Paper B9

Integrated Bio- and Seismostratigraphy of the Southern Sabah Offshore, Malaysia

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Recently, the Sarawak Shell Berhad Biostratigraphy team has reviewed a selection of key wells from the Southern Sabah Offshore, and has built a consistent biostratigraphic zonation and framework, largely based on nannoplankton and planktonic foraminifera. The biostratigraphic zonation has been tied to regional seismic lines in order to create a robust bio- and seismic stratigraphic framework. A work flow has been set-up and the value of such an approach has been demonstrated in the regional evaluation projects.

Biostratigraphic resolution limitations are caused by both geological and sampling factors. Sampling is best done on cuttings, provided they are representative for the interval drilled. Areas of rapid deposition, especially in the slope and / or slump scar fill depositional environments tend to have a poor microfossil yield.

In parallel, seismic stratigraphic analysis has been carried out to establish the regional stratigraphic framework in an ongoing attempt to unravel sand fairway systems transporting sand from the Sabah inboard to the deep water. The delineation of these 'sand fairways' is a key element in the assessment of reservoir risk in the Sabah deep water Hydrocarbon plays.

Mapping of clinoform packages (foreset corridors) is the key to understanding sediment supply and progradational patterns. Flattening on a continuous seismic reflector above the mapped foreset corridor clearly shows the depositional architecture (Figures 1 and 2). Shelf margin (clinoform geometry) mapping in the Sabah inboard area has increased the understanding of the location and direction of the sediment supply to the deep water. Progradation and aggradation stacking patterns demonstrate the influence of actively forming anticlines and synclines during the deposition.

The nature of reflection termination patterns define a range of significant stratigraphic surfaces such as unconformity, onlap, downlap and toplap surfaces. Divergent and convergent reflection packages demonstrate the active growth phases of the anticlinal and synclinal structures, which in turn have a major impact on the sand fairway distribution and morphology.

Wheeler diagrams have been generated to compile all available stratigraphic information, i.e. both bio- and seismic stratigraphic data. They are an excellent way to demonstrate the depositional links between inboard and outboard depositional areas, as well as across zones of poor data, i.e. often the slope (Figure 3).

The Sumandak – Ranau system has been investigated in some detail and a potential fairway can be demonstrated, although linkage to the Sabah deep water reservoir units still remains to be proven.

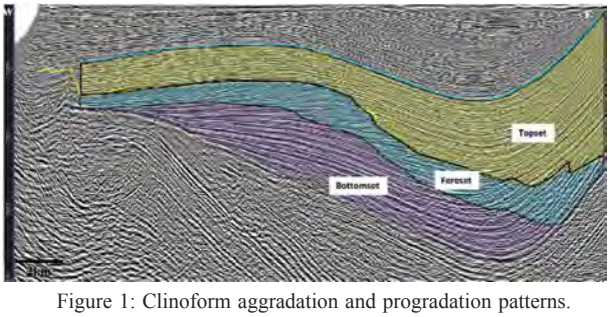

Figure 1: Clinoform aggradation and progradation patterns.

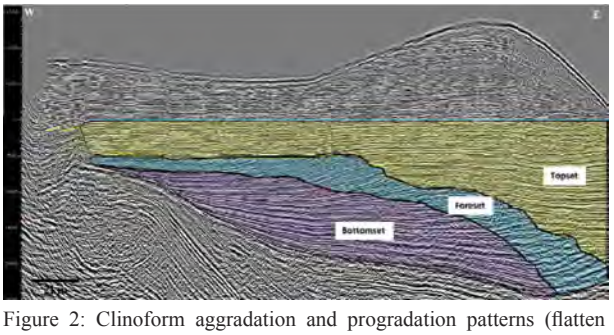

Figure 2: Clinoform aggradation and progradation patterns (flatten on blue line).

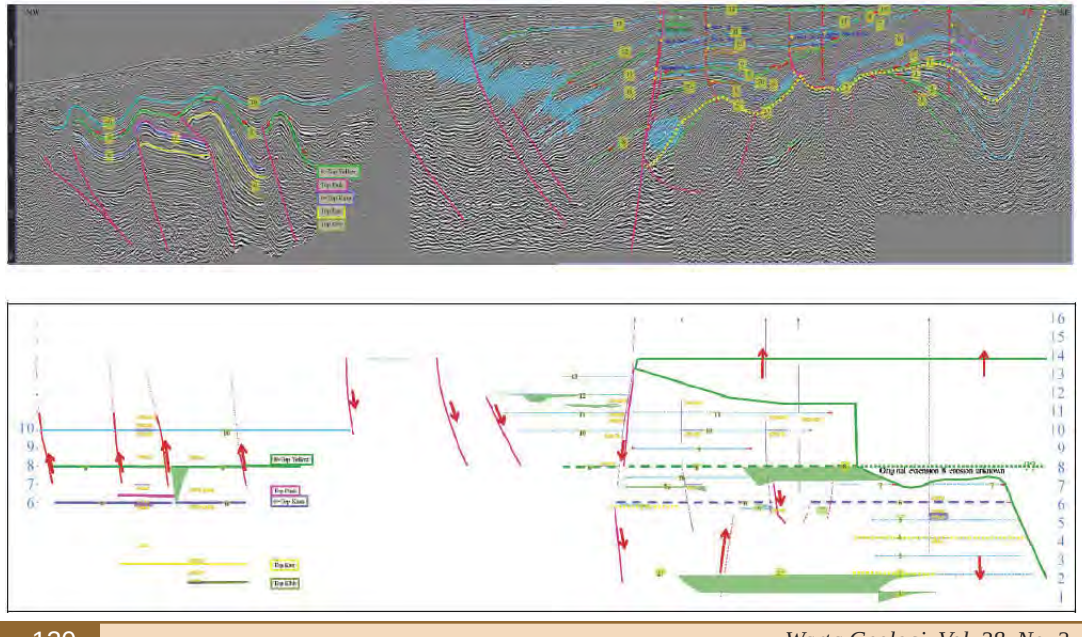

Figure 3: Wheeler (Time-Rock Synopsis) diagram.

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