

CHAMOSITIC AND PHOSPHATIC OIDS IN THE TERENGGANU SHALE (LOWER MIOCENE), OFFSHORE PENINSULAR MALAYSIA

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The Terengganu Shale (lower Miocene) in the Tenggol Arch area, offshore West Malaysia, consists of generally non-bioturbated and massive, dark green mudstone deposited on a broad and relatively shallow, low-energy shelf. Thin oolitic and granule-sand layers occur in the mudstone, and are composed of mainly chamosite ooids and pisoliths, with some very coarse quartz-feldspar sand and granules, and locally abundant phosphate ooids. Phosphate concretions also occur in the mudstone.

The chamositic ooids and pisoliths are interpreted to have formed by early diagenetic alteration of reworked lateritic oolites derived from the adjacent landmass which was undergoing tropical weathering. The oolites were transported by rivers onto the shelf during floods, and were then reworked by storms and incorporated in the shelf muds. Phosphate ooids developed near the contemporary shelf edge, along the then active Tenggol Fault. This area was probably a site for upwelling basinal currents, analogous to present-day continental margins. Phosphate concretions formed during shallow burial diagenesis of anoxic, phosphate-rich shelf muds.

The Terengganu Shale on the Tenggol Arch records a period of maximum flooding of the Sunda Shelf at the end of a major transgression in the early Miocene. Lithological characteristics of the Terengganu Shale, supported by palynological data, indicates that this also was a period of low detrital influx possibly as a result of a relatively dry climate.