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CATATAN GEOLOGI GEOLOGICAL NOTES

Yatsengia jengkaensis - a new yatsengioid rugose coral from the “Jengka Pass Limestone”, Pahang, central Peninsular Malaysia

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Abstract: A new species of Middle Permian (Wordian) yatsengioid rugose coral, *Yatsengia jengkaensis* from the Jengka Pass Limestone outcrop, Pahang, Central Peninsular Malaysia is described and illustrated. This new taxon is distinct from all previously described species in having larger corallite diameter and more complex axial column. This species is found in association with *Neoschwagerina* and *Verbeekina* indicating a Middle Permian age.

Keywords: Permian rugose coral, Jengka Pass, Pahang, Central Peninsular Malaysia

INTRODUCTION

Middle-Late Permian rugose corals occur throughout Pahang, central Peninsular Malaysia. The coral taxa have been described and illustrated from late Middle Permian by Igo (1964); Middle Permian (*Neoschwagerina-Yabeina*) Zone, Kato & Ezaki (1986); Middle Permian (Murgabian-Midian), Fontaine *et al.* (1988); and Late Permian, Aye Ko Aung *et al.* (2013). In the past 25 years, Fontaine *et al.* (1988) collected some massive colonies of tabulate coral (*Michelinia cf indica* Waagen & Wentzel) and a rugosan species (*Parawentzelella socialis* Mansuy) from the Jengka Pass outcrop about 24 km east of Temerloh (8 km east of Bukit Kepayang, Pahang) (Figure 1) where a Permian section is well-exposed in a road cutting. The samples were collected stratigraphically from six different points (JP1, JP2, JP3, JP4, JP5 and JP6) (Figure 4). The present paper focuses the systematic study of a new rugose coral species collected from JP2 limestone of the Jengka Pass outcrop. The sample collection of coral and limestone was done by us in the frame of a B. Sc. study and for the preparation of an undergraduate thesis (Julaiha Azmi, 2010). It includes the description of carbonate sedimentology, logging a section of the Jengka Pass outcrop, re-collection of the faunas and systematic description of them and comparison and correlation with the Jengka Pass faunas with those from other areas such as within the Pahang State and Japan. The fieldwork was carried out during two trips (29-30 January, 2012 and 3 April, 2012). In the first trip, the samples were collected stratigraphically from six points in the log section (JP1-JP6). The new coral bearing limestone sample was collected from the JP2 outcrop (Figure 2) in the second trip. A total number of 70 thin sections were prepared for

further study on the carbonate petrology and paleontology of the faunas such as foraminifers, coral and algae.

“THE JENKA PASS LIMESTONE”

The Jengka Pass outcrop located a little to ENE of the Jengka Pass between 170 and 173 km points from Kuala Lumpur along the Temerloh-Meran Road in Pahang. It occurs within the Indochina Plate. This Indochina Plate was separated from the Gondwana in the Devonian during the opening of the Paleo-Tethys in the Middle Devonian that caused North China, South China and Indochina to separate from the Gondwana. During Permian, Indochina was having a tropical environment. The name “Jengka Pass Formation” was first used by Ichikawa *et al.* (1966) to include the strata represented by the alternation of sandstones and mudstones with intercalated limestone lenses within the highly inclined sequence lying unconformably below a gently inclined strata of thick-bedded red conglomeratic sandstone of the Upper Triassic to Lower Jurassic Tembeling Group. Some layers of mudstone become carbonaceous and contain indeterminate plant fragments. Generally the strata are steeply inclined and are affected by strong faulting. Locally small anticlinal structures, disturbed by faulting is observed, where the strata are even slightly overturned. These rocks are well exposed on northern side of the road cutting near the Jengka Pass. In this study, a number of fusulinids, smaller foraminifera, rugose and tabulate corals and brachiopods were collected from the limestones on the northern side of the cutting. Nakazawa (1973) stated that the Jengka Pass outcrop can be divided into two members, the upper Middle Permian Limestone and the Upper Permian Sandstone-Shale Members. On the

basis of the faunas that he has collected, he concluded that the Limestone Member is evidently older than the Sandstone-Shale Member.

Discussion on the stratigraphic status of the “Jengka Pass Limestone”

It is rather difficult to consider the stratigraphic placement of the “Jengka Pass Limestone” since the limestone is tightly folded and faulted as seen in the figure available (Fig. 5.21, Lee, 2009) (Figure 3) and the nature of outcrop in the present day (Figure 4). In places, the beds are steeply inclined and some slicken sides of the criteria of fault are also observed at the outcrop. In addition, the contact between the “Jengka Pass limestone” and the sandstone beds that occur above and below is

clearly sharp, no stratigraphic relationship is recognizable between these beds. Summing up on these facts, the authors tend to agree with a point made by Mustaffa Kamal on 25 July, 2012 at an undergraduate seminar of the Department of Geology, University of Malaya that, the “Jengka Pass Limestone” should probably be an allochthonous block which might have been transported from a nearby main limestone body.

