

**STRATIGRAPHY OF THE RANSI MEMBER OF
THE MIDDLE EOCENE TO OLIGOCENE
TATAU FORMATION IN THE TATAU –
BINTULU AREA, SARAWAK,
EAST MALAYSIA.**

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**FACULTY OF SCIENCE
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ABSTRACT

A recent study in the Tatau-Bintulu area indicates that the Ransi Member which was originally dated as Upper Miocene to Pliocene (Kamaludin Hassan, 2004) is part of the Upper Eocene to Upper Oligocene Tatau Formation. This finding is inconsistent with that of Liechti, et.al (1960) who proposed that it was equivalent to the Middle to Upper Miocene Begrih Formation while Ismail (2000) proposed that it was equivalent to the Upper Miocene to Pliocene Balingian Formation.

The study area is located in a horst bounded by two parallel NE-SW trending faults 4.5 km apart. The gently folded Ransi Member that is located at the base of the Tatau Formation, sits above an angular unconformity that separates it from the underlying more tightly folded Belaga Formation.

The Ransi Member is made up of mostly thick bedded conglomerate and sandstone interbedded with thin shale horizons. The conglomerate in Tutong Hill, Tatau Hill and Ransi Hill are mainly composed of pebbles of angular to sub-angular clasts of chert, quartz, igneous and metamorphic fragments. The igneous clasts are composed of rhyolite similar to that in the Middle Eocene igneous intrusion at Bukit Piring in the Tatau Area. A very thick black carbonaceous horizon was found at the Horat Pacific Quarry, to the northeastern part of Tatau Hill. Vitrinite reflectance from the coal of Ransi Member is similar to the Tatau Formation, it is higher than the Vitrinite Reflection of Nyalau and Balingian Formations but lower than Belaga Formation. Cross-bedded sandstone channels are dominant in the Ransi Member. Rounded to sub-rounded cobbles and boulders of soft sandstone and slumped features are found in the Pelungau area indicating a different source and depositional

conditions that distinguishes it from the Ransi Member. The Pelungau Conglomerate is a local event that occurs within Tatau Formation that might have been triggered by faults.

The discovery of significant burrowing in many sandstone beds within the upper part of the Ransi Member together with marine microfossils in the shale beds suggest that the fluvial channels in a lower coastal plain environment was gradually replaced by a more shallow marine environment indicative of a marine transgression. The source of the Ransi beds was largely from the radiolarian rich chert and metamorphic rocks of the older Rajang Group located to the south as indicated by paleocurrent determinations. The presence of volcanic clasts in the conglomerate from Tatau Hill suggests a volcanic source in the hinterland during the deposition of the Ransi beds.

The gently folded Arip Limestone is a shallow marine deposit equivalent to or younger than the Ransi Member found within the Tatau Formation to the southwest of the area. Microfossils such as *Globigerinatheca sp.* in the Arip Limestone extends the age down to Middle Eocene from Late Eocene previously (Leitchi et al, 1960) for the base of the Tatau Formation. If it is younger than the Ransi and the Ransi is at the base of the Tatau Formation, than the Ransi's age could be older than Middle Eocene.

ABSTRAK

Kajian terkini yang dijalankan di kawasan Tatau – Bintulu menunjukkan Ahli Ransi yang sebelumnya ditarikhkan berusia Miosen Atas hingga Pliosien (Kamaludin Hassan, 2004) adalah merupakan sebahagian Formasi Tatau yang berusia Eosen Atas hingga Oligosen Atas. Hasil penemuan ini adalah bercanggah dengan Liechti, et.al (1960) yang mencadangkan usianya adalah sama dengan Formasi Begrih iaitu Miosen Tengah hingga Miosen Atas manakala Ismail (2000) pula mencadangkan ianya adalah sejajar dengan usia Formasi Balingian iaitu Miosen Atas hingga Pliosien.

Kawasan kajian terletak pada horst yang disempadani dengan dua sesar selari yang berarah TL-BD dan dipisahkan sejauh 4.5km. Ahli Ransi yang terlipat landai terletak di bawah Formasi Tatau dan ianya berada di bahagian atas ketakselarasan bersudut yang memisahkannya dengan Formasi Belaga yang terlipat lebih ketat.

Ahli Ransi kebanyakannya terbentuk daripada lapisan tebal konglomerat dan batu pasir yang bersaling lapis dengan lapisan syal yang nipis. Konglomerat yang terdapat di Bukit Tutong, Bukit Tatau dan Bukit Ransi kebanyakannya mengandungi klas pebel yang bersudut hingga sub-sudut yang berasal dari cert, kuarza dan serpihan batuan igneus dan metamorf. Klas igneus daripada riolit adalah sama dengan penerobosan igneus pada Miosen Tengah di Bukit Piring yang terletak Tatau. Satu lapisan hitam berkarbonat yang tebal dijumpai di Kuari Hormat Pacific iaitu di bahagian timur laut Bukit Tatau. Pantulan vitrinit daripada lapisan arang batu berkarbon ini adalah sama dengan Formasi Tatau tetapi lebih tinggi daripada Formasi Nyalau dan Balingian yang lebih muda. Lapisan batu pasir bersilang adalah dominan dalam Ahli Ransi. Batu pasir lembut yang bersaiz tongkol, bundar hingga

sub-bundar serta fitur gelonsoran merupakan ciri – ciri yang dijumpai di Pelugau yang mana menunjukkan asalan dan ciri pengenapan yang berbeza dan ciri ini diperlukan bagi membezakan Ahli Ransi yang lain.

