

Structural Analysis Using Borehole Images: Examples from the Foothills of Western Canada

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Abstract

Structural evaluation and modeling of multiple thrust-folded reservoirs in the Foothills has always been a challenging topic. The poor resolution of seismic data in the area results in considerable uncertainties regarding the interpretation and mapping of structural elements. With the advent of borehole imaging technology, the ability to analyze complicated structure controlled reservoirs has improved significantly. Borehole image derived dip data can provide an accurate interpretation at the borehole location, and clarify the importance of smaller scale structural elements that are below seismic resolution. Borehole images also provide quantitative information on bedding, fracture, and fault attributes, such as bedding orientation and fracture/fault spacing. Knowledge of these attributes is critical to assessing thrust-folded reservoirs and also aids in the exploration and exploitation of many petroleum reservoirs.

This paper will demonstrate the use of the local curvature axis and 3D structural modeling techniques to quantitatively assess thrust-folded reservoirs. With a better picture of the reservoir, production can be optimized by drilling wellbore trajectories that maximize drainage and "exploring with the bit" can be reduced with better sidetrack decisions. Examples of structurally complex reservoirs from the Foothills of Western Canada will be discussed in this study.