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## Abstract

Seismic reservoir characterization requires to be corrected if anisotropy is present on either side of the reflection boundary. The inherent anisotropy of a layered media should be considered, both for structural imaging of subsurface features and for more advanced techniques such as amplitude variation with offset (AVO) analysis of hydrocarbon reservoirs. Because it needs to be known how much is due to hydrocarbon and how much is due to anisotropy effect.

In this study the anisotropy effect is analyzed on the horizontal alignment with vertical axis of symmetry. Utilizing well log data, the Backus averaging is carried out to calculate the anisotropic stiffness parameters from properties of the isotropic elastic layers that describe an equivalent anisotropic medium. In the next step Thomsen parameters is estimated. By using these parameters amplitude variation with offset (AVO) analysis is modified within an anisotropic media. Finally, anisotropic seismic inversion after optimizing inversion parameters is implemented.

In anisotropic rocks, there is the additional complication that the P and S wave velocities themselves may vary with the angle of propagation (angle-dependent), again causing AVO. In this research, the comparison between seismic angle gather and synthetic angle gather at well location in an anisotropic AVO class is performed. The results of anisotropic seismic inversion within a vertically transverse isotropy (VTI) media represent discrepancies in amplitude variation with offset (AVO) in comparison to the isotropic assumption case. This difference in amplitude variation with offset (especially far offset) using anisotropic correction may result in obtaining changes of elastic properties. Consequently, changes in reservoir properties estimation and reserve calculation are concluded. As can be anticipated, seismic anisotropy not only cause changes on travel time and structural imaging, but also an amplitude variation is observed that should be applied on seismic reservoir characterization.

Anisotropy effects on reservoir characterization are not considered as much as anisotropic seismic imaging. Using anisotropic parameters to perform inversion process may lead to optimizing reservoir modeling and also reduce reserve uncertainties and drilling cost.