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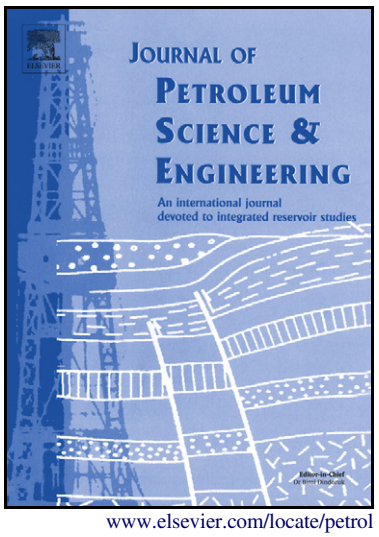

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Identification of natural gas fractured volcanic formation by using numerical inversion method

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Abstract

The difference between formation resistivity and tight surrounding rock resistivity is caused by reservoir fractures and fluid property in the pore space, when factors such as mudstone, pore and other conductive minerals are eliminated. Therefore, the use of volcanic lithology identification, the resistivity of gas-bearing reservoir, and tight surrounding layer with the same lithology are selectedto determine the formation true resistivity formula for gas-bearing intervals, which eliminates the factors of reservoir factures and fluid property in the pore space throughnumerical inversion methods. Thus, the difference-ratio value of structural resistivity is defined as the ratio of difference between formation true resistivity and deep investigation laterolog resistivity to deep investigation laterolog resistivity. Such parameters reflect the influence of reservoir fractures and fluid property in the pore space for the reduced rate of resistivity, so it identifies fluid property of volcanic fractured formation. Finally, the identification plate of oil layer, gas layer, and water layer for volcanic reservoir is established. Therefore, the natural gas layers of volcanic fractured formation is effectively evaluated and identified in combination with other well logging curves, reservoir performance data, and gas surveying information.

Keywords: Volcanic rock; Fractured formation; Lithology identification; Structural resistivity; Natural gas; Inversion methods

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