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Case study of thin reservoir detection in Copa Macoya gas field, Eastern Venezuela Basin

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Abstract: It is a key to identify the distribution of multi-reservoir sand layers for exploration and development of Copa Macoya gas field in East Venezuela basin. However, it is difficult to estimate reservoir distribution because the each target sand layer is not thick enough to be detected by the limit of seismic resolution. In addition, synthetic seismograms cannot be tied with surface seismic data because well logs are distorted by borehole washouts, formation damage and other factors.

In order to address this problem, damaged data was corrected by applying correlations of highest quality well log data obtained from the surrounding wells, and then pseudo logs were drawn. By using these corrected data the correlation between seismic and synthetic seismograms was improved.

These data were used to define lithology index (LI) based on rotation of coordinate axis, using the relation between acoustic impedance (AI) and shear impedance (SI) as an attribute to delineate between sandstone and shale. Next, simultaneous inversion was carried out and LI volume was determined from AI and SI volumes. The LI volume was then processed with spectral whitening in order to improve the resolution of the result of the inversion.

In this research, distribution of sand layers was studied by using high resolution LI volume. As a result, distribution showed better correlation with well data than in the past for some of the sand layers. However, the anomalies that indicate the distribution of sand layers in this study area could not always be obtained, because of the limitation of the methodology applied in this study.

Key words: [thin sand](#), [well log edit](#), [pseudo log](#), [simultaneous inversion](#), [spectral whitening](#), [lithology index](#), [Copa Macoya gas field](#)

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