

# Redefining The Lolotoi Formation, Timor-Leste

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**M**etamorphism within the Lolotoi Formation was found to occur differently within the mafic precursors and the meta-sedimentary units. Mafic units show an actinolite-chlorite-epidote-quartz assemblage of mid-upper greenschist. Meta-sedimentary units show variations within a chlorite-quartz assemblage, with other units composed of garnet, sericite or andalusite. These units indicate metamorphic conditions of greenschist to epidote-almandine facies.

The Lolotoi Formation preserves evidence for three stages of ductile deformation and three types of brittle deformation. The S1 fabric is limited in exposure and is only located when S2 occurs as a spaced cleavage in thin-section. The pervasive fabric (S2) occurs with varying orientations as a result of to later brittle deformation. This fabric is often crenulated by S3 and occurs occasionally with an S-C fabric. The last deformation occurring within the Lolotoi Formation (S3) is localised at outcrop exposure and occurs as a crenulation cleavage. Fault trends are orientated 100°, 050° and north-south.

Geochemical analyses of the Lolotoi Formation suggest that basalts from the field area are related by crystal fractionation, or crustal assimilation. On a primitive-mantle normalised spider diagram the Lolotoi Formation plots with close affinities to an N-type mid ocean ridge basalt. Together with the textural and lithological evidence, this suggests that the Lolotoi Formation represents part of an oceanic crustal package.

The basal contact of the Lolotoi Formation is represented by a fault gouge that has a structural thickness of greater than 100 m. This contact occurs with the underlying Eocene units. A ductile shear zone represents the upper contact which separates the Lolotoi Formation from the overlying Cablac Formation. The Lolotoi Formation was significantly deformed prior to its juxtaposition with the overlying Cablac Formation.

Slivers of Lolotoi Formation involved in the ductile shear zone and intercalated with the base of the Cablac Formation suggest that these two units were structurally juxtaposed. Significant late brittle faults dissect both the Lolotoi and Cablac formations.

Comparisons with the Aileu Formation suggest that the Lolotoi Formation is not of similar metamorphism, deformation, lithology or origin. When compared to the Mutis Complex of West Timor they show broadly similar characteristics in relation to lithology and metamorphism. ■