
Seismic attributes associated with thin channel and crevasse splays sand identification

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In the area where there is few well data, prediction of sand distribution is greatly improved by the usage of 3D seismic data set and its attributes study. This is especially effective in area where the depositional environment is dominantly lower coastal plain

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where channel sands and crevasse splays are abundant. Seismic attributes study is more useful if there is an acoustic impedance contrast between the sand reservoir and its encasing shale. Higher confidence in seismic stratigraphic prediction is further realised if the sand reservoir is associated with a lower acoustic impedance as compare to its encasing shale.

In Bertam field which is situated on the Tenggol Arch at the flank of Malay Basin, the attributes studies of the 3D seismic data assist in the delineation of the channel sand and crevasse splays deposit. Bertam-1 well which is an oil discovery well encountered a 7 m net oil sand at Tertiary IIA sequence.

This study will attempt to illustrate a correct workflow and the application of an integrated softwares' tool in predicting the stratigraphic distribution of a channel sand and crevasse splays deposit. The workflow included quality control of the data set, analysis of geophysical parameters of the various lithologies, generation of synthetic seismogram, automated seismic horizon tracking and seismic attributes extraction. Further efficiency and accuracy were accomplished using a common database and integrated softwares' tool.

The most important success factor in this study is the selection of the seismic attributes parameter and its extraction methodology. A time window of 10 and 20 msec was chosen and the critical seismic attribute is the root-mean-square value (RMS). The quality of the RMS map is counterchecked with the maximum negative and absolute value map. The reference seismic horizon was chosen at the top of the sand reservoir which is associated with the maximum peak value. Its accuracy is controlled by the usage of automated seismic horizon tracking which is further edited by manual seismic horizon tracking in spiky area.

The results of the seismic attributes highlighted a system of complex channel sands and crevasse splays deposit. In the area of interest where there is structural closure, the RMS amplitude map suggested a varying distribution of sand reservoir. This additional data from the seismic attributes map is critical to the evaluated of a small oil field and in locating the delineation/production well.