The lithofacies and biofacies of the “Jengka Pass Limestone” are closely correlated with those of Kg. Awah which is located at a few kilometers west of Jengka Pass. The “Kg. Awah Limestone” also has the similar algal-foraminiferal limestone as blocks in an agglomerate at the JKR Quarry. It is suggested that both the “Jengka Pass Limestone” and “Kg. Awah Limestone” should be considered as a limestone unit of member rank within the Gua Musang Formation (Middle Permian-Late Triassic) (Mohd Shafeea Leman, 1993, 1994, 2004) which is dominated by three lithofacies: argillaceous, calcareous, and volcanic, in which the calcareous facies is somewhat widely distributed in the areas to the north of the Jengka Pass and Kg. Awah localities.

Faunas of the “Jengka Pass Limestone”

The list of the faunal collection included in the present study is shown below:

Foraminifera fauna

Neoschwagerina katoi Ozawa, *Verbeekina verbeeki* (Geinitz), *Sumatrina annae* Volz, *Pseudofusulina* sp., *Globivulvulina* sp., *Pachyphloia* sp., *Tetrataxis* sp., *Climacammina* sp., *Fronidina* sp., *Paleotextularia* sp., *Deckerella* sp., *Genitzina* sp., and *Aghammina* sp.

Coral fauna

Rugose coral: *Yatsengia jengkaensis* Aye Ko Aung & Julaiha sp. nov.

Tabulate coral: *Michelina cf indica* Kato & Ezaki

Algae fauna

Dasycladacean green algae: *Mizzia* sp.



Figure 1: Location map of the Jengka Pass area, Pahang, Peninsular Malaysia.

Table 1: *Yatsengia jengkaensis* sp. nov.: some dimensional characters of representative corallites (mm).

UM Cat. No.	n:d Ratio	Preparation	Remarks
10581	17 : 11 × 9	transverse section	Late ephebic (Holotype)
	16 : 8 × 9	transverse section	Late ephebic (Holotype)
	16 : 6 × 7	transverse section	Late ephebic (Holotype)
	17 : 6 × 9	transverse section	Late ephebic (Holotype)
	18 : 9 × 10	transverse section	Early ephebic (Holotype)
	16 : 9 × 8	transverse section	Early ephebic (Holotype)
	14 : 6.5 × 5.5	transverse section	Early ephebic (Holotype)
	17 : 8 × 6.5	transverse section	Early ephebic (Holotype)
			longitudinal section
10582	16 : 6 × 6	transverse section	Late ephebic (Paratype)
	18 : 11 × 8	transverse section	Late ephebic (Paratype)

MATERIALS AND METHODS

Specimens were studied under light microscopy of the transverse and longitudinal thin-sections of the rugose corals. The rugose coral terminology and supergeneric classification follows that of Hill (1981). The abbreviations used are: N = number of major septa; d = diameter of corallite in mm. All illustrated specimens are housed in the Department of Geology, University of Malaya, Kuala Lumpur, Malaysia and are prefixed by UM. The locality designated UML, refer Middle Permian, "Jengka Pass limestone" Pahang, Central Malaysia (N 03° 32.537', E 102° 37.393').

Systematic Palaeontology

Class ANTHOZOA Ehrenberg, 1834
 Subclass RUGOSA Milne-Edwards & Haime, 1850
 Order STAUROIDA Verrill, 1865
 Suborder STAUROINA Verrill, 1865
 Family LITHOSTROTIIDAE d'Orbigny, 1852
 Subfamily YATSENGIINAE Hill, 1956
 Genus YATSENGIA Huang, 1932

Type species. (by original designation):
Waagenophyllum (Yatsengia) asiatica Huang, 1932, p. 56; OD, 3866, IGP, Nanking.

Diagnosis. Fasciculate, corallites slender, septa few; major septa long, commonly reaching axis, where cardinal and counter cardinal may appear continuous; axial parts of others may become disconnected and form radial septal

laminae in wide axial structure of numerous abaxially declined tabellae that commonly do not form column wall but intermesh with less steeply abaxially declined periaxial tabellae; minor septa short, dissepimentarium narrow; fossula not notable (Hill, 1981).

Yatsengia jengkaensis Aye Ko Aung & Julaiha sp. nov. (Figure 5 A-E)

Material and occurrence. Two colonies (sample KJ-1 & 2), from (JP2 horizon) of the Middle Permian "Jengka Pass Limestone", near Jengka Pass road cutting, 24 km east of Temerloh (8 km east of Bukit Kepayang) (N 03° 32.537', E 102° 37.393') Pahang, Peninsular Malaysia. Holotype: UM10581 and (5) thin sections, Paratype: UM10582 and (5) thin sections.

Age and distribution. Middle Permian (*Neoschwagerina* – *Verbeekina* Zone) of Pahang, central Peninsular Malaysia.

Etymology. After Jengka Pass locality, Pahang State, Central Peninsular Malaysia.

Diagnosis. Phaceloid corallum with large suboval corallite, diameters 6.5 × 5.5 to 11 × 9 mm; 14 – 18 long, slightly sinuous major septa, minor septa are short, restricted within the dissepimentarium.

Description. Corallum compound, large, fasciculate and phaceloid. Corallite is cylindrical, slender and tall. In transverse section, corallite is round in outline, and is 11 × 9 mm in diameter in the largest corallite. Wall is thin, Dissepimentarium is narrow with one row of concentric dissepiments, but often it lacks dissepiments. Tabularium is wide in which axial structure is not well differentiated. Septa are radially arranged and in two orders. Major septa are 14 – 18 in number, some of which are extending into the axial structure. Minor septa are short, restricted within the dissepimentarium when the latter is present. Fine structure of septa is obscured owing to recrystallization, but might have been diffuse-trabecular, from the shallow structure left behind after recrystallization. Axial structure consists of a few, irregularly twisted septal lamellae, some of which are direct axial elongation of major septa.

