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Paleozoic Limestone of the Kinta Valley: Paleogeography and Implications to the Regional and Petroleum Geology of Peninsular Malaysia

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Abstract

A number of isolated limestone hills, distributed over a 1,200 km² area in the Kinta Valley, display a striking tower-like morphology. The limestone hills are the remnants of thick Paleozoic limestone deposits, mainly Carboniferous to Permian in age, that have been severely eroded and karstified. Layers of shale and siltstone, several hundreds of meters thick, are interbedded with or underlie the limestone. The hills overlie extensive younger granite bodies, which have affected the limestone through contact metamorphism. The degree of metamorphism increases eastwards, towards the granite of the Main Range but appears to be, in places, somewhat anomalous with some intact sedimentary outcrops resting directly on top of granite. Sequence stratigraphic analyses, sedimentological and petrographic observations indicate that most of the Paleozoic formations outcropping in the Kinta Valley were deposited in a relatively deep marine environment, most likely on a slope. The limestone mainly consists of thinly laminated mudstone to wackestone with occasional breccia blocks. Slumping is common throughout the section and is locally enhanced by beds of chert. Slump measurements indicate a slope dipping to the west with an approximately N-S strike direction, suggesting the presence of a platform paleomargin, probably with grainy deposits, to the east of the Kinta Valley. The regional structural style, investigated through field studies, remote sensing analyses and geophysical methods (gravity and magnetic surveys), may be dominated by thrusting, with elements of strike-slip faulting. Paleogeographic reconstruction, analysis of the structural history and regional correlations suggest the potential presence of a deep Paleozoic carbonate play east of Peninsular Malaysia. Onshore regional data indicate that shallow marine Paleozoic sequences cover most of the Sunda Shelf area in Western Malaysia, Thailand and Indochina. Although speculative, this deep Paleozoic play may have been tested in the past, although possibly inconclusively.