

*Paper 16***Petroleum systems of Southeast Asia**

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Sunda, the Southeast Asia pre-Tertiary core, comprises a collage of lenticular continental fragments, magmatic arcs, oceanic assemblages and mélanges which originated in eastern Gondwana and have migrated northward to accrete at the southern margin of Eurasia. The principal collision was Late Triassic (Carnian/Norian) in age. Other internal and peripheral collision/ accretion events have occurred in Triassic, Cretaceous and Tertiary times.

Post-consolidation Sunda contained a large Mesozoic megabasin, largely continental with compressive marine margins on the west, south and east. At the close of Cretaceous time Sunda stood above sea-level.

Tertiary basins of Sunda are small rift/sag basins formed during extrusion phases following INDA/EURA collision. The main times of basin formation were Late Eocene (Sumatra and West Java basins) and Mid Oligocene (Sunda rift basins), although Paleocene rifting had already splintered the margins of the former Cretaceous landmass.

There are two main petroleum systems with a number of variation on the central themes:

1. Rift/sag basins with source rocks in lacustrine Oligocene shales near the top of the rift

cycle and reservoirs dominantly in the overlying sag cycles, either coastal plain sandstones or grain limestones and reefs. Regional seals are provided by blanket shales of the Neogene wedge middle. Gentle folding may be present at the top of the Paleogene half-cycle (Sumatra). Inversion takes place from Middle Miocene to Pliocene, which is also the dominant time of maturation and migration. Geothermal gradients are high.

2. Delta sag basins flank the uplifted compressional arc-collision terrane of central Borneo. Upper Miocene-Pliocene quartz-rich reservoirs, in both coastal plain and turbidite facies, owe their excellent poroperm qualities to their provenance in quartz-rich Crocker type flysch sandstones of the collision zone. Source rocks are shales and coaly shales interbedded with the reservoirs. Reefs are only productive in special circumstances; i.e., when overlying a source rift basin. Seals are local transgressive shales. Heat flow is moderate to cold. The delta sags developed over both accretionary prisms (Northwest Borneo) and rift margins (Kutei Basin).

Microcontinents in collision with the Borneo-Palawan trend are largely gas-prone. With source rocks either rift basins within the microcontinent (Palawan) or lying between it and the Borneo core (Luconia). Reservoirs are mainly carbonates.

Hydrocarbons in eastern Southeast Asia are less well developed than in Sunda. Rift-sag basin-forming cycles are followed by drift and collision events, with the main source rocks in sag/drift shales and main reservoirs in upper drift elements and post-collision molasse.
