

Time-lapse Inversion with Sparseness, Impedance and Structural Constraints

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Abstract

This paper examines an inverse framework for time lapse data. In particular, we focus our attention into the problem of incorporating sparseness, impedance and structural constraints in the recovery of time-lapse seismic signatures.

In principle, sparseness constraints and impedance bounds are used as *a priori* information to recover the missing low and high frequency spectral components. In order to increase the robustness of our inversion a structural constraint is also considered. Structural constraints are designed to control the zone of changes in the reservoir. In other words, by knowing the zone of interest one can assign spatial dependent variances to highlight areas where changes are expected. We show that a careful use of simultaneous inversion with sparseness, impedance and structural constraints can lead to good estimators of subtle time-lapse signatures.