

# **Time-lapse acoustic impedance inversion at Popeye field, Green Canyon 116, offshore Gulf of Mexico**

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## **ABSTRACT**

Time-lapse (4D) impedance inversion is an independent method that does not require prior normalization of base and seismic surveys; equivalent results are achieved with time-lapse inversion of non-reprocessed data as time-lapse inversion of reprocessed, normalized data. Inversion using specifically derived, base and monitor wavelets accounts for amplitude and phase differences between base and monitor surveys, eliminating the need to normalize the surveys before inversion. Application of these two methods at the Popeye field (Green Canyon 116, Gulf of Mexico) image the gas-water contact to move up to 900 m westward and 90 m vertically upwards and 9% impedance increase in drained regions after 4 years of production. Gassmann fluid substitution forward modeling predicts a similar 8% impedance increase in the drained region and a volumetric drainage model predicts a similar contact movement (700 m westward).

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