A five-fold stratigraphic and tectonic subdivision of the Malay Peninsula and the implications on its tectonic evolutionary history

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The generally accepted and widely used threefold division of the Malay Peninsula is a geographic and spatial one. Despite its usefulness in giving a general picture of the geology of the Malay Peninsula, it does not reveal the real geology, which involves stratigraphic development, tectonic history and magmatism through time.

A new five-fold stratigraphic and tectonic subdivision of the peninsula through geologic time, which involved the recognition of five major unconformities, is proposed. The identified unconformities are the Middle Devonian Unconformity, the Variscan (Middle Permian) Unconformity, the Indosinian (Upper Triassic) Unconformity, the Middle Cretaceous Unconformity and the Pliocene-Pleistocene Unconformity and erosional surface.

These unconformities and their time-equivalent conformities are the bounding discontinuities to mega-sequences of sedimentary rocks, igneous rocks and other minor unconformities. The mega-sequences are informally named as:

1. The Setul Mega-sequence of Cambrian to Lower Devonian age;
2. The Singa Mega-sequence of Late Devonian to Early Permian age;
3. The Semanggol-Semantan Mega-sequence of Permian to Late Triassic age;
4. The Tembeling Mega-sequence of Jurassic to Mid-Cretaceous age and
5. The Tertiary Batu Arang Mega-sequence.

The basin architecture for each mega-sequence is as follows:

1. The Setul mega-sequence
   — the presence of shallow deltaic sediments in the west grading into platform sediments and eventually deep basinal sediments to the east suggest a continental margin setting.
2. The Singa mega-sequence
   — the presence of shallow marine near-shore sediments to the west and eastern sides of the basin together with the presence of deep water sediments along the central part of the basin suggest deposition within a rift basin setting.
3. The Semanggol-Semantan mega-sequence
   — a five province facies distribution is recognised that represents sedimentation along strike-up controlled basins.
4. The Tembeling mega-sequence
   — they are composed of continental alluvial fan and red beds sequence deposited in many small intermontane basins probably associated with dextral strike-slip fault movements.
5. The Batu Arang mega-sequence
   — they are continental sediments deposited in isolated strike-slip pull-apart basins.

The structural inversion of the Setul megasequence is attributed to an Early to Mid-Devonian deformation and metamorphic event. This event was subsequently followed by an

Warta Geologi (Newsletter of the Geological Society of Malaysia), Vol. 25, No. 2, March-April 1999

extensional event that caused rifting and the deposition of the Singa megasequence strata. The corresponding patterns of sedimentation of the Singa megasequence in all the three belts imply that the whole peninsular has acted as a single block by Mid-Palaeozoic. The structural inversion of the rift basin is attributed to the dextral transpressive deformation and the low grade metamorphic Mid-Permian (Variscan) event that eventually give rise to a five-fold facies distribution of the Permo-Triassic Semanggol-Semantan megasequence. The structural inversion of the Permo-Triassic basins is attributed to the continued dextral transpressive movements that is accompanied by granite emplacements, which eventually caused uplift and the deposition of continental Jurassic-Cretaceous Tembeling megasequence sediments within small strike-slip fault-controlled basins. The structural inversion of the Tembeling intermontane basins is attributed to Mid-Late Cretaceous event that caused sinistral movements. Pull-aparts along *en-echelon* strands of the developing NW trending sinistral strike-slip faults gave rise to the small isolated occurrences of the Batu Arang megasequence.