Kesan pengorekan haiwan yang terdapat pada banyak lapisan batu pasir di antara Ahli Ransi dan lapisan syal yang mengandungi mirofossil marin merupakan penemuan penting yang menunjukkan aliran fluvial di dataran pantai telah digantikan dengan persekitaran laut cetek secara beransur – ansur dan ini petunjuk kepada transgresi marin. Batuan punca lapisan Ransi adalah sebahagian besarnya terbentuk daripada radiolaria yang kaya cert dan batuan metamorfik dari Kumpulan Rajang Tua yang terletak di bahagian selatan seperti yang ditunjukkan oleh arah arus paleo. Kehadiran klas volkanik dalam konglomerat yang ditemui di Bukit Tatau mencadangkan terdapat sumber volkanik di pedalaman semasa tempoh pengenapan lapisan Ransi.

Batu kapur Arip yang terlipat landai adalah kemungkinan deposit marin seumpama atau lebih muda dari Ahli Ransi yang dijumpai di dalam Formasi Tatau di kawasan tenggara. Mikrofosil seperti *Globigerinatheca* sp dalam Batu kapur Arip mengunjurkan umur ke bawah iaitu kepada Eosen tengah, yang sebelumnya daripada Eosen atas bagi lantai Formasi Tatau.

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*Word of You had come to my ears,
but now my eye has seen You. (Job 42:5)*

*Because You are the LORD who
makes all thing; stretching out the
heavens by Yourself and giving
the earth its limits. (Isaiah 44:24)*

*Though I go through the valley of
deep shade, I will have no fear of
evil. For You are with me, Your
rod and Your support are my
comfort. (Psalms 23:4)*

TABLE OF CONTENT:

Description	Page	
Abstract	... i	
Abstrak	... iii	
Acknowledgement	... v	
Table of content	... viii	
List of Abbreviations	... x	
List of Figures	... xi	
List of Plates	... xix	
List of Tables	... xxv	
Chapter 1: Introduction		
1.1	Introduction to the project	... 1
1.2	Objective	... 2
1.3	Study area	... 3
1.4	Previous work	... 5
1.5	Geography	... 7
1.6	Geomorphology	... 12
Chapter 2: General Geology and structure		
2.1	Regional geology	... 13
2.2	General geology of Tatau area	... 18
2.3	Structures of Tatau area	... 22
Chapter 3: Methodology		... 24
Chapter 4: Stratigraphy		
4.1	Stratigraphy of Tatau area	... 32
4.2	General Lithostratigraphy of Tatau area	... 39
4.3	Stratigraphy of Ransi Member	... 48
4.3.1	Facies of Ransi Member	... 51
4.3.1.1	Discussion	... 72
4.3.2	Paleontology of Tatau Formation	
4.3.2.1	Introduction	... 77
4.3.2.2	Foraminifera	... 77
4.3.2.3	Systemmatic description of foraminifera from the Arip area.	... 79
4.3.2.3.1	Larger Benthonic Foraminifera	... 80

4.3.2.3.2	Planktonic foraminifera	... 93
4.3.2.3.3	Smaller benthonic foraminifera	... 96
4.3.2.3.4	Rhodophyta	... 99
4.3.2.4	Paleoichonology	... 103
4.3.2.5	Discussion	... 107
4.3.3	Biostratigraphy	
4.3.3.1	Previous biostratigraphy investigation	... 115
4.3.3.2	Update on biostratigraphy in the Tatau area	... 122
4.3.3.2	Discussion	... 130
4.3.4	Lithostratigraphy of Ransi Member	... 133
4.4	Conclusion	... 162

Chapter 5: Petrology

5.1	Introduction	... 165
5.2	Petrography of the Ransi Member	... 166
5.3	Petrography of the Pelungau Hill	... 203
5.4	Diagenesis	... 205
5.5	Petrography of the Lesong Hill calcareous Sandstone	... 209
5.6	Petrography of the Piring Hill rhyolite	... 211
5.7	Petrography of the Arip limestone	... 220
5.8	Coal Petrology	... 223
5.9	Conclusion	... 227

Chapter 6: Depositional Environment and Geologic History

6.1	Introduction	... 233
6.2	Depositional Environment	... 235
6.3	Geologic history of the Tatau area	... 241

Chapter 7: Conclusion ... 244

References ... 248

Appendix

List of Abbreviations:

cm	Centimeter
F	Facies
Fig.	Figure
g	Gram
GPS	Global positioning system
IUGS	International Union of Geological Science
km	Kilometer
L	Locality
LBF	Larger benthonic foraminifera
m	Meter
mm	millimeter
ma	Million years
mg	milligram
%Ro	Vitrinite reflectance in oil immersion
SSB	Sarawak Shell Berhad
sp.	Species
U	Unconformity
Vr	Vitrinite reflectance
XRF	X-Ray Fluorescence

