

## ABSTRAK

Daerah penelitian terletak di Pulau Timor Bagian Barat, Provinsi Nusa Tenggara Timur. Penelitian lapangan dikonsentrasikan pada studi singkapan di Desa Nenas, Kecamatan Mutis, Kabupaten Timor Tengah Selatan, dimana batuandasar Pra-Tersier (Formasi Maubise) bagian dari *Oceanic Passive Margin Australia* dan batuandasar (Kompleks Mutis) bagian dari *Banda ForeArc* tersingkap. Penelitian ini dalam upaya memahami evolusi tektonik yang didasarkan pada data geokimia. Hasil penelitian didapati lima Formasi batuan yaitu; Formasi Maubise (TRPmv & TRPml), Formasi Aitutu (Tra), Kompleks Mutis (pPm), Batuan Ultrabasa (Ub) dan Kompleks Bobonaro (Tmb). Merupakan bagian dari *melange* tektonik kompleks akresi. Formasi Maubise mencerminkan *Oceanic Plate Stratigraphy* (OPS), terbentuk pada *mid-oceanic ridge basalt* (MORB). Batuan magmatik Formasi Maubise merupakan *sub-alkaline basalt* bersifat *tholeiitic*, normalisasi terhadap MORB memiliki pola identik dengan N-MORB, anomali positif unsur Th, Nb dan Ti namun  $< 1$ , mengindikasikan bukan terbentuk pada lingkungan subduksi. Diskriminan tektonik menunjukkan tipe N-MORB pada batas lempeng divergen. Batuan metabasal Kompleks Mutis bersifat *tholeiitic*, normalisasi *primitive mantle* dan *chondrite* identik dengan *Tholeiitic*, anomali negatif unsur Th, Nb, dan Ti  $> 1$ , sebagai penciri subduksi. Diskriminan tektonik menunjukkan tipe *Island Arc Tholeiitic* (IAT) + *ForeArc*, pada batas lempeng konvergen. Evolusi tektonik daerah penelitian terbagi menjadi dua fase. Fase pertama pada 250 juta tahun lalu (Permian), saat peregangan samudera *Meso-Tethys* memicu pembentukan batuan magmatik Formasi Maubise, menandai fase tektonik divergen pada *Oceanic Passive Margin Australia*. Fase kedua pada 12-3 juta tahun lalu (Neogen), subduksi antara *Oceanic Passive Margin Australia* dengan *Banda Volcanic Arc*, diikuti kolisi pada 2 juta tahun lalu (Kuartar) saat *Continental Shelf Australia* bertumbukan dengan *Banda ForeArc* yang mengakibatkan metabasal Kompleks Mutis yang telah terbentuk sejak Kapur akibat *multiple subduction event* saat peregangan *Ceno-Tethys* teranjak (*overthrust*) diatas Formasi Maubise.

Kata kunci: Evolusi Tektonik, Batuan Magmatik, Geokimia, Timor Barat.

## ABSTRACT

*The study area is in West Timor. Fieldwork was concentrated on outcrops in Nenas Village, where the Pre-Tertiary basement rocks (Maubise Formation), representing the Australian Oceanic Passive Margin, and the Mutis Complex, representing the Banda Forearc, are exposed. This research aims to understand the tectonic evolution of the region through geochemical analysis. Five lithostratigraphic units were identified: the Maubise Formation (TRPmv & TRPml), Aitutu Formation (Tra), Mutis Complex (pPm), Ultramafic Rocks (Ub), and the Bobonaro Complex (Tmb). They are part of a tectonic mélange accretionary complex. The Maubise Formation reflects Oceanic Plate Stratigraphy characteristics and originated from mid-ocean ridge basalt. Its magmatic rocks are sub-alkaline basalts with a tholeiitic affinity. MORB-normalized trace element patterns are consistent with N-MORB, with positive anomalies in Th, Nb, and  $Ti < 1$ , indicating a non-subduction origin. Tectonic discrimination diagrams classify as N-MORB types formed at divergent plate boundaries. Metabasalt rocks of the Mutis Complex are also tholeiitic, primitive mantle, and chondrite-normalized, indicating Island Arc Tholeiitic affinity, negative anomalies in Th, Nb, and  $Ti > 1$ , indicative of a subduction-related setting. Tectonic discrimination plots suggest an Island Arc Tholeiitic+Forearc setting at convergent plate boundaries. The tectonic evolution of the study area is divided into two major phases. The first phase occurred 250 million years ago (Permian), when the Meso-Tethys Ocean rifted, triggering the formation of Maubise magmatic rocks, marking a divergent tectonic regime along the Australian Oceanic Passive Margin. The second phase occurred during the Neogene (12–3 Ma), involving subduction between the Australian Oceanic Passive Margin and the Banda Volcanic Arc. This was followed by a collision event around 2 million years ago (Quaternary) when the Australian Continental Shelf collided with the Banda Forearc. This event resulted in overthrusting the previously formed metabasalt rocks of the Mutis Complex (likely originating from multiple subduction episodes during the Ceno-Tethys extension) above the Maubise Formation.*

**Keywords:** Tectonic Evolution, Magmatic Rocks, Geochemistry, West Timor.