Evaluation of the Campanian Reservoir Fairways in the Guyana-Suriname Basin

Author Block: H. Maulana, R. M. Simamora, M. R. S. M. Maarof, Z. H. Hasnan, L. G Hong, PETRONAS

Abstract:

Introduction
The Guyana-Suriname Basin (GSB) has recently experienced a very active exploration period with impressive string of discoveries initiated by Liza-1 (ExxonMobil) in the Guyana side all the way to the latest discoveries by Apache and PETRONAS in the Suriname side. One of the key components for the relatively large discoveries are the stacking nature and reservoir quality of the main reservoir fairways in the Upper-Middle Campanian.

Methodology
The evaluation relies heavily on spectral decomposition of the available 3D seismic with various quality. We conditioned the contiguous seismic to enable consistent attributes interpretation and calibrate it with well observation. The stacking pattern modelling is built based on image log interpretation which is then projected throughout the seismic volume based on horizon slicing on the RGB volume (Figure 1). The recent well data also gives insight on the heavy mineral for provenance study that can be linked to the Greenstone belt in the eastern part of the Guiana Shield.

Discussion
Multiple point-sourced fairways coming from Suriname side, albeit smaller, are observed as opposed to the well-known Berbice Canyon. On the detailed mapping, there are numerous smaller canyons along the Suriname’s shelf edge coeval with the Berbice. These feeder systems may have accessed different part of the hinterland hence delivered some variation on the reservoir quality. The reservoir quality from these feeders is very fine-fine grained in the proximal part and getting coarse toward the basin floor forming lobate shapes. Despite poor sorting in the proximal part, the porosity remains high due to overall low temperature in the basin (average ~27 degC/km).

Apart from the canyon-fed sources, the fairways are also controlled by the underlying geometry, with some weak confinement drives the direction. A high degree of channel amalgamation in semi-ponded deposits is also observed hence increasing the overall thickness of these excellent reservoirs. A model was devised to describe the overall feeder system, fairways and stacking pattern of these Campanian reservoir section.
Fig. 1—3D view of spectral decomposition of the Upper Campanian reservoir fairways showing complexity of the individual pattern and the underlying surface within the lower slope depositional environment.