

Stratigraphic Evolution of Oligocene–Miocene Carbonates and Siliciclastics of East Java Basin, Indonesia

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The Oligocene–Miocene of East Java is characterized by multiple stages of isolated carbonate mound growth surrounded by deeper marine off-mound sediments or by shallow-marine mixed carbonate-siliciclastics or just clastics. Three stratigraphic intervals are recognized: Kujung (carbonate mound and off-mound), Tuban (mixed carbonate-siliciclastic), and Ngrayong (siliciclastic). Exposures of the Kujung unit are limited to a few isolated outcrops.

At the base, the oldest Kujung exposed is represented by a high-energy, laterally extensive, shallow-marine carbonate facies that grades laterally into deep-marine off-mound sediments of calcareous mudstone and chalk (lower Kujung). The carbonates ramp was drowned around 28.0 Ma. The exposed Kujung shallow water carbonates were covered by chinks and deep water carbonate turbidites deposited around 23.44 and 24.31 Ma. These carbonate turbidites are time equivalent to tops of seismic reflectors capping the youngest Kujung mounds that often their location is fault controlled. The Tuban unit (22–15Ma) consists of widely exposed shallow-marine mixed carbonate and siliciclastic and poorly exposed open-marine shale and chalk facies.

The Tuban consists of at least six stacked cycles that reflect deltaic deposition with episodes of shallow-marine carbonate mound growth. The Ngrayong unit (15–12 Ma) represents a period of regional siliciclastic influx and progradation of tidally influenced deltas and grades into turbidites, basinal shale, mudstone, and chalk. Ngrayong beds are truncated by Bulu carbonates (Serravallian–Tortonian). The timing of carbonate growth, mixed carbonate-siliciclastic, and clastic lithologies constrain the tectonic history of the area and controls on carbonate growth and demise.