The wall is sinuous in longitudinal section. Dissepiments are small and in one row or they may be altogether absent. Tabulae are mostly complete and ascending gently to the axial structure, and are distantly spaced. They may be locally incomplete. Axial structure is in a form of not well defined axial column with domed axial tabellae and sinuous septal lamellae. But it may be reduced to simple waxy lamellae at the centre of corallite.

Remarks: This species is different from that of *Kg. Awah*, Pahang and *Bukit Biwah*, Terengganu described and illustrated by Kato & Ezaki (1986) due to its larger corallite diameter. *Kg. Awah* and *Bukit Biwah* specimens have 6.4 mm and 7.3 mm in corallite diameters respectively, the new species has 10 mm. In addition to that, Jengka Pass specimen has more complex axial column than *Yatsengia* sp. A from *Kg. Awah* and thinner corallite wall than *Yatsengia* sp. B from *Bukit Biwah*. The present



Figure 2: *Yatsengia jengkaensis* and *Verbeekina verbeeki* bearing JP2 outcrop of the "Jengka Pass limestone".

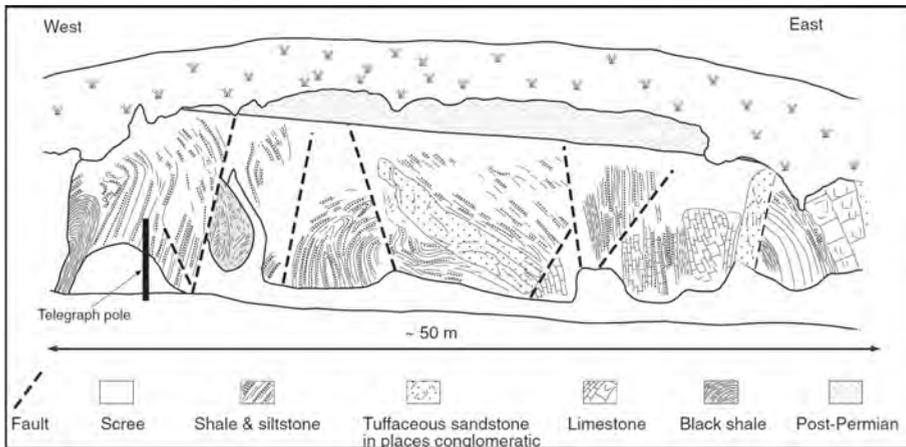


Figure 3: Sketch of north side of road-cut at Jengka Pass (from Lee, 2009).



Figure 4: The sequence of “Jengka Pass limestone” (photograph taken in 2010, facing north).

form is distinguished from the type species of the genus *Yatsengia hangchowensis* Huang from southern China by having larger corallite although both has similar number of major septa. It also has larger corallite diameter than the same species from the upper part of Unit 1 of the Surmaq Formation (*Neoschwagerina* Zone), Abadeh and Julfa, Iran, illustrated and described by Ezaki (1991), and from the middle part of Thitsipin Formation (Wordian), Kyaukkupyin area, Ye-U, Ye-ngan Township, southern Shan State, Myanmar (Aye Ko Aung & Aung Myo Zaw, 2008). The type species (*Yatsengia asiatica*) has corallite diameter of 6 mm and has 18 major septa.

Geological age: Middle Permian (*Neoschwagerina* - *Verbeekina* Zone)

CONCLUSION

This paper has introduced a new yatsengioid rugose coral species, *Yatsengia jengkaensis* from the “Jengka Pass limestone”. The occurrence of the genus *Yatsengia* is reported for the first time from the “Jengka Pass limestone”. On the similarity of rugose and tabulate corals and associated microfossils such as fusulinids and small foraminifers, the “Jengka Pass limestone” and “Kg. Awah limestone” should be considered as a single limestone lens which represents the calcareous unit of the Gua

Musang Formation of Permian-Triassic age. Additionally, it is important to note that some Permian corals (e.g. *Waagenophyllum yini* Fontaine, *Multimurinus fontainei* (Kato & Ezaki) and *Ipciphyllum subelegans* Minato & Kato from the Sibumasu Block in Myanmar and those of the East Peninsular Malaysia Indochina Block suggest that both were at a close paleogeographic position, likely in the Cathaysian paleogeographic provinciality during the Middle Permian. and foraminifers reported from central Peninsular Malaysia (Bukit Kepayang, Kg. Awah and Bukit Bewah) (e.g. *Neoschwagerina* – *Verbeekina* Zone) display strong affinities with those of the Shan State of Myanmar (Aye Ko Aung *et al.*, 2013; Aye Ko Aung & Mustaffa, 2013), Kampuchea, Vietnam and South China.

ACKNOWLEDGEMENTS

Facilities provided by the Department of Geology, University of Malaya are gratefully acknowledged. We thank Zamrut Bin Daunar, Kherman Bin Mahali, Syawal, Dibah, and Yong of the Department of Geology, University of Malaya for helping to collect the samples. Professor Dr Lee Chai Peng of Department of Geology, University of Malaya is thanked for critically reviewing this paper. The present work is supported by the University of Malaya Research grant RG147/11AFR to the first author.

