

Paper 1

The evolution and prospectivity of the West Luconia Delta, offshore Sarawak, Malaysia

DAVID MACKERTICH

Amerada Hess (M) Ltd.
Suite 9.02, Level 9, Menara Tan & Tan
207 Jalan Tun Razak
50400 Kuala Lumpur

The West Luconia (Rajang) Delta has seen little exploration activity compared to the other Tertiary Delta systems offshore Borneo. In part this may have been due to its location close to an international boundary but also might be due to a lack of well and seismic data on which to base interpretations. Another reason that it may have been under explored might also have been because of its other name — the 'Rajang Delta'. This implies that it has been solely sourced from the Rajang River which is today a muddy river draining predominantly argillaceous deposits. The name simply does not inspire exploration!

This under-explored delta system has all the makings of a major play fairway offshore Sarawak, sediment source, reservoirs, hydrocarbon source rock and abundant structures. Over the next few years as more seismic data is acquired and interpreted and exploratory wells are drilled we will surely understand more about this potentially prolific province.

Location and structural evolution

The West Luconia delta is considered to lie close to the north-western tip of Borneo (Fig. 1). Most of the published models show a sediment depocentre to the west of the Central Luconia Platform and to the east of the Natuna Arch. There is still debate about the structural evolution of Borneo but most models imply a counter clockwise rotation of Borneo through Miocene times. This coupled with the thought that there is a major lineament passing through this area make unravelling the structural and sedimentological history somewhat difficult.

Hydrocarbon Prospectivity

As with the Baram Delta, the West Luconia Delta is perceived to be a delta system in which the sediment has been derived from the 'highlands' of Borneo (Fig. 2). In the case of the Baram Delta this is the Crocker Range whilst in the West Luconia Delta it is perhaps a mixed sediment source. One of the principal sediment source areas for the West Luconia Delta is considered to have been the Schwaner Mountains or the calc-alkaline West Borneo basement which extends from the western part of Borneo eastwards to the Kutei Basin. Sediment is also likely to have been sourced from reworking of Palaeocene to Early Miocene clastic sediments (e.g. the Kayan Sandstone/Plateau Formation).

There is no shortage of structuration that might give rise to valid traps in the West Luconia province (Fig. 3). On the delta top growth faults forming large tilted fault blocks are abundant (Fig. 4). Deeper offshore, near the delta slope, a combination of sediment loading, listric thrust faulting and compressional inversion has given rise to 'toe thrusts'.

A number of different source rocks exist for the traps seen in this delta province. Like in the Mahakam Delta organic material is considered to have been transported with sediments (rivers, turbidites) into the offshore area. In addition there is the possibility of lacustrine source rocks being present in the area. Early Miocene to Oligocene sub-basins have been described further north in the South China Sea.

All in all the West Luconia Delta has all the makings of a major hydrocarbon province. Exploration to date has been limited (certainly on the Malaysia side of the border) and active operators have recently acquired acreage in the heart of this exciting province.