

Integrated Imaging of VSP and OBS Data in the Angle Domain

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ABSTRACT

Vertical seismic profiling (VSP) surveys not only provide higher-frequency data than that acquired using ocean bottom sensor (OBS) methods, but they can also be analyzed for reservoir properties via seismic inversion of angle gathers. OBS surveys, on the other hand, provide better lateral subsurface illumination coverage than VSP surveys. Integrating VSP and OBS data in depth imaging can produce results which optimize the interpretation effort: increased vertical resolution of OBS images to better delineate subtle geologic features such as sand stringers. This paper illustrates a Kirchhoff-based prestack depth migration method for VSP and OBS data to produce angle domain common image gathers (ADCIGs). To integrate VSP and OBS depth images in a seamless fashion, a post-migration processing workflow was applied to blend two sets of ADCIGs with similar dip-angle contributions. The integrated imaging of two data sets in the angle domain was successfully applied to both 3D VSP and OBS data acquired in the Northern offshore region of the Kingdom of Saudi Arabia.