Poster 6

Sequence stratigraphic study of the Erb West field, offshore Sabah, Malaysia

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The Erb West field in the offshore Sabah, comprises a NE-SW trending, dome-shaped anticline terminated by a major NW-SE trending normal faults in the NE sector. The crestal part of the field is virtually unfaulted whereas the southern flank is dissected by several E-W trending normal faults. The structural configuration is believed to be the result of deep seated wrench faulting which characterised the Sabah area during Miocene and Pliocene (Fig. 1).

The sequence stratigraphic study of the field was conducted using well data and 3D seismic. The high resolution sequence stratigraphic correlation of the well logs was done using the technique described by Van Wagoner (1995) and formed the basis for the sequence stratigraphic concept adopted in this study. The conceptual model proposed by the "Exxon" group (Mitchum, 1977; Vail, 1987; Van Wagoner, 1990) is employed with slight modification to obtain a better understanding of the geology and a realistic perspective of the reservoir facies distribution within the field. The seismic facies analyses was done using a modified technique from Vail *et al.* (1977) and Brown and Fisher (1977). The new stratigraphic scheme for the Erb West field is proposed (Fig. 2).

The Upper Miocene Stage IVC and IVD of the Erb West field strata can be divided into four stratigraphic units namely, P, N, M and L. These units can be grouped into different system tracts, with reference to Exxon's third order sequence model. The P unit is the lowstand system tract (LST), M and N is the transgressive system tract (TST). The TST can be subdivided into Early TST (N unit) and Late TST (M unit). The highstand system tract (HST), is believed to be the L unit.

During the deposition of the Unit P, N and M, the paleo-high was located to the East of the Erb west field and is known as the Erb High. It was separated from the Erb West field by the N-S fault system. To the north of the field is a SE-NW trending fault zone. This fault system is mostly a series of normal faults with the down-thrown side to the N and NE. To the S and SW sector, the field is cut by a series of faults making a fault zone trending in the E-W to SE-NW direction. This faulted zone, appears as a trough feature which is bounded by normal faults.

The faults system and the arrangement of the fault blocks dictated the highs and lows in the Erb West field. The regional high is in the southern and southeastern part of the field. It is related to the Erb High further to the east. The siliciclastic sediments of the Erb West field was derived through or from this high.

The faulted zone in the SW part, provide a major passage for sediments discharge. This low, which is bounded to the south and north by high relief zone, received the sediments from both sides, the south and the north. The northern high, where the major portion of the field is situated, is referred to as the central high. The low faulted zone area is then called the central

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low. Beyond the main SE-NW trending fault system is a low relief area which is dipping towards the NE (Fig. 3).

The depositional system of the studied Erb West field's strata, ranges from the incised-valley fill, deltaic, and coastal to shallow marine systems. The incised-valleys and delta systems is common in the LST strata (P unit). However, during the TST (N and M units), other coastal and associated systems were developed due to increased accommodations for sediments dispersal. The estuarine and coastal to shallow marine system has been identified from these units.

The fairly consistent facies type, size and orientation within the Erb West field indicates the consistent position of the paleogeographic elements, like highs and lows, orientation of the regional dip and faults throughout the deposition of the studied units. Even though, there is a slight difference, it is only minor variances. Its distribution reflect the fluctuation of sea levels record and preservation from the erosional processes.

The fluctuation of sea level due to either, eustatic or tectonic or both is apparent in the Erb West field. The shifting of coastal and associated facies as seen on the seismic sections, is used to delineate the sea level position and characterise the sea level changes. This can be seen from the sedimentary facies distribution of each stratigraphic unit. The facies distribution for each stratigraphic unit with emphasis on the sand facies, is illustrated.