Improved 3-D Seismic Interpretation and Reservoir Model Construction Using PaleoScan Technology

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Traditionally seismic interpretation and 3D reservoir model construction can be a labour intensive process. This paper demonstrates the application of new workflows, using PaleoScan software, which greatly improve the speed of the interpretative process and 3D model build. A recent discovery from offshore Angola, were fast track seismic interpretation and modelling was required to support appraisal drilling, will be used to demonstrate this innovative approach.

Within PaleoScan a continuous geo-model is built across the seismic volume, based on an optimization technique which establishes a relationship between every seismic sample. This optimisation is constrained by the picking of horizon links, which reduces the amount of seismic configurations and improves the robustness and rapidity of the computation process. The resultant geo-model can be used to extract any horizon within the seismic volume and derive a set of surfaces (surfaces stack), which can be scanned to analyse seismic attributes. Additionally a fault throw attribute cube can be processed from the surfaces stack, which can be used for fault network extraction and fault throw analysis.

The Chissonga discovery well, located in Block 16, Lower Congo Basin, Angola, was completed in early 2009. To evaluate the discovery and support appraisal planning, additional fast track seismic interpretation and reservoir modelling was required. The generation of a surface stack throughout the entire volume revealed a series of stacked channel complexes not fully recognised by previous interpretations. Additionally, horizons could now be extracted specifically for reservoir description, guides for elastic inversion and for 3D velocity and reservoir model construction. The final 3D model was constructed using surfaces from the surfaces stack, PaleoScan interpreted horizons, a fault network extracted from a fault throw cube and geo-body interpretation using attribute surface stacks.