

Merging of Multi 3D Land Seismic Surveys, Challenges and Mitigations

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ABSTRACT

During the last two decades, KOC has extensively acquired and processed 2D and 3D seismic data across the State of Kuwait. Several G&G studies such as exploration, reservoir characterization, well planning and prospect evaluation have been carried out by utilizing each data set separately. Comprehensive efforts have been paid in designing these surveys and parameterizing the processing for the highest resolution and best result in order to produce the most accurate subsurface images. G&G studies require data from multi seismic surveys, this commonly faces the classical problems of regional matching seismic horizons, faults and geological features from one survey to another. This problem is attributed to several factors including the inconsistency of acquisition parameters such as shot and receiver interval, bin size, survey orientation, static solution and seismic processing sequences. To overcome this problem, we have analyzed the differences and designed a reprocessing flow including seismic data interpolation/regularization, amplitude matching and spatial and time variant alignment to several seismic surveys to condition the different vintages and produce a seamless merged data set therefore, suitable to merge the different surveys into one unified volume. The work has been done using KOC in-house processing capabilities and included the conditioning and merging of multi surveys of 3D seismic data such as Burgan, Arifjan, Abduliya, Dareef, Umm Gudair and Kraa Almaru. The results show better tie of seismic horizons, faults, and geological features across multi survey seismic volumes. Which have been reflected on the regional interpretation and the reservoir characterization studies as well.