

PETROLEUM EXPLORATION IN SUBANDEAN BASINS
“Learning from the past – Looking to the Future”

Fracture Estimation using a P-Wave Azimuthal Attribute Analysis in the Cagüi Area

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A P-wave azimuthal attribute analysis using only conventional P-wave seismic data was performed in the Cagüi area in the Magdalena Middle Valley basin. The main objective of this analysis was to estimate the orientation and density of the fractures in the Rosablanca formation. This kind of study is usually conducted using multicomponent seismic data but this requires a very special type of seismic acquisition that is very expensive and uncommon in our country. On account of that it was necessary to use normal P-wave data to carry out this research. Although it is not possible to see individual fractures with conventional reflection seismic technology, it is possible to detect their overall effect in the attributes of the P-wave data.

The P-wave attributes analyzed were amplitude, AVO gradient, velocity and travelttime. Each one of them shows azimuthal dependent variation which is evidence of a fracture induced anisotropic media in the formation studied. The estimated orientation of the fractures is roughly the same in the four attributes used and is also in agreement with the well data. In the case of the density of the fractures, there are differences between the calculated values in all the attributes. The synthetic experiments reveals that the velocity and travelttime attributes are more reliable in this case. The methodology used was developed by the Edinburgh Anisotropy Project and this same study can be performed in any other area in order to support the hydrocarbon exploration.