

Architecture and growth history of a Miocene carbonate platform: Luconia Province., Malaysia

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Using 3-D seismic reflection data, wireline logs and core data we reconstruct the architecture and growth history of a Miocene Carbonate platform in the Luconia Province, offshore Sarawak, Malaysia. Platform growth started in the Late Oligocene to Early Miocene, by coalescence of isolated patch reefs. The growth history includes phases of progradation, backstepping and occasional collapsing of platform flanks, guided by syndepositional faulting. The most pronounced seismic reflections in the platform correspond to flooding events (thin transgressive system tracts). Subaerial exposure preceding the flooding could be demonstrated in only one case.

Platform growth was terminated by gradual submergence (drowning) indicated by smooth, concentric seismic reflections forming a convex mound. Seismic response is strongly influence by variation in porosity. Three different processes have significantly contributed to porosity in the carbonate rocks: selective leaching during exposure, dolomitization and leaching during deep burial, probably related to warm fluids rising from depth. As most of the carbonate porosity formed by carbonate dissolution under deep burial, the slide masses and related turbidites may contain highly porous rocks in the basin between platforms. These porous bodies may onlap other platform slopes, terminate there and become enveloped in clay-rich hemipelagic sediment. On the other hand, the porous layers may establish fluid conduits between neighbouring platforms if slides and turbidites from different platforms touched one another on the basin floor.