List of Figures:

Figures	Description	Page
Fig. 1.1	Geological map of study area, Tatau-Bintulu, Sarawak.	3
Fig. 1.2	Localities (L) of outcrops in the study area	4
Fig.1.3	Satellite image shows the Borneo Island and highlighted is the location of the Tatau town.	7
Fig. 1.4	Drainage system of the Tatau area (Modified from SRTM and topographic map (source data from National Mapping Malaysia, 1973)).	11
Fig. 2.1	Structural zones of northwest Borneo (after Hutchison, 2005).	14
Fig. 2.2	NNE-SSW diagrammatic cross-section to suggest the plate-tectonic model for Early Cretaceous to Middle Eocene convergent tectonics. (After Moss, 1998; Hutchison, 2005).	15
Fig. 2.3	Geological map with major structures of the Tatau area.	21
Fig 4.1	Map and stratigraphy of the Tatau area (modified from Wolfenden (1960) in Hutchinson (2005)).	33
Fig. 4.2	Geological map with SW-Ne trending Anak Nyalau Fault in Tatau area. Sample locality also shown in the map.	38
Fig. 4.3	Fining upwards turbidite beds of Bawang Member at locality L2 in Tatau area.	40
Fig. 4.4(a)	Legend of lithostratigraphy log.	41
Fig. 4.4(b)	Lithostratigraphy log of Belaga Formation at locality L2, Tutong Hill.	42
Fig. 4.5	Heterolithic beds with light grey sandstone and dark grey of silty clay beds in locality L14, Arip area.	44
Fig. 4.6	Steeply dipping coarsening upward Tatau Formation beds with thicknesses of sandstone beds increasing upsection to the right at the locality L13, Piring area.	44
Fig. 4.7	Arip Nursery (L11) limestone (LM) interclated with dark grey calcareous shale (CS) beds below.	46

Fig. 4.8	Outcrop of fossiliferous Arip Limestone at locality L11, Arip Nursery.	47
Fig. 4.9	Richly fossiliferous Arip Limestone outcrop at locality L10, Arip Cave.	47
Fig. 4.10(a)	Legend for lithostratigraphic log.	49
Fig. 4.10(b)	Lithofacies in the Ransi Member at different localities.	50
Fig. 4.11	Graded conglomerate to sandstone bed at locality L2, Tutong Hill	54
Fig. 4.12	Normally graded conglomeratic bed in facies F1, Ransi Member at locality L5, Tatau Hill.	54
Fig. 4.13	Normally graded conglomerate to pebbly sandstone in facies F1 at locality L7, Ransi Hill.	55
Fig. 4.14	Graded sandstone to shale of deep-water turbidites in Bawang Member at locality L2, Tutong Hill.	55
Fig. 4.15	Load structure (L) in conglomerate bed with thin shale bed below in facies F1 in locality L2, Tutong Hill.	55
Fig. 4.16	Sand-filled channel beds cutting into underlying shale beds at locality L5, Tatau Hill.	59
Fig. 4.17	Conglomeratic braided-channel bed (BC) cutting into sand-fill channel (SC) at locality L4, Tatau Hill.	59
Fig. 4.18	Thick to thin channel-fill sandstone beds at locality L4, Tatau Hill.	59
Fig. 4.19	Trough cross lamination in channel-fill sand beds at locality L8, Hormat Pasifik Quarry. Bed thicknesses decreases and shale interbeds increases upwards.	60
Fig. 4.20	clay-filled ox-bow lake (O) cut by overlying sandstone channels at locality L1, Tutong Hill.	60
Fig. 4.21	Normally graded Pebbly sandstone in facies F2 at locality L8, Hormat Pasifik Quarry.	61
Fig. 4.22	Normally graded pebbly sandstone to silty clay in facies F2 of Ransi Member at locality L3, Hormat Pasifik Quarry.	61

