Sequence stratigraphical analysis of the NW Borneo sedimentary basins

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The Cenozoic sedimentary sequence of NW Borneo is a record of the complex interplay between fluctuations in sea level, tectonically driven upheavals of the Borneo Landmass and also the localised structural movements related to shale diapirism. In this paper we show how analysis of selected key wells in the main geological provinces of Sarawak and Sabah helps unravel the superimposition of these processes and assess their importance in terms of the genesis, character and the distribution of the basin fills at various times in the last 25 Ma.

The cyclic depositional character of the Neogene and Quaternary sedimentary packages in the on- and offshore basins of Sarawak and Sabah was first recognised in the Baram Delta and described by almost every author since the late 1960's. The depositional "Cycles" (in Sarawak) or "Stages" (in Sabah) were recognised at basin scale, used for intra-basin correlations, and applied at a much smaller scale for well-to-well correlations of single sedimentary packages (reservoirs/seals). The recognition of the local "Stages" and "Cycles" passing diachronously across basinal boundaries was believed to be difficult or impractical.

The introduction of sequence stratigraphical analysis techniques has provided the basis for integrating "cycle" and "stage" boundaries with "classical" sequence components. It is now possible to base a regional correlation on the assignation of the earlier "cycles" to Haq TB sequences (3rd order cycles). The regional correlation of these TB sequences is based on the iterative integration of detailed biostratigraphy from well sections with seismic data. The significance of the major tectonic events and resultant unconformities is not disputed, however, the recognition of the main TB sequences is important because it allows the reconstruction of the sedimentary history at basin scale, assists in timing of the tectonic events and forms the basis for correlation across basin and political boundaries.

The application of a consistent stratigraphic framework for NW Borneo enhances our ability to predict lithology and source rock development, understand how the key tectonic episodes are manifested across the region and link the prospective exploration fairways.

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