

The Geological Evolution of Borneo Island

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THE GEOLOGICAL EVOLUTION OF BORNEO ISLAND

by

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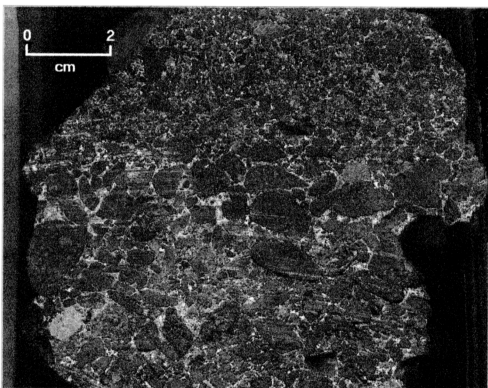
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Frontispiece : Pamali Breccia, Meratus Mountains, SE Borneo

Specimen courtesy of S.G.Bergman, Arco Petroleum Co.

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SYNOPSIS

The research described in this thesis has been addressed by reviewing existing geological maps, reports, professional papers and other published material pertaining to Borneo island and the surrounding seas and presently available to the author. Re-interpretations of some of the published data are given where, in the light of new information, new method or reasoned argument, it is appropriate to do so. Reports are included of independent field work funded partly by the University and conducted during his candidature.

The thesis commences with a brief description of the geology of the seas surrounding Borneo Island. The stratigraphy of the onshore geology is then described commencing with the nature and possible origin of the oldest Basement rocks followed by elucidation of the stratigraphy and origins of Mesozoic sediments and associated igneous and metamorphic rocks. Cretaceous volcano-plutonic arc rocks, oceanic crustal rocks and associated overlying deepwater sediments and melange zones are discussed in relation to postulated subduction zones and their implications for vertical tectonics and accretion of a late Mesozoic landmass. The rifting of the Mesozoic landmass and subsequent development of hydrocarbon-rich Cenozoic basins is described in terms of paleo-environment, sedimentology and structure. The characteristics and origins of a variety of Cenozoic igneous rocks is portrayed in relation to rifting processes as well as melting due to crustal thickening. The development of a Cenozoic tectonic framework and its effect on the present drainage and topography as well as its influence on Recent tectonics and seismicity is explained. The thesis concludes with a concise exposition of the geological evolution of Borneo and its relationship within the regional tectonic framework of SE Asia.

SINOPSIS

Penyelidikan yang dibincangkan dalam tesis ini telah dibuat dengan mengkaji semula peta-peta geologi, lapuran lapuran, kertas kertas profesyenal dan bahan bahan yang diterbitkan mengenai kepulauan Borneo dan lautan lautan sekeliling yang didapati oleh penulis. Penafsiran semula data-data yang diterbitkan ini dibuat apabila terdapat penerangan baru, kaedah baru atau perbincangan, dimana ianya harus dilakukan. Hasil dari kerja lapangan sendiri semasa pencalonan M.Sc ini juga dilapurkan.

Tesis ini bermula dengan keperihalan ringkas mengenai geologi lautan sekeliling kepulauan Borneo. Stratigrafi kawasan kawasan daratan dibincangkan bermula dengan sifat dan asalan yang mungkin bagi Batuan Dasar tertua dan diikuti dengan perbincangan stratigrafi dan asalan enapan Mesozoic dan batuan igneus dan metamorfik yang berkaitan. Batuan arka volkan-pluton Kapur, kerak lautan dan zon-zon melange dibincangkan berhubung dengan zon subduksi yang telah ditafsirkan serta implikasinya terhadap tektonik menegak dan akresi daratan Mesozoic lewat. Penghanyutan daratan Mesozoic dan perkembangan selanjutnya lembangan-lembangan Cenozoic yang kaya dengan sumber hidrokarbon dibincangkan dengan merujuk kepada persekitaran paleo, sedimentologi dan struktur. Sifat-sifat dan asalan batuan batuan igneus Cenozoic diperbincangkan dengan kaitannya dengan proses penghanyutan serta peleburan akibat penebalan kerak. Perkembangan tektonik Cenozoic dan kesannya

terhadap saliran dan topografi dan kaitannya dengan tektonik Resen dan aktiviti aktiviti seismik diterangkan. Tesis ini disudahi dengan kupasan ringkas evolusi Borneo dan hubungannya dengan rangka tektonik rantau Asia Tenggara.

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