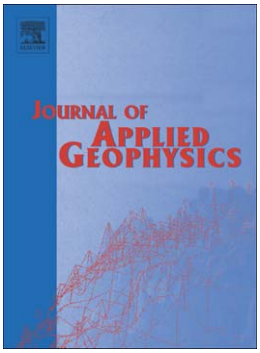

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Blocky inversion of multichannel elastic impedance for elastic parameters

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Abstract

Petrophysical description of reservoirs requires proper knowledge of elastic parameters like P- and S-wave velocities (V_p and V_s) and density (ρ), which can be retrieved from pre-stack seismic data using the concept of elastic impedance (EI). We propose an inversion algorithm which recovers elastic parameters from pre-stack seismic data in two sequential steps. In the first step, using the multichannel blind seismic inversion method (exploited recently for recovering acoustic impedance from post-stack seismic data), high-resolution blocky EI models are obtained directly from partial angle-stacks. Using an efficient total-variation (TV) regularization, each angle-stack is inverted independently in a multichannel form without prior knowledge of the corresponding wavelet. The second step involves inversion of the resulting EI models for elastic parameters. Mathematically, under some assumptions, the EI's are linearly described by the elastic parameters in the logarithm domain. Thus a linear weighted least squares inversion is employed to perform this step. Accuracy of the concept of elastic impedance in predicting reflection

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