutron, and sonic; (II) integration of rock and log data to identify lithologies and petrophysical properties; and (III) presentation of rock physics data through graphical crossplots to establish correlations between porosity, mineralogy, and saturation.

Results and Conclusions

Although the selected wells were drilled in the mid-20th century and do not show commercial hydrocarbon presence, they offer valuable geological insights. Preliminary analysis shows variations in gamma ray responses indicating lithological changes, shales showing high radioactivity, sandstones showing lower levels. Resistivity logs reflect water saturation, and sonic/neutron logs suggest zones of higher porosity and less consolidated formations. These findings support reservoir characterization and help identify parameters like net pay and effective porosity. The integration of these results in future steps will deepen the understanding of the Amazon Basin's reservoir potential and support ongoing energy exploration initiatives.