Mesozoic marine basins of west Sarawak: Some thoughts on their evolution and paleogeography

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Two phases of Mesozoic marine sedimentation occurred in west Sarawak:

i. a middle-late Triassic clastic-volcanic phase of the Sadong Formation and Serian Volcanics, and
ii. a late Jurassic-late Cretaceous clastic-carbonate with subordinate volcanic phase of the Kedadom, Bau and Pedawan Formations. Poorly preserved Jurassic-Cretaceous(?) chert with associated basic igneous rocks of the Serabang and Sejingkat Formations and the Sebangan Hornstone may represent a deeper marine condition to the present north.

The late Triassic basin was probably marine towards the north with terrigeneous and volcanic clasts derived from a southerly source, where fluvial and deltaic deposition preserving several thin coal beds occurred. A basin inversion and folding in the early to middle Jurassic terminated its deposition.

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During late Jurassic-early Cretaceous the shallow water Bau Limestone accumulated in several paleohighs in the Bau-Krokong, the fringes Jagoi and Kisam "islands" and the NNW-SSE chain Penrissen-Batang Kayan area. Relative rise in sea level terminated the shallow water limestone deposition in early Cretaceous. In the deeper environment, the thin and thick graded beds of feldsparthic sandstone, coarse-tail graded, polymictic extraformational conglomerate sheets and channels and several horizons of mass-flow deposits were sedimented intermittently within black carbonaceous shale. Several lenses of limestone with predominantly packstone texture are found towards the base of the Pedawan Formation.

In the Siniawan area, mass flow deposits are well developed with stratigraphic thicknesses ranging from a meter to very thick, in excess of 80 meters. They occur within a variety of facies association; thinner ones within coarse, thick-bedded sandstone, channel and sheet conglomerate and minor shale sequence.

Blocks of various sizes in the thicker deposits consists of contorted beds of thick turbidite sandstone which exhibits a spectrum soft sediment deformational features resulting in the b ds being in coherent, semi-coherent to incoherent state. Closely associated with these contort l beds are shale diapirs, supporting the interpretation that beds were deformed under high pore pressure condition through elastic and plastic behaviour. Minor cobble-sized volcanic and chert fragments are present. The matrix of these deposits consists of mainly of mud, but in some of the thicker beds the matrix are muddy sand.

The sedimentological features suggest that the thicker mass flow deposits originated in the slope and base of slope environments where thick-bedded turbidite and conglomerate were initially deposited. Thinner bedded mass flow deposits could either represent the collapse of the basinal sediments or that they are the distal portion of a much larger mass flow deposits.

Regional consideration suggests that the late Jurassic-late Cretaceous of west Sarawak could have been deposited in several small basins separated by uplifted landmass in the present south and an open marine condition to the present north. The scenario probably ended in the Tertiary with the uplift and erosion of the Mesozoic rocks, resulting in inconformable relationship with the overlying Tertiary sequence, as seen in the south of the Santubong peninsula.

However, if the paleobiogeographical constraints based on work done by previous workers the Triassic Krusin Flora, late Jurassic and early Cretaceous coral and rudists are taken into consideration, a relatively northerly paleoposition may be interpreted for west Sarawak during the Mesozoic. If the post-late Cretaceous counterclockwise rotation of west Borneo based on Paleomagnetism work is correct, then its Mesozoic paleogeography would be a land mass to the west or north and the marine basin to the east and south.