Fig. 4.23	Multiple sets of cross bedding (CB) and cross lamination (CL) in facies F2 sandstone, locality L5, Tatau Hill.	62
Fig. 4.24	Planar cross lamination (CL) in the cross bedding (CB) in channel deposits in facies F2, Locality L5, Tatau Hill.	62
Fig. 4.25	Trough cross lamination (TC) in facies F2, locality L1, sandstone bed (SB), Tutong Hill.	63
Fig. 4.26	Parallel lamination in dark grey silty clay of F3 at locality L1, Tutong Hill	66
Fig. 4.27	Parallel lamination in light grey silty sand of F3 at locality L3, Hormat pasifik Quarry.	66
Fig. 4.28	Branching <i>Orphiomorpha</i> on bedding plane of Ransi Member at Locality L2, tutong Hill.	67
Fig. 4.29	Inclined <i>Orphiomorpha</i> in sandstone layer at the locality L5, Tatau Hill.	67
Fig. 4.30	Fine sand filled burrow siltstone bed in locality L4, Tatau Hill.	67
Fig. 4.31	Paleocurrent map of Ransi Member in Tatau-Bintulu area.	75
Fig. 4.32	Rose diagram of the paleocurrent direction based on clasts orientation for the Ransi Member. L01 & L02 Tutong Hill; L03 Hormat Pasifik Quarry; L04 & L05 Tatau Hill; L07 Pelungau Hill.	76
Fig. 4.33	Top of sandstone bed with <i>Orphiomorpha</i> in the Tutong Hill.	104
Fig. 4.34	<i>Orphiomorpha</i> with knobby wall in section of sandstone bed at the Arip Hill.	104
Fig. 4.35	Sandstone with vertical <i>Orphiomorpha</i> in Hormat Pasifik Quarry.	104
Fig. 4.36	Side view of sandstone bed with <i>Taenidium</i> with cylindrical meniscus backfilled structure in Tutong Hill.	105
Fig. 4.37	top of sandstone bed with <i>Thalassinoides</i> branching network infilled with secondary iron oxide in Tatau Hill.	106
Fig. 4.38	Distribution of the foraminifera in the Tatau area. Time scale based on Berggren et al (1995).	114

Fig. 4.39	Map showing the locations of the Microfossils have collected in the past.	117
Fig. 4.40	Correlation (C) of the outcrops in the Tatau Area for the Ransi member.	132
Fig. 4.41	Angular unconformity (U) between conglomerate Ransi Member overlying shaly Bawang Member.	135
Fig. 4.42	Burrow in the Ransi Member sandstone bed.	135
Fig. 4.43	Ransi Hill outcrop with coarse sandstone (sst) beds and light greenish shale (sh) beds.	135
Fig. 4.44	Lithostratigraphy log of Ransi Member at locality L7, Ransi Hill.	136
Fig. 4.45	Tutong Hill outcrop where the angular unconformity (U) between underlying Bawang Member with overlying Ransi Member was found. The Bawang beds is tightly folded and overturned (dotted line) at locality, L2.	138
Fig. 4.46	Angular unconformity of Bawang Member (BW) below the Ransi Member (RM) at locality L2, Tutong area.	138
Fig. 4.47	Channel cut deposit with shale-filled channel representing an ox-bow lake (OB) at locality L1, Tutong Hill.	138
Fig. 4.48 (a)	Lithostratigraphy log 1 of Ransi Member at locality L1,Tutong Hill.	139
Fig. 4.48 (b)	Lithostratigraphy log 2 of Ransi Member at locality L1,Tutong Hill.	140
Fig. 4.48 (c)	Lithostratigraphy log 3 of Ransi Member at locality L2,Tutong Hill.	141
Fig. 4.48 (d)	Lithostratigraphy log 4 of Ransi Member at locality L2,Tutong Hill.	142
Fig. 4.49	Graded conglomerate bed at locality L5 the lower part of Tatau Hill.	144
Fig. 4.50	Tatau Hill (L5) outcrop with thick sandstone beds and thin shale beds.	144

Fig. 4.51	shallow marine deposits Tatau Hill (L4) outcrop where coarse sandstone channel deposits gradually change into shaly sandstone that rich by <i>Orphiomorpha</i> burrows.	144
Fig. 4.52	Braided channel deposits with shale lenses and graded sandstone beds at L4, Tatau Hill.	144
Fig. 4.53 (a)	Lithostratigraphy log 1 of Ransi Member at locality L5,Tatau Hill.	145
Fig. 4.53 (b)	Lithostratigraphy log 2 of Ransi Member at locality L5,Tatau Hill.	146
Fig. 4.53 (c)	Lithostratigraphy log 3 of Ransi Member at locality L4,Tatau Hill.	147
Fig. 4.53 (d)	Lithostratigraphy log 4 of Ransi Member at locality L4,Tatau Hill.	148
Fig. 4.54	Hormat Pasifik, L3 with abundant black carbonaceous sandstone and shale. The light layers are due to the weathering of sandstone layer.	150
Fig. 4.55	Sub- angular to angular poorly sorted pebbly sandstone bed with chert clasts in locality L3, Hormat Pasifik Quarry.	150
Fig. 4.56	Light coloured coarse sandstone beds interbedded with thin black shale lamination at locality L8, Hormat Pasifik Quarry.	150
Fig. 4.57	Vertical <i>Orphiomorpha</i> burrow in the sandstone bed at locality L8, Hormat Pasifik Quarry.	151
Fig. 4.58	A thin coal seam (C) at locality L3 in Hormat Pasifik Quarry.	151
Fig. 4.59 (a)	Lithostratigraphy log 1 of Ransi Member at locality L3,Hormat Pasifik Quarry.	152
Fig. 4.59 (b)	Lithostratigraphy log 2 of Ransi Member at locality L8,Hormat Pasifik Quarry.	153
Fig. 4.60	synsedimentary fold (in red line) in conglomerate bed related to fault (F) at locality L6, Pelungau area.	155
Fig. 4.61	Pelungau Conglomerate outcrop cut by synsedimentary fault (F) at locality, L6, Pelungau area.	155