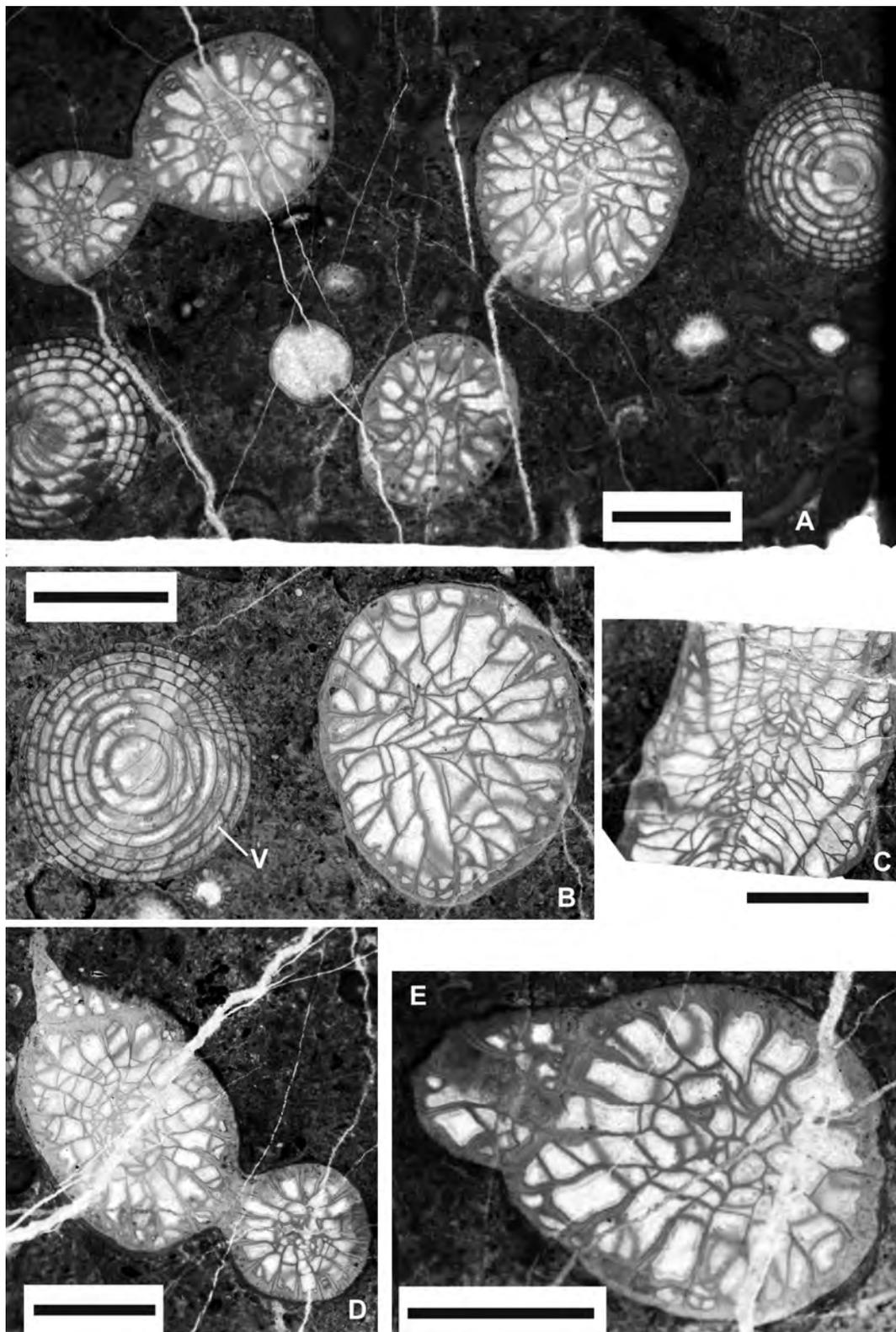


Figure 5: *Yatsengia jengkaensis* sp. nov. A) UM10581, Holotype, transverse section of the phaceloid corallum; B) enlarged photograph of a corallite from Figure A and *Verbeekina verbeeki* (V); C) UM10581, Holotype, longitudinal section; D & E) UM10582, Paratype, serial transverse sections of the corallite showing offsets. Scale bar = 5 mm.

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Enterolithic Structures

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Differential changes in volume in the solidification process of carbonate and siliciclastic components of the Setul limestone are exhibited in rock outcrops of the formation at Pantai Beringin and Tanjung Cawat coastal stretch (Figure 1). The dark parallel strings are siliciclastic layers in its host rock of Setul limestone located at the east end of Pantai (coast) Beringin (Figure 2). A few hundred meters from the locality of Figure 2 at Tanjung Cawat is a large recumbent fold verging west. The dark coloured strings of siliclastic material are crumpled, and sometimes show up as overfolds (center of Figure 2). The overfold structures may attain strong complexity

(Figures 3 and 4). The complex of small overfolds in Figure 3 indicates 43 per cent shortening. The crumpled layers in Figure 4 appear as parts of outcrop-size antiform and synform. The minor structures occur on a limb of the large recumbent fold (Figure 5), its axis (marked by X) striking 350 degrees and in subhorizontal position.

