
Imaging of Cretaceous Fault System: A 3-D seismic Case Study in Onshore Bahrain

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The study is focused on the effectiveness of 3D seismic data for imaging subsurface faults of Cretaceous system. Interpretation was carried out through standard horizon and fault correlation tools on vertical displays as well as through generation and interpretation of time slices and horizon seismic attributes like dip and azimuth displays, which afford a quick and conclusive alignment of the lineaments.

The 3-D interpretation effort has brought out a detailed fault pattern imaging. Though the observed faults are predominantly oriented in north-south direction in line with previous work, 3-D data demonstrates that this complex fault zone actually consists of numerous fault blocks. In addition, a NW-SE trending younger fault system, not observed in earlier studies, offsetting the N-S fault system has been identified in this study mainly due to capabilities of horizon attribute analysis. Such enhanced fault pattern imaging immensely helped in appreciating the regional and local stress field orientations, thus supplementing the present day understanding of fault tectonics at the field scale. It will also be useful in planning of development effort of the Cretaceous oil reservoirs in Ahmadi, Wara, Mauddud and Nahr Umr formations. Present work reveals and reaffirms the undisputed imaging capability of 3-D technique in search of potential subsurface geological features, signifying its applicability in the central part of the Gulf through some characteristic illustrations extracted from one of Bahrain onshore 3-D surveys.