Fig. 4.62	rounded sandstone (Sst), shale (Sh) and squeezed shale (SSh) clasts at locality L6, Pelungau area.	155
Fig. 4.63	Lithostratigraphy log of Pelungau bed at locality L6, Pelungau.	156
Fig. 4.64	Conglomerate beds of Nyalau Formation overlain by Quaternary sand deposits along Sangan Road.	159
Fig. 4.65	Tidal deposits of thin sandstone and shale interbedded below the conglomerate beds, Sangan Road.	159
Fig. 4.66	Sub-angular sandstone (Sst), shale (Sh) and coal clasts (C) in Nyalau Formation conglomerate at Sangan Road.	159
Fig. 4.67	Fossilized tree trunk in conglomerate bed of Nyalau Formation, Sangan Road.	159
Fig. 4.68 (a)	Lithostratigraphy log 1 of Nyalau Formation at Sagan Road.	160
Fig. 4.68 (b)	Lithostratigraphy log 2 of Nyalau Formation at Sagan Road.	161
Fig. 4.69	Propose stratigraphy base on the Vitrinite Reflectance (Vr%) and petrology study.	163
Fig. 5.1	Conglomerate clasts provenance plotted on Boggs (1992) classification chart.	168
Fig. 5.2	Thick graded Ransi Member conglomerate beds sitting on top of tightly folded Bawang Member turbidite at locality L7, Ransi Hill.	169
Fig. 5.3	Cobble sized clasts in Ransi Hill conglomerate bed (scale is in 5cm).	169
Fig. 5.4	Graded conglomerate bed with pebble-sized clasts and organic matter (OM) at locality L2, Tutong Hill.	172
Fig. 5.5	Sub-angular to sub-rounded clasts in cut conglomerate hand specimen from locality L1, Tutong Hill. Matrix is cemented with hematite minerals.	172
Fig. 5.6	Clast supported thick conglomerate beds at locality L2, Tutong Hill.	172

Fig. 5.7	Graded Bed of pebbly sandstone from facies F1Ransi Member, locality L1, Tutong Hill.	177
Fig. 5.8	Hand specimen of Ransi Member graded pebbly sandstone from facies F2, locality L2, Tutong Hill.	177
Fig. 5.9	Tutong Hill sandstones plotted in Mc Bride's (1963) classification chart.	179
Fig. 5.10	Quartz grains provenance plotted on classification chart (Basu et al.,1975).	179
Fig. 5.11	Histogram of grain-size distribution and rock compositions of Tutong Hill (locality L1 & L2) sandstone from thin sections.	181
Fig. 5.12	Quartz grain provenance plotted in Basu et al. (1975) classification chart.	188
Fig. 5.13	Tatau Hill sandstones plotted on Mc. Bride's (1963) classification chart.	189
Fig. 5.14	Histogram of grain-size distribution and rock compositions of Tatau Hill (locality L5) sandstone from thin sections.	190
Fig. 5.15	Hand specimen of quartz rich pebbly sandstone from TT2 at the lower section of Tatau Hill, locality L4.	191
Fig. 5.16	Hormat Pasifik Quarry sandstone plotted on Mc. Bride's (1953) classification chart.	198
Fig. 5.17	Quartz grain provenance in Basu et al. (1975) classification chart of specimens from Hormat Pasifik Quarry.	198
Fig. 5.18	Histogram of grain-size distribution and rock compositions of Hormat Pasifik Quarry (locality L3 & L8) sandstone from thin sections.	200
Fig.5. 19	A few faults (red dotted line) that cuts into the conglomerate beds (C).	204
Fig.5. 20	Conglomerate bed that composed of rounded sandstone (Sst) and shale (Sh) clasts in Pelungau outcrops (locality L6).	204
Fig. 5. 21	Total alkalis-silica (TAS) diagram for the studied of the Piring Hill volcanic rock (after Le Maitre et. al., 1989).	214

