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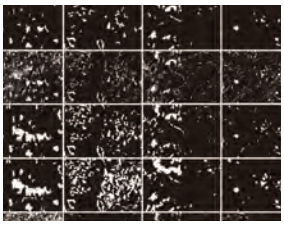
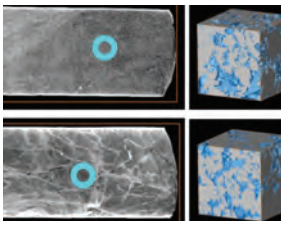
APRIL 2024 PAPER SUMMARIES



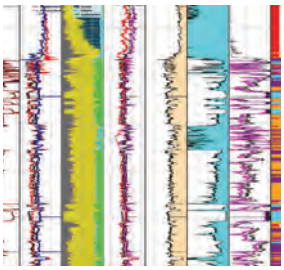
Chen et al. **PAGES 233–245**

In this study, a deep-learning semantic segmentation method was adopted. Based on the pore-net model, the pore intelligent identification and quantitative characterization of shale SEM images were realized. The results show that the pore-net model has better performance than the traditional method. This method can accurately calculate the porosity of shale SEM images and provides a reliable reference value for shale reservoir evaluation.



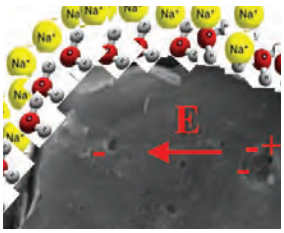
Grader et al. **PAGES 149–157**

The Valhall chalk formation addressed in this paper is heterogeneous and has high porosity and low permeability. Standard laboratory procedures for measuring for dynamic data such as capillary pressures and relative permeabilities are difficult. This paper presents an alternative digital rock method for determining relative permeabilities that compares well with some experimental data. The digitally derived relative permeability data were defined in a fraction of the time than it took in the laboratory and provide a platform for exploring the effects of various wetting scenarios.



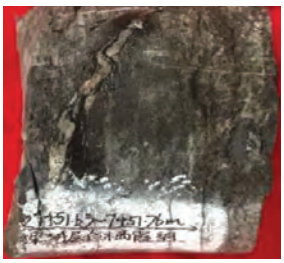
Lee et al. **PAGES 215–232**

This paper discusses the significance of MWD logs in estimating geological, petrophysical, and geomechanical properties, particularly in unconventional wells where data acquisition is limited. A novel workflow is proposed, employing machine-learning algorithms to predict triple-combo logs from drilling dynamics, followed by a physics-based joint inversion model to estimate reservoir properties. Validation on a blind test demonstrates excellent agreement, offering insights into lithofacies identification, real-time drilling operations, reservoir characterization, missing log imputations, and potentially significant time savings in computation.



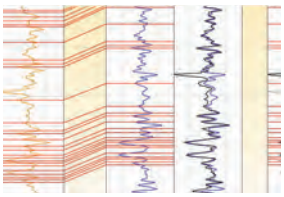
Liu et al. **PAGES 158–172**

In this paper, three special kinds of microscopic ionic capacitors models were promoted, which are (I) the intergranular pore microscopic ionic capacitor model, (II) the particle with isolated pore microscopic ionic capacitor model, and (III) the pyrite or graphite or other organics microscopic ionic capacitor model. Finally, the characteristics of microscopic ion capacitors are summarized: irregular polar area and varying distance between poles, varying charges with time, and salinity of the formation water.



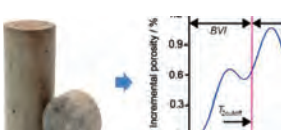
Xiong et al. **PAGES 194–214**

Based on the relationship between geology and productivity, this paper establishes the evaluation index system of high productivity controlling factors by the mathematical method. Quantitative analysis and evaluation of the relative importance of each indicator are used to determine the key controlling factors affecting productivity. The result shows that the high productivity of ultradeep gas wells in the Qixia Formation is mainly controlled by the degree of dolomitization, the distribution of high-energy shoal-mound complexes, and the degree of fracture development. It can be used to guide the deployment of new productive wells.



Xu et al. **PAGES 246–255**

This paper presents a white-box intelligent solution to the classic depth-matching problem by automatically identifying and matching events on well logs. The new method follows conventional petrophysical wisdom and allows more user interaction to validate and fine-tune the results. The automated well-log depth shift workflow significantly reduces the processing time while consistently enhancing the cross correlation between the reference log and target log.



Zhang et al. **PAGES 173–193**

Core analysis using nuclear magnetic resonance (NMR) has been widely used in the petroleum industry. A step-by-step procedure of NMR core analysis is described in detail in this paper, which could be helpful for better understanding both experiments and results.