Provenance of the Cretaceous–Eocene Rajang Group submarine fan, Sarawak, Malaysia from light and heavy mineral analysis and U-Pb zircon geochronology

Thomson Galin, H. Tim Breitfeld, Robert Hall, Inga Sevastjanova

PII: S1342-937X(17)30288-5
DOI: doi: 10.1016/j.gr.2017.07.016
Reference: GR 1854

To appear in:

Received date: 13 April 2017
Revised date: 24 July 2017
Accepted date: 31 July 2017

Please cite this article as: Thomson Galin, H. Tim Breitfeld, Robert Hall, Inga Sevastjanova , Provenance of the Cretaceous–Eocene Rajang Group submarine fan, Sarawak, Malaysia from light and heavy mineral analysis and U-Pb zircon geochronology, (2017), doi: 10.1016/j.gr.2017.07.016

Provenance of the Cretaceous–Eocene Rajang Group submarine fan, Sarawak, Malaysia from light and heavy mineral analysis and U-Pb zircon geochronology

Thomson Galin [a,b], H. Tim Breitfeld [a], Robert Hall [a], Inga Sevastjanova [a,c]

[a] *SE Asia Research Group, Department of Earth Sciences, Royal Holloway University of London, Egham, TW20 0EX, UK*

[b] *Minerals and Geoscience Department Malaysia (JMG) Sarawak, Jalan Wan Abdul Rahman, Kenyalang Park P.O. Box 560 93712 Kuching, Sarawak, Malaysia*

[c] *Getech Group plc, UK, Leeds, LS8 2LJ, UK*

Keywords: Provenance, Zircon U-Pb ages, Rajang Group, Sarawak, SE Asia

Abstract

The Rajang Group sediments in central Borneo form a very thick deep-water sequence which was deposited in one of the world's largest ancient submarine fans. In Sarawak, the Lupar and Belaga Formations form the Rajang Group, characterised by turbidites and large debris flows, deposited in an interval of at least 30 Ma between the Late Cretaceous (Maastrichtian) and late Middle Eocene. Borneo is one of the few places in SE Asia where sediments of this age are preserved. Heavy mineral assemblages and detrital zircon U-Pb dating permit the Rajang Group to be divided into three units. The Schwaner Mountains area in SW Borneo, and West Borneo and the Malay Tin Belt were the main source regions and the contribution from these source areas varied with time. Unit 1, of Late Cretaceous to Early Eocene age, is characterised by zircon-tourmaline-dominated heavy mineral assemblages derived from both source areas. Unit 2, of Early to Middle Eocene age, has zircon-dominated heavy mineral assemblages, abundant Cretaceous zircons and few Precambrian zircons derived primarily from the Schwaner Mountains. Unit 3, of Middle Eocene age, has zircon-tourmaline-dominated heavy mineral assemblages derived from both sources and reworked sedimentary rocks. There was limited contemporaneous magmatism during deposition of the Rajang Group inconsistent with a subduction arc setting. We suggest the Rajang Group was deposited north of the shelf edge formed by the Lupar Line which was a significant strike-slip fault.