SOME DIAGENETIC ASPECTS OF THE SUBIS LIMESTONE

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The Subis Hill, in the vicinity of Batu Niah, forms a shallow water reefal buildup. Preliminary field study indicate the existence of core-reefal facies, flank facies and open marine facies. These facies are predominantly composed of bioclastic packstone and wackestone. Petrographic studies of samples from these 3 major facies indicate that the bioclastic components were extensively micritised, resulting in the formation of micritic envelopes and where micritization was more intense, the eventual loss of skeletal microstructures. Degree of micritization appears to be governed by the original skeletal component. Within the core facies, the original aragonitic composition of the coral framework was totally leached away, creating moldic porosity and leaving behind only the micritised outlines of the corals. Other bioclastic components and limemud in the core facies were either not affected by this initial dissolution phase or were only slightly affected. This initial dissolution is absent from the other facies. Subsequent to the initial dissolution phase, the newly created voids were filled by calcite cement (C1). These form interlocking mosaic; where voids are relatively large, the sizes of the calcite mosaic increase towards the center of the voids. The C1 cement infilling the coral framework are turbid with opaque inclusions, while the C1 cement infilling smaller vugs in the limemud are clearer.

The core facies also record a second phase of dissolution. This phase results in extensive leaching which is non-selective, i.e. it attacked both bioclastic components and limemud and even earlier formed C1 cement, thus resulting in the formation of extensive vuggy porosity. Vugs were later filled by large, poikilotopic calcite (C2) showing cross-cutting fabric. Abundant micritic detritus, generally in the form of clots or peloids were trapped within the growing spar. Within the flank facies, vugs created by the second dissolution phase were observed. Vugs were filled by C2 cement which is in the form of calcite mosaic. This cement also contain abundant micritic detritus in the forms of peloids or clots.

In the open marine facies, bioclastic wackestones do not show evidence of dissolution. Chambers of fossils were filled with ferroan calcite mosaic. Petrographic studies of the Subis Limestone indicate that the reefal buildup had passed through several diagenetic environments. The formation of the Subis Limestone took place in warm, shallow marine waters. This is in line with the faunal content (presence of abundant corals, coralline algae, *Lepidocyclina*, etc) and the presence of extensive micritization of the faunal elements. Evidence for the presence of marine cement have not been observed. They may have been present but could have been subsequently dissolved away. From this marine environment, the Subis Limestone migrated into the fresh-water phreatic environment where solution by undersaturated meteoric waters took place. The core facies and the flank facies remained essentially submerged in this zone of solution while the open marine facies remained outside of it. Fluctuations within the freshwater phreatic zone is interpreted to have been responsible for the formation of ± C1 and C2 cements. Both these cements were interpreted to have been formed within the active zone of fresh water circulation. The ferron calcite cement of the open marine facies is interpreted to have been formed in marine pore waters. The Fe^{++} could have been derived from the clay minerals that were deposited in this facies.

Warta Geologi (Newsletter of the Geological Society of Malaysia), Vol. 14, No. 1, January-February 1988