Geochemistry of pillow lavas in Timor: Implications for supra-subduction zone magmatism and the evolution of the Banda Arc

J.K.M. LEE[1]

[1]School of Earth Sciences, University of Melbourne, 3010, Victoria, Australia (leejk@student.unimelb.edu.au)

Miocene—Pliocene pillow lavas outcropping on the northern coast of Timor are thought to represent an extension of the Banda Arc volcanics which has been obducted to form a supra-subduction zone (SSZ) ophiolite. The main body of pillow lavas in Timor are exposed in the northern part of the Oecusse district (the Oecusse Volcanics). These lavas are intruded by sub-vertical dykes, both of which display basalt to basaltic andesite compositions. A similar, but significantly smaller body of pillow lavas 200 km to the east in Baucau display similar geochemical compositions. Older, more altered basalts found further inland are part of the Permian Maubisse Formation (Gondwana Megasequence) and display contrasting geochemistry compared to the more recent pillow lavas.

This study presents a new extensive dataset from petrographic, whole-rock major/trace element, and Sr-Nd-Pb-Hf isotopic analyses matched with field observations to differentiate the various unmetamorphosed lavas found throughout Timor. This information is also used to constrain the nature of SSZ magmatism occurring in SE Asia and aid in constraining tectonic models for the formation of Timor.

The pillow lavas display mostly flat REE patterns with weak negative Eu anomalies. Several samples exhibit LREE depletion, while the basalts of the Maubisse Formation have significant LREE enrichment. Nb/Ta and Zr/Hf ratios range from 11.4—18.4 and 24.1—45.2, respectively. The signatures of these lavas vary from previous data obtained from the Banda Arc volcanics and suggest that the origin of these SSZ obducted lavas could be more enigmatic than previously thought.