

**AAPG Annual Convention
Salt Lake City, Utah
May 11-14, 2003**

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Stratigraphic Architecture of a Deep-Water Deposit in Northwest Borneo

Deep-water sands are relatively new exploration targets in Southeast Asia. The Paleogene deep-water sediments of the Crocker Formation partially exposed along the coastal mountain ranges of NW Borneo provides an opportunity to understand deep-water reservoir system. This paper presents the results of a detailed facies analysis of the Crocker Formation deep-water sediments within the Kota Kinabalu area in Sabah. The Crocker Formation in the Kota Kinabalu area can be divided into two lithological units—a lower sandy and an upper shaly unit. The sandy unit consists predominantly of grey sandstones interbedded with various colored shales, whereas the shaly unit consists predominantly of shale with thin sandstone interbeds. The Crocker Formation can be broadly divided into four main turbidite facies—(i) Very Thick-bedded Sandstone Facies; (ii) Thick to Medium-bedded Sandstone Facies; (iii) Thin-bedded Sandstone and Shale Facies; and (iv) Red Shale Facies. The four facies has been interpreted to represent, channels, channel margins and fan lobes, inter-channels and basin plain deposits, and pelagic deposits, respectively. The facies and vertical sequence analysis suggests that the Crocker sediment is dominantly a sand-rich submarine fan system. The sequence consists of about 500 m stacked channel-levee-fan lobe complex, draped over by about 100 m pelagic and basin plain deposits. The sandy bottom megasequence consists of at least 20 major channel sand sequences that range in thickness from 5-70 meters. Although there are changes in terms of sand to shale ratio, the overall thickness of the channel sand sequences is generally maintained for several kilometers.