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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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 Hormat 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. Microfosils 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 Pliosen (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 Pliosen.

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 kebanyakkannya 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 peneroboson 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 tedapat pada banyak lapisan batu pasir di antara Ahli Ransi dan lapisan syal yang mengandungi mirofosil 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)*

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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

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