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DIP-DEPENDENT CORRECTIONS FOR DATA RECONSTRUCTION IN TRUE-AZIMUTH 3D SRME

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This paper presents a method to apply dip-dependent azimuth, midpoint and offset corrections during the data reconstruction in True-azimuth (TA) 3D Surface-related Multiple Elimination (SRME). The method is applied to synthetic examples and a field dataset. Comparisons are made with a TA 3D SRME which uses a more conventional differential NMO reconstruction, with no additional corrections. Results show that the new method is capable of correcting for primaries, diffractions, multiples and diffracted multiples. It is demonstrated that correcting for azimuth, midpoint and offset effects using geological constraints, during the data reconstruction can significantly improve the prediction of multiples in the presence of complex 3D events, such as diffracted multiples.

TA 3D SRME has already been shown to deliver a significant uplift in de-multiple when compared with 2D SRME and other zero-azimuth forms of 3D SRME (Aaron et al 2008). This is the result of honoring the azimuth of input traces by predicting multiples at the exact input source and receiver locations. However, in order to predict multiples with TA 3D SRME, a large number of traces are needed with a wide array of midpoint, offset and azimuth values. Since it is not feasible to acquire all of the required offsets and azimuths needed at each location, they must be reconstructed from the data that is available.

While the differential NMO in the data reconstruction part of the SRME process attempts to correct for the offset difference between the desired trace and the best fitting trace, it does not correct for the differences in midpoint and azimuth. Our method corrects for the azimuth, midpoint and offset differences between the desired and best fitting trace.

The dip-dependent TA 3D SRME was applied to an offshore field dataset and showed improvement in attenuation of the complex diffracted multiples when the dip-dependent corrections are applied during data reconstruction.

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