

Application of Shell volume interpretation software in fast-track 3D seismic interpretation

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Sarawak Shell Berhad/ Sabah Petroleum Company exploration is operated under the Production Sharing Contract environment. The agreements call for certain seismic, drilling and financial commitments to be fulfilled within the 7 years of exploration period. The early discovery and fast-track development of the fields will enhance the economics of the investment. Hence, Shell is always in search of the fast-track technologies, not only to shorten the cycle time but also to reduce the risks associated with exploration. In view of the increasing usage of the 3D seismic data in hydrocarbon exploration, Shell has developed a suite of software to reduce the turnaround time for the 3D volume seismic interpretation. The package will provide not only the understanding of the regional structural framework and the seismic facies distribution, but also the detection of the potential presence of hydrocarbons.

In SSB/SSPC, a workflow for the semi-automated 3D seismic volume interpretation utilizing the above-mentioned Shell developed volume seismic interpretation package has been established recently. The key features of the workflow are as follows:

1. Noise reduction: Filters applied following the direction of seismic reflections themselves rather than the grids of seismic data to improve the horizon continuity and fault interpretability.
2. Seismic fault detection: Fault highlighting based on seismic discontinuities/ fault zones and structural trends (dip, azimuth and combined dip/ azimuth seismic volumes)
3. Regional horizon tracking: Fast interactive tracker of 'phantom horizon' based on a single click on the seismic section.
4. Seismic facies identification: Seismic facies classification based on neural network and multi-attribute volume.
5. Seismic based hydrocarbon detection: (1) Large footprint median filter in horizontal direction for flat spot detection, (2) Tracking of subtle amplitude variations along structure, and (3) Pore-fill prediction based on AVO response of near and far offset seismic cubes.

The poster will show the overall workflow, each step of which will be illustrated with seismic examples. The workflow, however, will be continuously updated to capture the latest release of the ongoing development of the technology. It is anticipated that the workflow will not only speed up the seismic interpretation to compensate for the long lead time required for the high resolution seismic acquisition and sophisticated seismic processing, but also to minimize the exploration uncertainties and to improve the profitability of the company.