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Please fill in your abstract title.	Scholte Wave attenuation with Polarization Filtering Using Pressure and Vertical Geophone sensors

Please fill in your author name(s) and company affiliation.

Given Name	Surname	Company
Mamadou S.	Diallo	Saudi Aramco, Dhahran, Saudi Arabia
Mustafa	Al Marzooq	Saudi Aramco, Dhahran, Saudi Arabia

Abstract

Objective

In OBC/OBN seismic data, Scholte wave constitute a prominent dispersive noise arrival that contaminate reflection arrivals. To attenuate this noise, we use polarization filtering method. Conventional polarization filtering methods operate on multicomponent recordings of the same physical quantity (i.e., acceleration, velocity, or displacement). We show how to perform polarization filtering by combining sensors of different physical quantities (Geophone and Hydrophone). We demonstrate the performance of the approach with actual data from an OBC survey.

Methods

We perform the polarization analysis and filtering by using hydrophone and geophone data. Analysis of the physics of particle motion at the water-solid interface, indicates that the ellipticity nature of particle motion of Scholte waves is preserved even if the polarization analysis is carried out between the geophone vertical component and the scaled hydrophone component. The impedance of a medium is the ratio between stress and particle velocity. We use this relationship between particle motion and stress to derive a scalar scaling factor between the hydrophone and geophone to apply the filter. The scaling is removed after filtering.

Results and Conclusions

We used actual data from an OBC survey to illustrate the performance of polarization filtering of Scholte waves using the hydrophone (P) and geophone vertical (Vz) components. The input data require minimal processing prior to application filter. We apply the filter in the time-frequency domain within the frequency band dominated by the Scholte wave arrivals. In this study, the discrimination between signal and noise is based mainly on one polarization attribute namely the ellipticity ratio (not shown). Comparison of input and filtered receiver gathers show a significant attenuation of the Scholte wave arrivals with minimal damage to reflection arrivals. This contribution demonstrates the ability of polarization filtering based on P and Vz sensors to successfully attenuate Scholte wave arrivals.

Novelty

Combining this method with the conventional approach that operates on receiver components sensing the same physical quantity only, makes it possible to perform polarization filtering on the complete set of multicomponent receivers (P, Vx, Vy, Vz) from OBC/OBN data. In contrast to multichannel noise filtering methods of Scholte/Surface Waves, polarization filtering is not affected by spatial aliasing. Therefore, for sparse geometry multicomponent acquisition, polarization filtering provides an adequate approach for attenuating strong interface wave noises.

References

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