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Seismic-scale petrophysical interpretation and gas-volume estimation from simultaneous impedance inversion

Wollner U., Arevalo-Lopez H., Dvorkin J.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2017 by The Society of Exploration Geophysicists. Simultaneous impedance inversion was performed to obtain the seismic-scale P-and S-wave impedances as well as the bulk density volumes from seismic angle stacks at a siliciclastic turbidite offshore gas reservoir. To translate these variables into seismic-scale total porosity (φ), clay content, and water saturation (S w ), we used a deterministic rock-physics model established at the well. A crucial input into this model is the bulk modulus (K f ) of the brine/gas system. We need to link it to S w at the seismic scale. This link can be one of simple mixing laws, such as harmonic and arithmetic. Alternately, it can be derived at the well by using upcaled variables and ensuring that they obey the well-data-driven rock-physics model. These different K f -S w relations produce different interpretations for φ and S w thus allowing one to assess the variability in the estimates of the gas volume in place that is proportional to the product of φ and (1 - S w ).

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Keywords

Rock physics

References