Fig. 5.22	Major element of K ₂ O vs. SiO ₂ plot for the Piring rhyolite. It shows a high-K calc alkali affinity.	218
Fig. 5.23	Chondrite-normalized REE profiles (normalizing values after McDonough & Sun, 1995) for the rhyolite. The Eu was low for both of the Piring Rhyolite dyke samples (L008 & L009).	218
Fig. 5. 24	Mid-ocean ridge basalts (MORB)-normalized REE profiles(normalizing values after McDonough & Sun,1995) for the rhyolite showing strong depletion of Ta, Nb, Eu and Ti that might attributed to fractionation of plagioclase and ilmenite (sample L008 & L009).	218
Fig. 5.25	Tectonic discrimination diagrams illustrating tectonic setting of the Piring Hill rhyolite: (a) Rb vs. Nb+Y diagram (Pearce et al., 1984), The A-type granites field in (a) is after Whalen et al. (1987) and red cycle of post-collision granites is after Pearce (1996); (b) Nb vs. Y diagram (after Pearce et al., 1984).	219
Fig. 5.26	Sketch showing the generation of Piring Hill rhyolitic magma as a consequence after slab breakoff during closure of Ranjang Sea (modified after Moghazi, 2003)	219
Fig.5.27(a – c)	Vitrinite reflectance (%Ro) of the Ransi Member. (d) Vitrinite reflectance (%Ro) of the Tatau Formation.	225
Fig. 5.28	Paragenesis based on textural evidence and geochemical consideration as proposed by Muad et al. (2000). Dashed bars indicate degree of uncertainty.	232
Fig. 6.1	Depositional model for the Ransi Member.	237
Fig. 6.2	Distribution of common marine Ichnofacies (after Pemberton et al., 1992).	239
Fig. 6.3	Tectonic model of the Tatau area. (a) Belaga, Tatau and Nyalau Formation being folded in the Miocene time; (b) Anak-Nyalau normal Fault that cut through the Tatau area; (c) footwall eroded and sediment deposited at the hangingwall.	243
Fig. 7.1	Comparison of the previous stratigraphy and suggestion of new stratigraphy position of Ransi Member and Tatau Formation age.	246

List of Plates:

Plates	Description	Page
Plate 4.1	Axial section of <i>Nummulites pengaronensis</i> . Less distinctive proloculus with whorls embracing part of alar prolongation broken.	82
Plate 4.2	Tangential section of <i>Nummulites</i> . Involute test with development of the pillar (P).	82
Plate 4.3	Oblique section of <i>Nummulites</i> . Marginal cord (C) present at the upper right of the plate.	83
Plate 4.4	Equatorial section (Centre) and axial section (left) of <i>Nummulites pengaronensis</i> . Chambers arranged spirally, height of the chambers gradually increasing as added. 3 whorls present for the equatorial section.	83
Plate 4.5	Oblique section that cut through the deuterocoel and protoconch showing big deuterocoel and rectangular equatorial chambers of <i>Discocyclina sella</i> .	87
Plate 4.6	Axial section of <i>Discocyclina sella</i> . Uneven thickness of roof and floor of equatorial chambers with encrustation of the test with calcareous mud.	87
Plate 4.7	Axial section of <i>Discocyclina omphala</i> . Test is ompheloid in shape. Deuterocoel and protoconch replaced with calcareous mud.	87
Plate 4.8	Near equatorial section of <i>Discocyclina</i> . Rectangular equatorial chambers and both deuterocoel and protoconch filled with dark calcareous mud.	88
Plate 4.9	Axial section of <i>Discocyclina</i> . Deuterocoel and protoconch filled with calcareous mud. Partly calcareous mud filled equatorial layer and lateral chamberlets around the embryo.	88
Plate 4.10	Transverse section parallel to shell axis of <i>Pellatispira</i> . It shows big spiral chamber lumen in both sides.	90
Plate 4.11	Axial section of <i>Pellatispira</i> aff. <i>provalei</i> . Lenticular specimen with depressed spiral sutures cover in the last whorl.	91
Plate 4.12	Axial section of <i>Pellatispira</i> . Biplanar with slightly lenticular specimen and presence of two spiral chamber lumen.	91

Plate 4.13	Transverse section of <i>Pellatispira</i> . Lenticular specimen with thick shell test and septum is clearly observed in between spiral chamber lumen.	91
Plate 4.14	Transverse section of <i>Pellatispira</i> . Lenticular specimen with thick radial canals. Spiral chamber lumen filled with calcereous mud.	92
Plate 4.15	Transverse section of <i>Pellatispira</i> . Discoidal specimen with depressed spiral sutures covered in the last whorl .	92
Plate 4.16	<i>Globigerinatheka</i> with three chambers filled with fine sparry calcite.	94
Plate 4.17	<i>Globigerinatheka</i> with thick wall. It is partly destroyed and replaced by micrite.	94
Plate 4.18	Globular <i>Globigerinatheka</i> with thin wall.	95
Plate 4.19	Subglobular <i>Globigerinatheka</i> with enclosing an earlier chamber within it.	95
Plate 4.20	Thick walled subglobular <i>Globigerinatheka mexicana mexicana</i> with enclosing an earlier chamber within it.	95
Plate 4.21	<i>Textularia</i> with biserial chambers.	96
Plate 4.22	<i>Textularia</i> with four pairs of chambers arranged biserially.	97
Plate 4.23	<i>Cibicides</i> with agglutinated wall and high trochospiral coil.	97
Plate 4.24	<i>Cibicides</i> with aperture centred along the axis of coiling.	98
Plate 4.25	<i>Bathysiphon</i> fragments in tube-like shape.	98
Plate 4.26	<i>Bathysiphon</i> in agglutinated form.	99
Plate 4.27	Various types of coralline alga present in the limestone.	100
Plate 4.28	Thick branch of <i>Mesophyllum</i> with broad central core (red arrow).	101
Plate 4.29	<i>Mesophyllum</i> with thick branch (b).	101
Plate 4.30	Transverse section of <i>Spongites</i> (S) with partly encrusting growth that attached to the foraminifera (F).	102
Plate 4.31	Axial section of <i>Spongites</i> with radiating growth.	102
Plate 4.32	<i>Bathysiphon</i> sp. found in sample L053-BU of the Bawang Member. The grain mounts of sediment.	125

