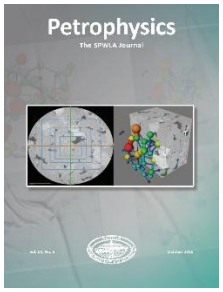

Petrophysics Vol. 66 No. 5 October 2025

TABLE OF CONTENTS PAGE

Digital-Core-Based Numerical Simulation of Conductivity in Low-Permeability Sandstone Reservoirs
Guoqing Feng and Junhui Zou
PETROPHYSICS, VOL. 66, NO. 5 (OCTOBER 2025); PAGES 858–871; 18 FIGURES, 6 TABLES.
DOI:10.30632/PJV66N5-2025a8

Application of Slip Interface Theory in the Evaluation of Casing Well Cementing Quality
Jinlin Pan, Xuelian Chen, Yuanda Su and Xiaoming Tang
PETROPHYSICS, VOL. 66, NO. 5 (OCTOBER 2025); PAGES 872–885; 9 FIGURES, 3 TABLES.
DOI:10.30632/PJV66N5-2025a9

TECHNICAL BRIEFING

That Pesky and Unpredictable Neutron Log Response in Shales
John Rasmus
PETROPHYSICS, VOL. 66, NO. 5 (OCTOBER 2025); PAGES 887–893; 2 FIGURES.
DOI:10.30632/PJV66N5-2025a10

Automatic Fracture Identifications From Image Logs With Machine-Learning Approaches: A Contest Summary
Hyungjoo Lee, Ramin Zamani, Lei Fu, Jaehyuk Lee, Chicheng Xu, Wen Pan, Michael Ashby, Vahid Dehdari, Saleh Alatwah, Juntao Ma, Jiaxin Li, and M. Amin Nizar C.A. Razak
PETROPHYSICS, VOL. 66, NO. 5 (OCTOBER 2025); PAGES 894–914; 15 FIGURES, 2 TABLES.
DOI:10.30632/PJV66N5-2025a11

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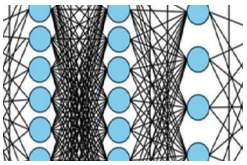
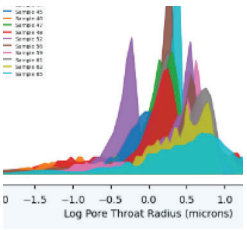
OCTOBER 2025 PAPER SUMMARIES



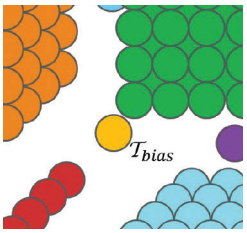
Al-Dousari et al. **PAGES 741–762**

This study proposes an efficient method for predicting static Young's modulus without requiring shear-wave data, utilizing compressional-wave traveltime, shale volume fraction, and bulk density logs. A nonlinear regression model achieved high accuracy and strong validation, while a backpropagation neural network further enhanced prediction by capturing complex nonlinear relationships.



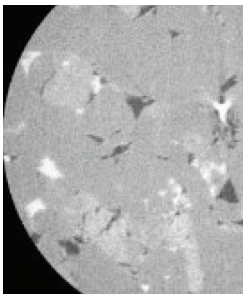
Fadhil **PAGES 807–838**

This article explores the application of quick_pp, an open-source Python library, as a tool to support the learning journey for aspiring petrophysicists using the public COSTA carbonate data set. The author demonstrates a petrophysical workflow covering lithology estimation, rock typing, water saturation modeling, and volumetric analysis with uncertainty. The work aims to provide a hands-on example of how integrating programming with fundamental principles can help newcomers develop practical skills and a deeper understanding of complex reservoir analysis.



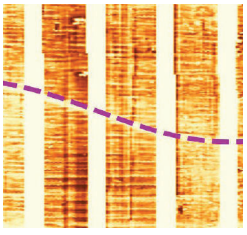
Fang et al. **PAGES 764–784**

This study constructs a multisource multimodal data set that combines conventional logging curves, NMR T_2 spectra, and geological stratification text to capture heterogeneous reservoir characteristics. To predict permeability from these diverse modalities, the authors propose an Explicit Tensor Interaction Network (ETIN) that integrates long short-term memory (LSTM), convolutional neural network (CNN), and deep neural network (DNN) modules for modality-specific feature extraction and explicitly models high-order cross-modal interactions.



