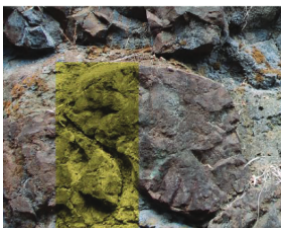
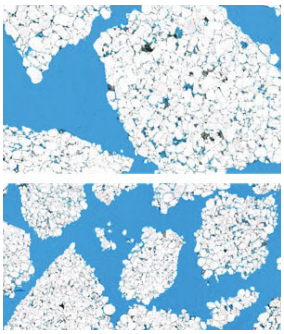
DECEMBER 2024 PAPER SUMMARIES



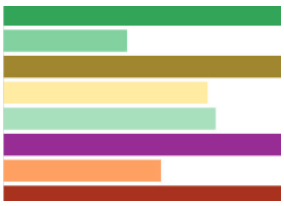
Alves Fornero et al. **PAGES 887–894**

The article presents a new methodology for creating synthetic borehole images from photographs of outcrops, aiming to improve the geological interpretation of subsurface formations. The technique uses algorithms in Python to generate pseudo-borehole images that respect the actual dimensions of the wells, allowing for a more accurate comparison with real borehole images. The results demonstrate that synthetic images can be useful in complex facies classification and have the potential to be applied to artificial intelligence algorithms.



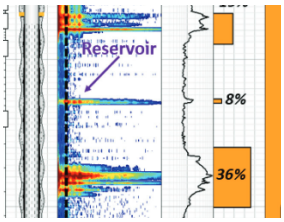
Britton et al. **PAGES 866–874**

A thin-section image-based artificial intelligence (AI) model has been developed and validated to determine analog petrophysical properties when conventional core samples are unavailable. Applying the AI model to analyze synthetic cuttings—derived from conventional core plugs with measured rock properties—enabled an evaluation of the feasibility of using cuttings to determine petrophysical analogs. However, when minimum representative elementary volume (REV) conditions limit the application of the AI model due to the small size of cuttings failing to capture the formation's heterogeneity, thin-section images from other formation-representative rock materials, such as rock chips or rotary sidewall cores, may provide more reliable inputs for AI analysis.



Cely et al. **PAGES 957–969**

This study presents a new gel permeation chromatography (GPC) method for analyzing reservoir oils and drill cuttings to predict fluid properties like API gravity. It uses machine-learning models to enhance accuracy and overcome challenges with oil-based mud contamination. The innovation unlocks valuable reservoir data from readily available drill cuttings, improving well integrity and field development strategies

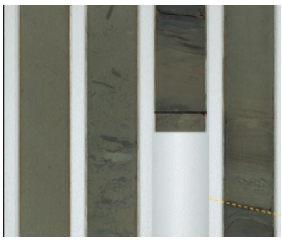


Galli and Pirrone **PAGES 919–927**

This paper shows how advanced noise logging (ANL) is the key to addressing tricky wellbore and completion integrity issues and introduces a novel methodology for the quantitative use of ANL using an in-house spectral analysis of the recorded data. The outcomes of the extensive ANL analysis represent a strategic input for production optimization activities, remedial jobs, workovers, well test interpretations, permeability estimations, and three-dimensional (3D) dynamic reservoir modeling.

Hawthorn et al. **PAGES 913–918**

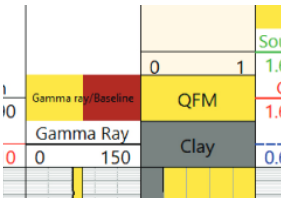
This paper discusses the criticality of understanding both operational and ultimate client logging goals when conducting casing and cement evaluation on drillpipe in parallel with ongoing operations.



Kostin and Sanchez-Ramirez **PAGES 1010–1022**

Perched water intervals and their associated transition zones, encountered in exploration, appraisal, or production wells, pose significant challenges to subsurface characterization workflows, often leading to inaccuracies in in-place volume estimation. Therefore, it is crucial to recognize and accurately describe perched water accumulations in subsurface models. The case studies from two deepwater fields presented in this paper can serve as analogs to help identify and describe perched water intervals in similar geologic settings.