Plate 4.33	Marine foram found in the Ransi member, sample L019-BS. The grain mount of sediment.	125
Plate 4.34	Undifferentiated foraminifera found in sample L034-C of Ransi Member.	125
Plate 4.35	Diatom commonly found in sample of L019-BS, L034-ML, L042 and L038G of the Ransi Member.	125
Plate 4.36	Thin section of limestone with some broken microfossil fragment (M) and quartz grains (Q). Sample L027-A from Arip Nursery.	127
Plate 4.37	Thin section of limestone with fragments of benthonic, coralline algae and planktonic foram, sample L027-B, from Arip Nursery.	127
Plate 4.38	Thin section of Arip Limestone with little quartz grain (Q) with calcite mineral (red color stain) and benthonic forams fragments (BF). Sample from L029-B, Arip cave.	128
Plate 4.39	Thin section of Arip Limestone rich in larger benthonic foraminifera and coralline algae. Sample from L029-C, Arip Cave.	128
Plate 4.40	Thin section of Lesong calcareous sandstone with angular quartz grains by calcite. Sample locality, L025 – B.	130
Plate 4.41	Foraminifera (F) and coralline algae (A) fragments found in thin section of Lesong calcareous sandstone. Sample locality, L025-C.	130
Plate 5.1	Thin section of locality L4 showing metamorphic quartz (Q) with undulatory extinction (cracking in quartz grains are an artifact of thin-sectioning).	169
Plate 5.2	Thin section of TL 5 at locality L2, Tutong Hill showing concavo-convex (CC) contact of the quartz grains.	182
Plate 5.3	Thin section of TL 3, from locality L2, Tutong Hill showing secondary quartz growth (Qo).	182
Plate 5.4	Thin section of TL 8 at locality L2, Tutong Hill showing metamorphic-origin polycrystalline quartz grain (PC) and monocrystalline quartz grain (MC).	182
Plate 5.5	Thin section of TL 2 at locality L2, Tutong Hill showing mica inclusion within quartz grains (in yellow circle) used for characterizing quartz grain source provenance.	183

Plate 5.6	Thin section of TL 6 at locality L2, Tutong Hill showing radiolarian chert with microcrystalline quartz filling radiolarian (in white circle) .	183
Plate 5.7	Thin section of TI 5 at locality L2, Tutong Hill showing radial fibrous chacedonic quartz occurs as pore fillings of radiolarian chert.	183
Plate 5.8	Thin section of TL 7 at locality L2, Tutong Hill showing rhyolitic igneous fragment with spherulitic texture similar to the Piring Hill rhyolite.	184
Plate 5.9	Pyrite (yellow) and iron (brown) grains found in the sandstone.	184
Plate 5.10	Thin section of TT3 showing quartz overgrowth and pseudomatrix (in cycle) within then quartz grain at locality L4, Tatau Hill.	191
Plate 5.11	Thin section of TT1 showing concavo-convex contact of the quartz grains in locality L4, Tatau Hill.	191
Plate 5.12	Thin section of TT1 showing mica inclusion with quartz grain similar to that Plate 5.6 from Tutong Hill.	192
Plate 5.13	Thin section of TT2 showing rRadiolarian chert fragment with microcrystalline quartz at locality L4, Tatau Hill.	192
Plate 5.14	Thin section of TT3 showing angular schist fragment at locality L4, Tatau Hill.	193
Plate 5.15	Spherulitic texture of the rhyolitic fragment that similar to rhyolite Piring Hill. Thin section of TT1 from locality L4, Tatau Hill.	193
Plate 5.16	Thin section of sample HL2 showing monocrystalline (MC), polycrystalline (PC) quartz grains and overgrowth of silica cement around quartz grains (red circle).	201
Plate 5.17	Thin section of sample HL5 showing sub-angular to sub-rounded quartz grains with concavo-convex contact and pseudomatrix in the sample.	201
Plate 5.18	Thin section of sample HL7 showing mica inclusion (in circle) within quartz grains for source provenance.	201
Plate 5.19	Thin section of sample HL5 showing radiolarian chert with microcrystalline quartz and polycrystalline quartz.	202
Plate 5.20	Thin section of sample HL2 showing spherulitic texture of rhyolitic igneous rock fragment (Circle) that similar to the rhyolite rock in Piring Hill, Tatau.	202

