

2D2C OBC Offshore Processing Experience in Kuwait

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ABSTRACT

KOC conducted an extensive 2D2C Ocean Bottom Cable Seismic Survey over offshore Kuwait which consists of more than 6000 km of seismic lines as a part of KOC Exploration Campaign in 2013-2014. The seismic lines have denser spacing compared to the previous 2D Streamer Seismic Survey that was conducted in 1981-1982. The primary objective of the 2D2C Offshore Seismic Survey was to have better definition and understanding of structural and stratigraphic features particularly for Jurassic and Paleozoic as well as Cretaceous levels. Water depth in the survey area varies from 2 to 37 meters; therefore, 2 components receivers with hydrophone and geophone were utilized with the bin length of 25 meters, a nominal fold of 120 and 480 live channels with split spread configuration. The acquired data of the 2D2C Offshore Survey exhibits low signal to noise ratio because of disturbance of direct waves, short period reverberations, multiples, severe bubbling in shallow water environment. Furthermore, the seismic quality is deteriorated due to sparse geometry, less source power in particular near shore areas. The original processing of seismic data was conducted by taking into account of different aspects along the whole sequence to ensure best results is delivered. The first round of interpretation revealed that the quality of the data need to be reassessed and improved. Therefore, KOC initiated and formulated several key processing steps and techniques in order to achieve optimum results. The key processing steps are: summation of hydrophone and geophone records, horizon keyed velocity analysis controlled by established velocity model from Boubiyan Dataset and well data, receiver gather interpolation from 50 to 6.25 meters, better noise attenuation scheme and implemented state of the art demultiple techniques. Moreover, in order to tie to seismic data in the vicinity area, a consistence of static solution was introduced. Our reprocessing effort has provided significant improvements in which better tie among seismic lines, continuous seismic horizons, enlighten stratigraphic features and faults definition especially in Cretaceous, Jurassic and Paleozoic levels. The results lead to have better understanding of subsurface features and help in de-risking of offshore frontier's exploration.