*Geological Society of Malaysia – Annual Geological Conference 1988*

# DIAGENETIC PATTERNS IN THE MID-TERTIARY BATU GADING LIMESTONES, SARAWAK

AZHAR HJ. HUSSIN
Dept. of Geology, University of Malaya

The 40 m thick limestones exposed in the vicinity of Batu Gading, Middle Baram area in Sarawak are composed of an Upper Eocene limestone, overlain disconformably by a Miocene limestone. The limestones rest with an angular unconformity on the folded sandstone-shale sequence of the Kelalan Formation.

The Eocene limestones exhibit a spectrum of microfacies variation with packstones and grainstones as end members. A cross-bedded, poorly washed, quartz grains bearing crinoidal-nummulitic packstone dominate the lower portion of these limestones. Minor occurrences of clean-washed nummulitid-discocyclinid-alveolinid grainstone occur in pockets and lenses. Smaller patch reefs composed of algal-bounded foraminifera constitute the other microfacies observed. Micritic rims on skeletal components are only slightly developed. Lesser amount of micritic pore-lining cement and fibrous calcite spars are present in the grainstones. Fractured tests, presence of associated stylolites and solution enlarged fractures are more apparent in the lower portion of the sequence. Extensive bioturbation are often observed close to the disconformity surface. Dissolution features such as channel voids, moldic porosity decrease in intensity downsequence from this surface. Larger calcite spars show a tendency to be more ferroan in the lower section while the calcite spar close to the disconformity surface are non-ferroan. These features indicate that the disconformity surface was an emergent surface.

The Miocene limestone consists of transported blocks of the Eocene limestone, large corals and algal colonies in the lower portion, overlain by a sequence of foraminiferal mudstone before being gradually replaced upsequence by sandstone and shale. Extensive micritization, dissolution and development of cavities floored by crystal silts are formed in the Miocene limestone. The calcite spars are non-ferroan and the limestone generally lack evidence of pressure solution.

The diagenetic pattern in the Batu Gading limestone suggest that diagenesis of the lower portion of the Upper Eocene limestone took place in depth under an overburden load. The pore waters are interpreted to be reducing and water movements were probably sluggish. However, the upper portion of the same limestone indicate extensive meteoric diagenesis occurring beneath an emergent surface. This was followed by marine inundation with the resultant deposition of the Miocene limestone. The extensive dissolution in the latter indicates that these limestones migrated from an initial marine environment to within the fresh-water phreatic zone during the early part of its burial history.