

INTEGRATION OF IMAGE LOGS IN THE STRUCTURAL ANALYSIS OF THE ZAUR FIELD, LOWER INDUS BASIN, PAKISTAN

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The Zaur field is located in the Lower Indus basin. Structurally, the field is characterized by complex extension-related horst-and-graben structures. Image logs are used to constrain subseismic features and understand the complex structure.

Structural analysis of the Zaur field, based on formation resistivity image logs, is focused on structural dip determination and the identification and characterization of faults and fractures, including induced features. The analysis shows structural dip variation, in most cases along a wellbore, due to changes of dip along faults and the common occurrence of faults and fractures in the Upper Goru formation. The presence of a cluster of conjugate, conductive fractures in the A Sand is indicative of open fractures in the Lower Goru Formation, a feature which is rarely seen at this stratigraphic level. Faults rarely occur in the Lower Goru formation but are observed to have major offset with associated drag and missing sections. Both faults and fractures show a general NNW/SSE and N/S orientation similar to the orientation of faults interpreted from three-dimensional (3D) seismic, implying that these features are genetically related. Variations in dip azimuth and magnitude of faults suggests that these features are synthetic and antithetic sets developed over listric faults with relatively broad, hanging-wall rollover anticlines in the Lower Goru Formation, and complex structures in the Upper Goru formation. Observed pressure differences across major faults suggests that these faults are sealing due to shale smear and brecciation.

Induced features are breakouts with WNW/ESE orientation of the minimum horizontal in-situ stress. Their development may be related to N/S-trending normal faults of E/W extension of 'mid' Cretaceous age or to the more recent N/S collision of the Indian subcontinent with the Eurassian plate (Eocene to present day).