The crumpled siliciclastic layers suggest much less volume changes had occurred, compared to those affecting the carbonate host rock during diagenesis at this particular location in Langkawi. Such structures are labeled as products **enterolithic deformation**.

These features were erroneously named “stylolites” (Jones, 1973, p.33-35) while the updated edition remained largely silent, Lee (2009, p.63), however, still included “stylolitic Setul Limestone” in Table 5.1. Bates and Jackson (1980) refer to stylolite as “a surface or contact, usually occurring in homogenous carbonate rocks and more

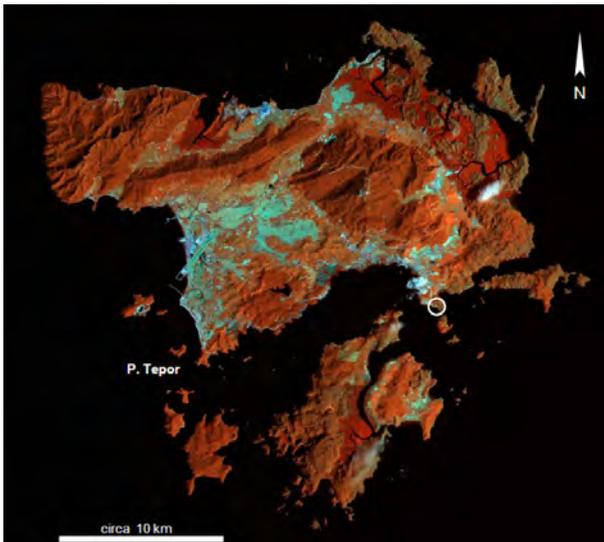


Figure 1: Index of Southeast corner (white circle) of the main island of Langkawi.



Figure 2: Part of 12-meter high outcrop of Setul Limestone at Pantai Beringin. Siliciclastic layers form dark bands, that sometimes exhibit crumpling. Figure 3.5, page 35, in Jones (1973) is from this locality.



Figure 3: Strong deformation of siliclastic interbeds in carbonate host rock, Strain of 43 per cent is indicated. Tanjung Cawat, SE point of Langkawi main island.

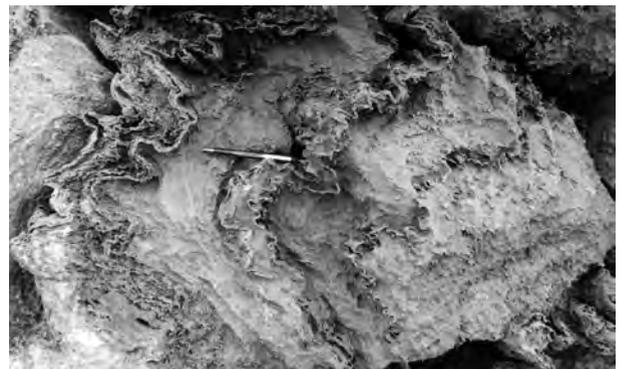


Figure 4: The distribution pattern of crumpled bands suggests a larger size of antiform-synform couple.

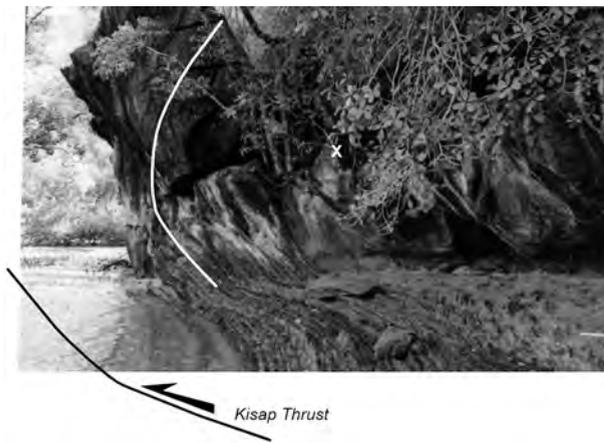


Figure 5: View along the axis (marked by X) of the large recumbent fold consisting of Setul Limestone, Tanjung Cawat, SE point of Langkawi main island. The large recumbent fold is thrust over the regional Kisap Thrust. The Ordovician-Silurian Setul Limestone was thrust over Mid-Permian Chuping Limestone.

rarely in sandstones and quartzites, that is marked by an irregular and interlocking penetration of the two sides, the columns, pits and teeth-like projections on one side fit into their counterparts on the other. As usually seen in cross section, it resembles a suture or the tracing of a stylus. The seam is characterized by a concentration of insoluble constituents of the rock, e.g. clay, carbon, or iron oxides, and is commonly parallel to the bedding. Stylolites are supposedly formed diagenetically by differential vertical movement under pressure, accompanied by solution.”.