Plate 5.21	Thin section of sample HL8 showing feldspar minerals (F) with albit twinning that angular in shape.	202
Plate 5.22	Pseudomatrix at the edge of the big quartz grain.	207
Plate 5.23	clay pseudomatrix around the quartz grains.	207
Plate 5.24	Pressure solution between quartz grains. Thin section of sample from locality L2, Tutong Hill.	207
Plate 5.25	Stylolitic structure in the Arip limestone. Thin section of sample from locality L10.	207
Plate 5.26	Overgrowth of quartz around quartz grain. Thin section of sample from locality L3, Horvat Pasifik Quarry.	208
Plate 5.27	calcite cementation around the quartz grain in the Lesong. Thin section of sample from locality L9.	208
Plate 5.28	Microcrystalline quartz in the chert that replace the radiolarian. Thin section of sample from locality L5, Tatau Hill.	208
Plate 5.29	rounded microcrystalline quartz in the chert fragments. Thin section of sample from locality L2, Tutong Hill.	208
Plate 5.30	Microcrystalline quartz growth outward to replace radiolaria in the chert. Thin section of sample from L8, Horvat Pasifik Quarry.	208
Plate 5.31	Under plan-polarized thin section of calcareous sandstone with a foraminifera fragments. Calcite stained red with potassium ferrigmite.	210
Plate 5.32	Thin section under x-nicol of Lesong Hill calcareous sandstone with sub- angular to sub-rounded monocrytalline quartz.	210
Plate 5.33	Thin section of rhyolite from Piring Hill showing spherulitic texture (flower like form).	215
Plate 5.34	Thin section of Piring Hill intrusion showing plagioclase phenocrysts with the spherulitic texture growth.	215
Plate 5.35	Thin section of Piring Hill rhyolite under PPL showing sheaf-like growth and quartz phenocrysts.	216
Plate 5.36	Muscovite in pore space of (red circle) Piring Hill rhyolite thin section.	216

Plate 5.37	Thin section of Arip Cave Limestone at locality L10 under PPL showing poorly sorted biosparite with peloids and bioclasts.	221
Plate 5.38	Thin section of Arip Cave Limestone at locality L10 stained with potassium ferricyanide showing micrite infilling rhodophyta chambers (RC). Sparry calcite infilled the echinoderm fragment (EF).	221
Plate 5.39	Stained thin section under PPL of Arip Nursery Limestone showing a fragmented foraminifera surrounded by micrite and sparry calcite with some quartz grain.	222
Plate 5.40	Polished section of coal (Vitrinite maceral) from locality L3, Hormat Pasifik Quarry of Ransi Member showing Vitrinite.	224
Plate 5.41	Polished section of L1, Tutong Hill of Ransi Member showing clay intercalated (C) with Vitrinite(V).	224

List of Tables:

Tables	Description	Page
Table 4.1	Type of facies presence in the Ransi Member and their abundance.	71
Table 4.2	Nyalau Foraminifera reinterpreted from the previous study.	118
Table 4.3 (a)	Tatau Foraminifera from the previous study (Liechti et al. (1960), Wolfenden (1960) and Kamaludin Hassan (2004)).	119
Table 4.3 (b)	Tatau Foraminifera from the previous study (Liechti et al. (1960), Wolfenden (1960) and Kamaludin Hassan (2004)).	120
Table 4.3(c)	Tatau Foraminifera from the previous study (Liechti et al. (1960), Wolfenden (1960) and Kamaludin Hassan (2004)).	121
Table 4.4	Samples for biostratigraphy analysis in the SSB (Shell, Miri)	123
Table 5.1	Clasts size, composition and its roundness of the Ransi Hill conglomerate.	168
Table 5.2	Clasts size, composition and its roundness of the Tutong Hill conglomerate.	171
Table 5.3	Mineral compositions of pebbly sandstone and sandstone samples from Tutong Hill outcrops.	178
Table 5.4	Quartz provenance analysis based on Framework quartz grains types in thin sections of samples.	178
Table 5.5	Grain size distribution of pebbly sandstone and sandstone samples from Tutong Hill.	180
Table 5.6	Mineral composition of samples from Tatau Hill.	188
Table 5.7	Composition of framework quartz grains of the samples from Tatau Hill.	188
Table 5.8	Grain size distribution of the pebbly sandstone and sandstone samples from Tatau Hill.	189
Table 5.9	Mineral composition of the pebbly sandstone and sandstone samples from the Hormat Pasifik Quarry. HL1 to HL9 are from bottom to top of thin section.	197

Table 5.10	Framework quartz grains of the samples from thin-section point-counts.	197
Table 5.11	Grain size distribution of the pebbly sandstone and sandstone samples from Hormat Pasifik Quarry.	199
Table 5.12	Average percentage of the Piring Hill igneous body.	214
Table 5.13	Major and trace element composition for calculated normative minerals of the Piring Hill rhyolite from XRD analyses.	217
Table 5.14	Mean vitrinite reflectance (%Ro) values of coal samples and estimated depth of burial (in km) for the different formations. Ransi Member has higher %Ro and higher depth of burial compare to Nyalau and Balingian Formations.	226