

Stratigraphy and Sedimentology of Neogene Sequence, East Java Basin, Indonesia

By

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The Neogene of the East Java Basin exhibits a series of sequences that evolved through a complex tectonic history. These sequences unconformably overlie a series of NE-SW trending highs cored with a pre-Tertiary metamorphic basement. The Ngimbang Formation, Early Oligocene, differentially fills the basement topography. This formation is characterized at the base by lacustrine, and marginal, non-marine sandstones and coals strings and at the top by shallow-water carbonates. The transgression continues through the Late Oligocene, Kujung, and the Early Miocene, Tuban carbonate formations. These two formations constitute the main petroleum reservoirs in East Java and they are widely distributed. These formations correspond to mostly reefal facies that show through time a smaller area of deposition prior to final drowning during the late Early Miocene. Basin equivalents strata correspond to deep-water carbonates (including the deep water carbonate turbidites called the Prupuh Member) and shales. The Early Miocene and the Late Oligocene carbonates are highly fossiliferous and are characterized by the dominance of larger benthic foraminifers such as *Lepidocyclina*, *Eulepidina*, *Miogypsina*, *Miogypsinoides*, *Cycloclypeus*, *Spiroclypeus*, *Nummulites*, and *Discocyclina*. The benthic assemblages are used as age markers (often excellent to correlate basin and shelf strata when found in turbidites) and as environmental indicators. Planktonic foraminifera provide excellent age constraints of the drowning across the basin. The general deepening was interrupted to the north, in the middle Miocene (Ngrayong formation), when deltaic and channel fill sandstones were deposited. The Ngrayong formation was truncated and the late middle-upper Miocene carbonates (Bulu Limestone) followed by burrowed sandstone and shallow marine shale (Wonocolo Formation) accumulated.

Differential subsidence through early early Miocene - earliest Pliocene occurred, and to the north strata were uplifted and eroded while to the south, erosion did not take place and sedimentation continued. Pliocene carbonates unconformably postdate a series of east-west trending anticlines. Pliocene facies change from basinal, globigerina marls to the west and south to shallow marine, reefal facies to the east and north.

The early stage of this study focuses on the stratigraphic distribution of the different Neogene shallow-water carbonates based on both surface exposures and well logs, as well as the diagenetic effect of the Pliocene unconformity on the reservoir facies.