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PERSATUAN GEOLOGI MALAYSIA
GEOLOGICAL SOCIETY OF MALAYSIA

**48th ANNUAL GENERAL MEETING
& ANNUAL REPORT 2013**



25th April 2014

Department of Geology, University of Malaya, Kuala Lumpur

AGENDA

Date: 25th April 2014
Time: 5.30 pm
Venue: Department of Geology, University of Malaya, Kuala Lumpur

The Agenda for the Annual General Meeting is as follows:

1. Adoption of Agenda
2. Welcoming Address by the President for Session 2013/2014
3. Confirmation of Minutes of the 47th AGM held on the 5th April 2013
4. Matters arising
5. Annual Report for Session 2013/2014
 - President's Report
 - Secretary's Report
 - Editor's Report
 - Treasurer's and Honorary Auditor's Reports
6. Election of Honorary Auditor
7. Other Matters:
 - 7.1 GSM Endowment Fund
 - 7.2 Future of PGCE
 - 7.3 Suggestion of name change for National Geoscience Conference
 - 7.4 Improvement to GSM Editorial Processes – KM Leong
 - 7.5 Election of Honorary Member
8. Announcement of New Council for 2014/2015
9. Presidential Address for 2014/2015

PERSATUAN GEOLOGI MALAYSIA GEOLOGICAL SOCIETY OF MALAYSIA (GSM)

MINUTES OF THE 47th ANNUAL GENERAL MEETING (AGM)

Date : 5th April 2013
Time : 5.30pm
Venue : Eastin Hotel, Petaling Jaya, Selangor

Members Present

- | | |
|---------------------------|----------------------------|
| 1. Abd Hanan Ahmad Nadzri | 11. Ralph L. Kugler |
| 2. Joy Jacqueline Pereira | 12. Meor Hakif Amir Hassan |
| 3. Dato' Zakaria Mohamad | 13. Samsudin Hj Taib |
| 4. Lee Chai Peng | 14. Mohd Nazan Awang |
| 5. Dato' Yunus Abd Razak | 15. Abd Rasid Jaapar |
| 6. Ling Nan Ley | 16. Leong Khee Meng |
| 7. Tan Boon Kong | 17. Nur Iskandar Taib |
| 8. Lim Choun Sian | 18. Zakaria Endut |
| 9. Ng Tham Fatt | 19. Ahmad Nizam Hasan |
| 10. Wong Yien Lim | |

The Chairperson of the AGM, Joy Jacqueline Pereira, who was the President of Geological Society of Malaysia called the meeting to order at 5.30pm when the quorum of AGM was met. The President welcomed members to the AGM and commented that the last session (year?) was very productive with the materialisation of many institutional arrangements, especially the just-signed agreement with the Institute of Geology Malaysia (IGM) to establish a joint committee on the advancement of geoscience education and knowledge.

1. Adoption of Agenda

The Chairperson tabled the following agenda to the AGM for acceptance:

1. Welcoming Address by the President for Session 2012/2013
2. Confirmation of Minutes of the 46th AGM held on the 13th April 2012
3. Matters arising
4. Annual Report for Session 2012/2013
 - President's Report
 - Secretary's Report
 - Editor's Report
 - Treasurer's and Honorary Auditor's Reports
5. Election of Honorary Auditor
6. Other Matters
 - 6.1 GSM Endowment Fund
 - 6.2 K.M.Leong: Recognition for GSM Publications; Sabah Pre-Cretaceous Geology
7. Announcement of New Council for 2013/2014
8. Presidential Address for 2013/2014

The agenda was unanimously accepted.

2. Confirmation of Minutes of the Previous AGM

The Minutes of the 46th AGM was tabled for confirmation.

Tan Boon Kong proposed that the minutes be confirmed, seconded by Samsudin Hj Taib.

The minutes were unanimously confirmed without any amendment.

3. Matters Arising

3.1 Best Student Award

The AGM was informed that the prize money for the best student award was increased according to what was proposed.

3.2 Activities by the chairs of Working Groups and Regional Representatives

The AGM was informed that the Secretary has continued to liaise with the chairs of Working Groups and Regional Representatives so that more activities were organised for members at various regions.

3.3 Promoting Geoscience in schools

The Council would bring the idea to the proposed Joint Committee to come up with a systematic programme for the said purpose.

Action: Incoming Council

4.0 Annual Reports 2012/2013

4.1 President's Report

The President tabled the President's Report (Appendix 1).

Dato' Yunus Abd Razak commented that the report was very good and proposed that the President's Report be accepted and this was seconded by Lim Choun Sian.

4.2 Secretary's Report

The Secretary tabled the Secretary's Report (Appendix 2). The AGM discussed the following matters:

- a. Tan Boon Kong enquired if the students who were awarded the Best Student Award had obtained First Class Honours.
- b. He suggested the Secretary to include the class details in future reports

Action: Incoming Council

Tan Boon Kong enquired the progress of GEOSEA 2014 preparation by Myanmar Geological Survey.

The AGM was informed that GSM has yet to receive any circular from them.

Lim Choun Sian proposed that the Secretary's Report be accepted and this was seconded by Tan Boon Kong.

4.3 Editor's Report

The Editor tabled the Editor's Report (Appendix 3).

Meor Hakif Amir Hassan enquired if there is any plan to reprint Bulletin issues that are out of stock.

The meeting was informed that GSM is in the process of putting all the Bulletins and Warta issues online in the GSM web site and so there is no plan for reprinting.

Dato' Yunus Abd Razak proposed that the Editor's Report be accepted and this was seconded by Lim Choun Sian.

4.4 Treasurer's and Honorary Auditor's Report

The Treasurer tabled the Treasurer's and Honorary Auditor's Report (Appendix 4). The AGM discussed the following matters:

- a. Abd Rasid Jaapar and Tan Boon Kong proposed that the income and expenditure of PGCE and also other conference be reported and published in Warta.
The AGM agreed to the proposal.

