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Geotrace introduces ray-traced anisotropic PSTM

Seismic data processing and data management company Geotrace has announced its new KirchMig tool for anisotropic ray traced prestack time imaging.

The new technique is particularly useful when imaging seismic data with long offsets (close to the horizontal), including seismic that is being used before horizontal drilling. Additionally, the inclusion of anisotropy provides more accurate imaging in the presence of rocks in which the velocity varies as a function of direction.

data and in the presence of anisotropy. It incorporates the geology and other known properties of the areas and allows us to work closely with our clients to tie together all of the available information. Ray tracing, combined with the inclusion of anisotropy, gives us a more accurate time image," Weigant added.

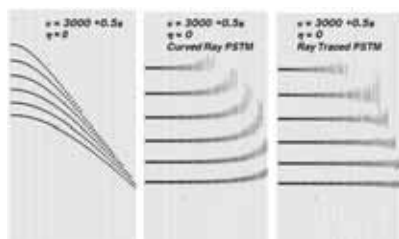


Figure 1: The synthetic isotropic gather on the left has been prestack migrated using a sixth order curved ray algorithm in the center and a ray traced algorithm on the right

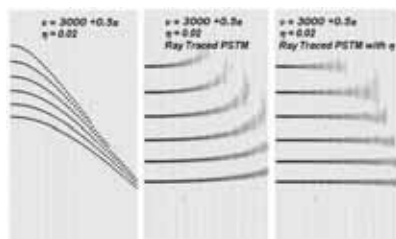


Figure 2: The synthetic anisotropic gather on the left has been prestack migrated using an isotropic ray traced algorithm in the center and an anisotropic ray traced algorithm on the right



"It is particularly good for long offset data and in the presence of anisotropy" - John Weigant, vice president of geotechnical applications with Geotrace

Geotrace's Anisotropic Ray-traced PSTM goes beyond the fourth and sixth order Taylor Series used for most "curved ray PSTM" implementations and uses one-dimensional ray tracing to more accurately image data with longer offsets and/or more complicated velocity models. The following synthetic test illustrates the superiority of the ray-traced method over curved ray in an isotropic medium where long offset data needs to be flattened.

The addition of the time anisotropy parameter, eta, further complicates the imaging challenges. It becomes necessary to include this parameter in the ray-traced imaging to properly flatten gathers when anisotropy is present. This is illustrated in figure 2.

Development of the product began in 2008, and it has been in production for several months.

"We've used this in a very complicated area in Oklahoma in the over thrust region—a particularly challenging area for time imaging," says John Weigant, vice president of geotechnical applications with Geotrace.

"We've seen some very nice results, specifically better results than we got in the past. It is particularly good for long offset

Geotrace's implementation of state-of-the-art interactive velocity analysis tools allows for fast analysis and picking of both velocities and the anisotropic parameter eta. Figure 3 shows the results of using this workflow in a very difficult imaging area. The technique helps with both dipping

events as well as deep subtle faulting that is so critical in unconventional resource plays.

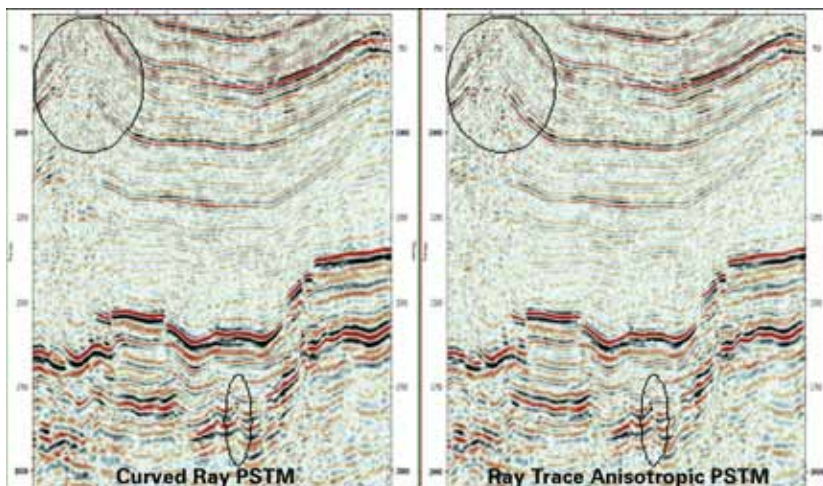


Figure 3: Anisotropic analysis and Ray Traced PSTM (right) have improved the more conventional sixth Order Curved Ray PSTM result on the left. The dipping events in the upper left of the section as well as the subtle faulting in the lower right have both been improved throughout the 3D volume