DECEMBER 2024 PAPER SUMMARIES

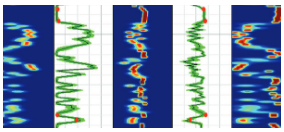


Mauborgne et al. **PAGES 929–943**

This paper highlights how a deeper understanding of measurement physics has improved accuracy, enabling the transition away from radioactive sources in high-risk drilling environments. This shift not only addresses regulatory constraints but also reduces the environmental impact of operations. The paper explores how sourceless density measurements are integrated with other data from a pulsed-neutron generator, demonstrating their effectiveness through log data results.

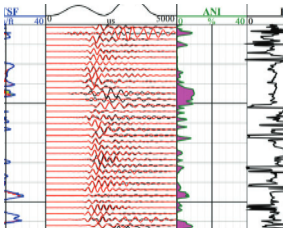
Perrier et al. **PAGES 875–886**

This paper presents an automated workflow that detects and picks non-sinusoidal bedding dip traces in real time in horizontal well borehole images and computes the corresponding orientation of the structure. It involves an AI model and clustering and interpolation methods.



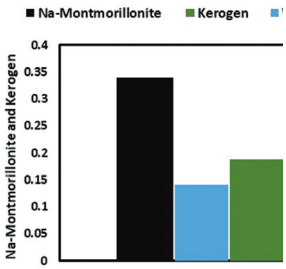
Pirrone et al. **PAGES 971–982**

The paper presents a novel physics-based probabilistic method for high-resolution permeability estimation that is capable of capturing and describing the heterogeneity of very thin-laminated scenarios. The approach is based on the integration of core data and dielectric dispersion logging.



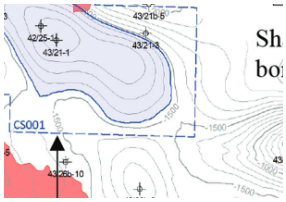
Qian et al. **PAGES 995–1009**

This paper examines the tight sandstone gas reservoirs on the northeastern edge of the Ordos Basin. Using a comprehensive analysis of logging and core experimental data, it establishes a fracability evaluation method for tight sandstone reservoirs, focusing on four key aspects: the difficulty of generating hydraulic fractures, the vertical expansion ability of hydraulic fractures, the radial extension direction of hydraulic fractures, and the complexity of the hydraulic fractures network.



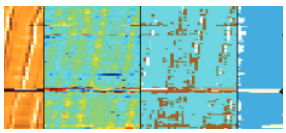
Silveira de Araujo and Heidari **PAGES 983–994**

The concept of adsorption is fundamental to understanding fine-scale interactions between solids and fluids in rocks and potentially can be used for wettability assessment. We experimentally compute water adsorption isotherms and perform sensitivity analysis on the impacts of wettability level, types of rock components, and concentrations of mineral constituents on water adsorption isotherms. The outcomes of this work demonstrate that water adsorption isotherms provide valuable insights into the interfacial interactions between a solid surface and water, offering information about the wettability of both pure minerals as well as mixtures of multiple minerals of different wettability levels.



Taplin et al. **PAGES 944–956**

As part of the Northern Endurance Partnership (NEP) CCS project, high-quality aquifer samples were required from the Bunter Sandstone Formation to assess the far-field water chemistry. An environmentally acceptable water-based mud system was developed with a new tracer chemical to monitor the sample pumpout. This system was successfully deployed in a shallow aquifer sampling job using a wireline formation tester, resulting in fluid samples with < 3% contamination.



Valstar et al. **PAGES 896–912**

This paper presents a general overview of well integrity techniques and measurements for carbon capture and sequestration (CCS) projects. It gives a recommended strategy for both the construction and monitoring phases over the life of the project.