INDONESIAN PETROLEUM ASSOCIATION
Proceedings of the International Symposium on Sequence Stratigraphy in SE Asia, May 1995

A PATCHWORK APPROACH TO VALLEY FILLS: A VIEW OF 3D SEISMIC GEOMETRIES IN OFFSHORE BRUNEI DARRUSALAM FROM SEQUENCE STRATIGRAPHY OF JERUDONG OUTCROPS

Jacques Durand*
Chrisophe Dumay*
Jean-Lou Grondin*
Alain Ferrer**

ABSTRACT

Seismic terminations and amplitude maps of a 3D seismic volume in offshore Brunei Darussalam show recurrent "valley" shapes of tens to one hundred milliseconds. The seiscrops reveal slightly sinuous, unramified and deeply embanked morphologies with an oblique infilling parallel to the extension. They display alternating high and low amplitudes separated from surrounding homogeneous low amplitudes by strong local incisions.

Sparse available well data were inadequate to constrain the interpretation of these geometries. The Jerudong outcrops along the coastline provide section of the same age and located on the same flank of the Berakas syncline.

The main depositional system consists of storm-dominated shelf successions. Developed and stacked swaley-cross stratified sand bars suggest a barred morphological coast and relatively protected backshore facies. Fluvial and estuarine stacked channels are isolated inside the shelf deposits. They are laterally lenticular, asymmetrical, of several hundreds of meters in width and vary from a few up to sixty metres in depth. Vertical evolution of environments exhibits abrupt facies shifts revealing stratigraphically significant surfaces. The tremendous changes in water depth suggested by the environments below and above these surfaces highlight the relative importance of the facies shifts with :

- sharp-based upper shoreface where swaley-cross stratified sand bars sharply prograde over offshore deposits.

- top of storm-dominated deposits eroded by the fluvial and estuarine stacked channels which cut through the backshore-foreshore facies and the shoreface, the lower offshore or the bathyal slope deposits (downward shift surface). The transgressive surface is present in the fill.

- wave ravinement surface that separates erosional trough cross beds of fluvial distributaries from overlying hummocky-cross stratifications or offshore marine shales.

The patchwork technique with the comparable scale as keystone offers a suitable tool for piecing together outcrops (stacked distributary channel shifting over deltaic storm-dominated shelf) and seiscrops ("valley" shapes) or terminations (infilling patterns).

* Jasra-Elf Joint Venture - Brunei
** Elf Aquitaine Production