Action: Incoming Council

- b. Abd Rasid Jaapar enquired about the progress of GSM website development.
The meeting was informed the website is being upgraded for GSM publications to be made available online and also to enable authors to submit papers online.

- c. The meeting proposed the honorarium paid to Ms. Anna Lim be increased; the increment amount to be decided by the Council.

Action: Incoming Council

- d. The meeting also proposed that the incoming Council look into securing a more conducive office for GSM.

Action: Incoming Council

Abd Rasid Jaapar proposed that the Treasurer's and Honorary Auditor's Report be accepted and this was seconded by Dato' Yunus Abd Razak.

5. Election of Honorary Auditor

Mr Ahmad Nizam Hassan proposed to continue to appoint S.F Lee & Co as the Honorary Auditor for the year 2013. The AGM unanimously agreed to the appointment.

6. Other Matters

6.1 GSM Endowment Fund

The President tabled the Terms of Reference for the GSM Endowment Fund (Appendix 5) for endorsement. The AGM unanimously endorsed the Terms of Reference for GSM Endowment Fund.

6.2 K.M.Leong: Recognition for GSM Publications; Sabah Pre-Cretaceous Geology (Appendix 6)

K.M.Leong wrote to the Council to raise his concerns regarding an alleged discrepancy in the age of the oldest rocks in Sabah in GSM and other publications.

The AGM opined that GSM as a Society is in no position to judge what is scientifically right or wrong or to stop publishing any of its publications. Members/authors are, however, encouraged to present new evidence or arguments against any interpretation, ideas or theories which are deemed to be erroneous or inaccurate by submitting their own papers in peer-reviewed journals, especially the Bulletin.

7. Announcement of New Council for 2012/2013

The AGM was informed that, upon the closing of nominations, single nominations were received respectively for the positions of President, Vice President, Secretary, Treasurer, Assistant Secretary and Editor, and four nominations for the four 2-year Councillor positions.

The Council for 2013/2014:

President	:	Prof. Dr. Joy Jacqueline Pereira (UKM)
Vice-President	:	Dr. Mazlan Madon (PETRONAS)
Imm. Past President	:	Dato' Yunus Abdul Razak (JMG)
Secretary	:	Mr. Ling Nan Ley (JMG)
Assistant Secretary	:	Mr. Lim Choun Sian (UKM)
Treasurer	:	Mr. Ahmad Nizam Hasan (GeoSolution Resources)
Editor	:	Associate Prof. Dr. Ng Tham Fatt (UM)
Councillors (2 years)	:	Mr. Tan Boon Kong (Consultant) Dr. Nur Iskandar Taib (UM) Dr. Tanot Unjah (UKM) Dr. Samsudin Hj Taib (UM)
Councillors (1 year)	:	Dr. Meor Hakif Amir Hassan (UM) Mr. Robert Wong (PETRONAS) Mr. Nicholas Jacob (JKR) Mr. Askury Abd Kadir (UTP)*

*Co-opted by the Council after the resignation of Dr. Liaw Kim Kiat (BHP Billiton)

8. Presidential Address

The re-elected President Prof. Dr. Joy Jacqueline Pereira thanked the members for their continuous support and confidence. She expressed gratitude to the members for the endorsement of the Terms of Reference for GSM Endowment Fund and also the support for the just-signed agreement with the Institute of Geology Malaysia (IGM). She hoped that with the support of the in-coming Council and members, the Society would progress to greater heights.

The AGM was adjourned at 7:00pm.

LING NAN LEY
Secretary 2012/2013
16 April 2013

PRESIDENT'S REPORT 2013/2014

Since the 47th Annual General Meeting (AGM) on 5th April 2013, the Geological Society of Malaysia (GSM) has continued with activities to advance geological sciences in the country and the surrounding region. Over the past year, the GSM Council has laid the foundation for enhancing strategic directions for geoscience at the national level by setting up a Joint Committee with the Institute of Geology Malaysia (IGM), improving fiscal stability through establishment of the GSM Endowment Fund and protecting its intellectual property through trademark registration. The GSM Council has also continued to strengthen regional leadership through its support to the Regional Congress on Geology, Mineral and Energy Resources of Southeast Asia (GEOSEA) and improve the knowledge capital on geoscience through its publications and flagship events.

The GSM-IGM Joint Committee, co-chaired by the respective Presidents was established under the agreement signed on 5th April 2013 by GSM and Institute of Geology Malaysia (IGM). The initial initiative of the Joint Committee is the annual thematic GSM-IGM Forum to enhance synergies and identify ways of achieving common goals that strengthen geosciences practice in the country. The inaugural GSM-IGM Forum was held on 19 December 2013, at the Geology Department, University of Malaya. The Forum focused on the roles of GSM and IGM in advancing geoscience research and practice. Recommendations from the Forum will serve as a basis to identify strategic directions and future initiatives to be implemented in a coordinated manner by GSM and IGM to enhance professionalism in the geoscience fraternity and promote geoscience in a systematic manner among various target groups, including students and the general public.