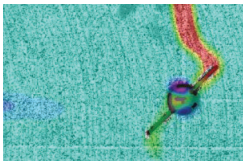
Feng and Zou **PAGES 858–871**

To address the limitation that conventional petrophysical experiments cannot systematically quantify how microstructural factors influence electrical properties in low-permeability reservoirs, this study used finite element simulations on 3D digital core models to analyze anisotropic electrical conductivity. A key innovation distinct from previous findings is that while the formation factor (F) of low-permeability sandstones follows Archie's law with porosity, the relationship between resistivity index (I) and water saturation (S_w) shows a bimodal trend at S_w \≈ 45%, deviating from classical Archie behavior. This result highlights the need to integrate pore-scale complexity into petrophysical models to improve resistivity-based saturation evaluations in tight hydrocarbon systems.



Lee et al. **PAGES 894–914**

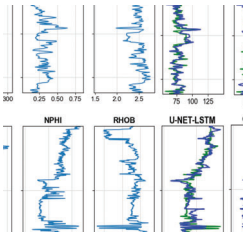
This paper summarizes a machine-learning competition focused on creating an automated and consistent method for detecting fractures in borehole image logs. The competition used resistivity image logs and other conventional data from wells in the Western Canadian Sedimentary Basin to train and evaluate models. The results showed that advanced machine-learning techniques can significantly enhance the accuracy of fracture identification, supporting the integration of data-driven solutions into petrophysical workflows.



Liu et al. **PAGES 728–740**

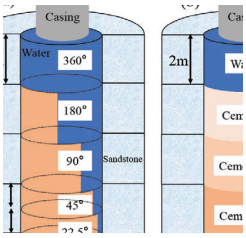
This paper studies the local mechanical failure behavior of wellbore rocks under uniaxial compression and describes the local mechanical failure behavior of rocks with initial defects during the elastic deformation stage by applying the theory of configuration mechanics. A damage constitutive model of wellbore rocks considering initial defects is constructed.

OCTOBER 2025 PAPER SUMMARIES



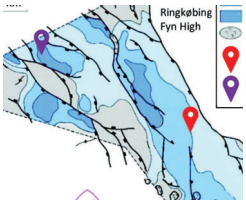
Oppong et al. **PAGES 785–806**

This study introduces a hybrid U-Net and LSTM network model for predicting missing compressional slowness (DTC) well logs. The model combines the U-Net's ability to extract multiscale spatial features with LSTM's strength in capturing depth-wise sequential trends. Evaluated on data from the FORCE 2020 competition, the U-Net-LSTM outperforms a benchmark CNN-LSTM model, achieving lower error rates and higher correlation, demonstrating its potential for reliable and geologically consistent log reconstruction.



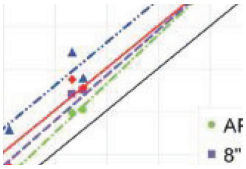
Pan et al. **PAGES 872–885**

Based on the slip interface theory, a new cased well model was developed, enabling quantitative evaluation of cement bonding quality between the casing and cement sheath by shear coupling stiffness. Compared to classical casedhole models, the new slip interface-based casedhole model successfully characterizes the continuous transition from well cemented bonding to complete debonding. Inversion results derived from both experimental and field well data demonstrate the superior effectiveness of the shear coupling stiffness curve in identifying small uncemented sector angles.



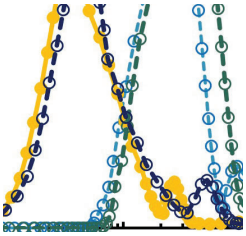
Prosetakis and Fabricius **PAGES 705–727**

We present a novel log interpretation workflow that combines the electrical log with a physical model for electrolytic conduction to quantify permeability, irreducible water saturation, and total water saturation, highlighting the additional use of Archie's m exponent. A complementary acoustic log workflow aids in identifying mechanically weak zones. Together, these approaches refine subsurface characterization and overcome limitations of conventional log interpretation.



Rasmus **PAGES 887–893**

Ever wonder why commercial neutron measurements from different vendors and even from wireline and logging while drilling read different porosities in shaly formations? How can I relate these measurements to lithology? Are these differences also reflected in non-shaly formations? We'll try to answer these questions in this article.



Zhu et al. **PAGES 840–857**

Estimating the NMR T_2 spectra and porosity of shale reservoirs is challenging due to the presence of iron-bearing minerals, organics, and complex pores, which hinder fluid evaluation critical for shale oil/gas. This study examines the Funing Formation shale in the Subei Basin through laboratory experiments to better define reservoir properties, identify bound water, and assess the impact of iron minerals on porosity. It corrects T_2 relaxation via NMR principles and mineral susceptibility, building T_2 spectrum and porosity correction models.