



SBGf Conference

18-20 NOV | Rio'25

Sustainable Geophysics at the Service of Society

In a world of energy diversification and social justice

Submission code: B75NPBKXZD

See this and other abstracts on our website: <https://home.sbgf.org.br/Pages/resumos.php>

Petrophysical Characterization of the Barra Velha Reservoir in the Wells of the Sururu Field, Santos Basin, Brazil.

Ilson Pio Filho (National Observatory), Giovanni Chaves Stael (National Observatory), Thais Silva (Observatório Nacional)

Petrophysical Characterization of the Barra Velha Reservoir in the Wells of the Sururu Field, Santos Basin, Brazil.

Please, do not insert author names in your submission PDF file

Copyright 2025, SBGf - Sociedade Brasileira de Geofísica/Society of Exploration Geophysicist.

This paper was prepared for presentation during the 19th International Congress of the Brazilian Geophysical Society held in Rio de Janeiro, Brazil, 18-20 November 2025. Contents of this paper were reviewed by the Technical Committee of the 19th International Congress of the Brazilian Geophysical Society and do not necessarily represent any position of the SBGf, its officers or members. Electronic reproduction or storage of any part of this paper for commercial purposes without the written consent of the Brazilian Geophysical Society is prohibited.

Abstract

The Santos Basin is located in the southeastern region of Brazil and encompasses the coastlines of the states of Rio de Janeiro, São Paulo, Paraná, and Santa Catarina. Its area, up to the bathymetric contour of 3,000 meters, is approximately 350,000 km². Oil exploration in this basin began in the 1970s. The Brazilian pre-salt has great strategic and economic importance for the country, and currently, the Santos Basin is the largest oil-producing basin in Brazil, with 44 discovered fields. In the pre-salt section, the petroleum system consists of the source shales of the Itapema Formation and the carbonate reservoirs of the Barra Velha Formation, which date back to the Barremian/Aptian ages. This study focused on the petrophysical evaluation of the Barra Velha reservoir using well log geophysical profiles. The well used in the study was 1-BRSA-618-RJS, in the Sururu field, with the aim of studying the permeability and porosity properties of the Barra Velha Formation. The parameters calculated were the clay volume and water saturation, using the nuclear magnetic resonance (NMR) log and the total and effective porosity profiles obtained from NMR, respectively. After that, it was possible to calculate the net pay of the reservoir being studied. The profiles showed a good response, with no alterations that could hinder the petrophysical evaluation. The gamma-ray (GR) profile showed low values, compatible with a clean formation. The porosity values (TCMR and CMRP) and permeability (KTIM) were satisfactory for a reservoir region. Moreover, the NMR profile showed high values, indicating a macroporosity region. The oil/water contact was estimated at a depth of approximately 5,740 meters, where a sharp drop in resistivity profiles and an increase in water saturation were observed. The well showed an extensive oil column, around 370 meters, indicating a considerable oil accumulation in this field. The results of the calculations and the petrophysical evaluation point to a field with a large oil accumulation and possibly an excellent producer with good permeability and porosity characteristics. Near depths of 5,420 and 5,490 meters, a permeability barrier exists, as there is a drop in porosity and permeability profiles. Below the oil/water contact, the Barra Velha reservoir is still present, with a clean gamma-ray profile and high saturation. From a depth of 5,825 meters, gamma-ray values exceed the shale baseline (LBF = 75 API), representing a lithological change, transitioning into mudstone and later into shale. The analysis of well log geophysical profiles allows for geological formation to be understood, helping to characterize the reservoir and assess its production potential.

Keywords: Petrophysical Characterization, Well Analysis, Sururu Field