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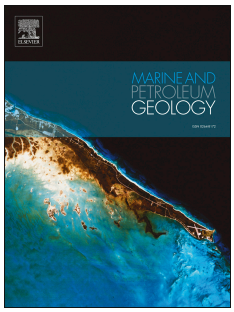

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A new model of pore structure typing based on fractal geometry

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Abstract

In this study, we report a physics-based model for pore structure typing in which a generalized model was also derived to calculate the specific surface area of the grains. In this model, a new pore-structure-type indicator was defined to characterize the discrepancies of pore structures based on the fractal geometry theory and a modified Kozeny-Carman equation. We compared the proposed model and conventional model with comprehensive experimental tests in 130 low permeability sandstone cores from the Dongfang gas reservoir in the South China Sea. The fractal dimension of the grain D_g was first accurately calculated through thin section analysis. The results show that grains of low-permeability sandstone indeed have the bifractal distribution with constant radius boundaries of approximately 30 μm, potentially accounting for the multiscale of pore spaces. Compared with the conventional model, considering the complex pore and grain size distributions as well as irreducible

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