

CRETACEOUS AND NEOGENE VOLCANIC LAVAS OF SABAH — ORIGIN AND TECTONIC SIGNIFICANCE

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A combination of field and geochemical investigation of the Cretaceous and Neogene volcanic lavas of Sabah (CNVLS) allow some control on the relative timing of events in its tectono-magmatic history. The presence of low-K tholeiitic lava (Telupid basalt of Cretaceous age) or so-called 'boninitic suite', interpreted as a product of partial melting of hydrated oceanic lithosphere in the mantle wedge, suggests that this is the first magma to form in response to intra-oceanic subduction. As subduction proceeds, the magma composition changes to calc-alkaline suite (high-K calc-alkaline lavas of Neogene Tungku and Tanjung Batu andesites), probably because the hydrated asthenosphere of the mantle wedge and confirmed an oceanic, supra-subduction zone origin for these volcanic arc assemblage.

An evolutionary sequence can be envisaged for the CNVLS which begins with the establishment of an oceanic island arc where supra-subduction zone extension led to the genesis of tholeiitic lava and/or boninitic (Telupid basalt) and followed by formation of the volcanic arc (Tungku andesite). Next, followed by Tungku arc-splitting, as extension continued, a marginal basin (Sulu Sea) developed. Later, incomplete closing of the Sulu Sea caused the southwards subduction beneath the older arc and the formation of the Tanjung Batu andesite.
