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Petrophysical Evaluation of Well Logs in Reservoir Rocks from the Santos Basin, Atapu, Brazil

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Abstract

This study focuses on the petrophysical characterization of reservoir rocks in the Atapu Field, Santos Basin, considering geological factors that influence hydrocarbon distribution and accumulation. The general objective is to analyze the petrophysical characteristics of the reservoir rocks, and the specific objectives included evaluating porosity, permeability, and fluid saturation using well logs. Data from four wells (1-BRSA-1146-RJS, 3-BRSA-1172-RJS, 7-ATP-6-RJS, and 8-ATP-4D-RJS) provided by the ANP (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis) in DLIS format were utilized. Well log analysis, using specific software, determined porosity, permeability, fluid saturation, P-wave and S-wave velocity curves, acoustic impedance, and water saturation. Preliminary results highlight the impact of diagenetic processes, particularly silicification and dolomitization, on the permo-porous system. The Barra Velha Formation exhibits favorable reservoir properties, especially in intervals enriched with shrubs and spherulites. Conversely, despite its high porosity and permeability, the Itapema Formation shows predominantly aqueous saturation. Challenges in Net Pay calculation using fixed cutoffs are discussed, and methodological improvements are suggested to enhance interpretation accuracy. This research contributes to a deeper understanding of the petroleum potential in the Santos Basin, specifically in the Atapu Field, and refines well log interpretation techniques for reservoir characterization.

Keywords: Petrophysics, hydrocarbon, Permo-porous System, NetPay, Reservoir Rocks