

Relation Between Seismic Curvatures and Fractures Identified from Image Logs - Application to the Mississippian Reservoirs of Oklahoma, USA

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Tensile fractures are often associated with structural heterogeneities such as geological anticlines and domes, which can influence the charge, seal and production rates of hydrocarbon reservoirs. The main goal of the project is to correlate high dense fractured zones measured from image logs with curvature attributes generated from post-stack seismic data. Surface seismic data can aid in the prediction of fracture orientation and intensity. The main targets of the study area are the Mississippian limestone and tripolitic chert reservoirs. The success of the wells depends on the number and orientation of open fractures that are encountered by the horizontal wells.

I generated the volumetric curvature volumes from seismic data to identify and delineate the minor faults/fractures. Fracture density is measured from the FMI logs of one of the horizontal wells. Then the fracture density is plotted along the horizontal well path and found a good correlation of fracture density from FMI with the highly deformed areas identified from curvature attributes. High fracture density is observed on the dome structures identified from curvature attributes.