The GSM Endowment Fund which commenced with an initial amount of RM 600,000 has been increased to a total of RM 1,050,000.00 as of 17 April 2014. The Council proposes the establishment of a Board of Trustees to ensure that the Endowment Fund is administered in a credible and accountable manner. It is recommended that the Board of Trustees comprise a mix of GSM Officers and Full Members who are not serving in the Council, to be appointed by the AGM. The Council also proposes that the funds be used for implementing various GSM programmes including provision of student awards as requested in the previous AGM. A transparent process in administering the Fund is critical for assuring donors and potential donors that their contribution is safeguarded. As only the interest accrued will be utilized at any one time, continuous expansion of the GSM Endowment Fund will serve to improve the fiscal stability of GSM.

Trademark registration is to protect the representation of GSM products and services such as the logo, words, name or any elements that related to the trademark. Through trademark registration, GSM can prevent any parties from using the trademark without its permission. The Intellectual Property Corporation of Malaysia granted GSM sole ownership of the Petroleum Geoscience Conference and Exhibition (PGCE) in 2012 based on its history of initiating and organizing the petroleum geology event since 1977. Apparently, the use of this term in full and all its derivatives is an infringement of GSM's intellectual copyright for which legal action can be taken. Trademark registration is now ongoing for other aspects to protect the intellectual copyright of GSM.

The 13th Regional Congress on Geology, Mineral and Energy Resources of Southeast Asia (GEOSEA XIII) was hosted by the Myanmar Geosciences Society on 10-11 March 2014 in Yangon, Myanmar. The event was organized for the first time by the newest member of the GEOSEA family. In consideration of the fact that the host is from the least developed country in Southeast Asia, the GSM Council decided on a one-time special sponsorship of RM 15,000 (USD 5,000). In return for the sponsorship, the Council requested for a waiver of registration fees for 10 GSM participants. First refusal for the waiver was given to GSM Members that made time to serve in the Council, lead Working Groups and organise flagship events. The Business Meeting of GEOSEA XIII held on 11 April 2014 approved the GEOSEA website hosted at www.geosea.asia and agreed to appoint a permanent Liaison Officer to the GEOSEA Secretariat. The President of Ikatan Ahli Geologi Indonesia (IAGI) offered to host GEOSEA XIV in 2016 while the President of the Vietnam Union of Geological Sciences (VUGS) offered to host GEOSEA XV in 2018. The Meeting unanimously thanked GSM for their leadership in ensuring the continuity of GEOSEA in the region and requested that GSM continue to serve as GEOSEA Secretariat for another term.

The knowledge capital on geoscience in the country and surrounding region has been enhanced through GSM publications and flagship events. GSM Publications released in the past year are Volume 39 of "Warta Geologi" and Volume 59 of the "Bulletin of the Geological Society of Malaysia". The effort to prepare the publication for ISI indexing is ongoing. The National Geoscience Conference (NGC) 2013 was held in Ipoh, Perak on 8-9 June 2013 in collaboration with the Minerals and Geoscience Department Malaysia, University Teknologi PETRONAS and other collaborators. The NGC 2014 will be held in Kuala Terengganu on 13-14 Jun 2014 in collaboration with Universiti Malaysia Terengganu and the Minerals and Geoscience Department Malaysia (JMG). The PGCE 2014 was not held because the 8th International Petroleum Technology Conference (IPTC) will be held in Kuala Lumpur from 10-12 Dec 2014. The cooperative framework between GSM and PETRONAS for organizing PGCE, which commenced

in 2012, has ended this year. The Council now seeks the guidance of the AGM on future plans for the PGCE. The Working Groups and Regional Representatives of GSM have greatly supported the Society's efforts in enhancing the capability of local geoscientists through the organization of various technical events. The long-established linkages between GSM and national and international institutions have been maintained through exchange of publications and joint initiatives.

The Council of GSM thanks everyone who contributed their time and effort to GSM over the past year. In particular, we record our appreciation to the respective organising chairpersons, Working Group leaders and their committee members as well as partner organisations—University of Malaya, IGM, UMT, JMG, PETRONAS, Universiti Teknologi PETRONAS, Universiti Kebangsaan Malaysia, Universiti Malaysia Sabah and all other collaborators for their contribution, support and unwavering dedication to GSM. Donors to the PGCE as well as the Malaco Group of Companies are also acknowledged for their contribution to the GSM Endowment Fund. Last but not least, I take this opportunity to thank GSM Council Members and Ms. Anna Lee for the tremendous support during my Presidency.

JOY JACQUELINE PEREIRA
President
Geological Society of Malaysia

SECRETARY'S REPORT 2013/14

1.0 Introduction

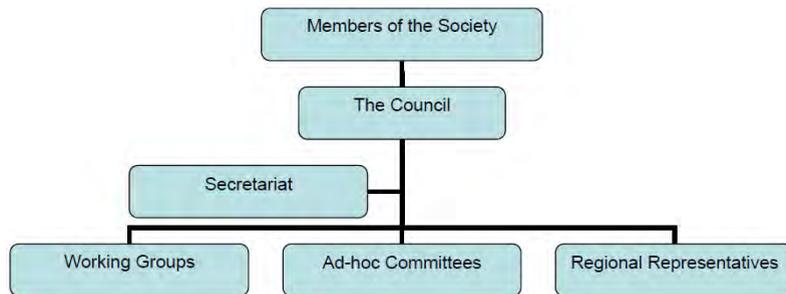
On behalf of the members of the Council of the Geological Society of Malaysia (GSM), it is my pleasure to present the Secretary's Report for the session 2013/2014.

2.0 Society structure

The Society's stakeholders are the members of the Society led by an elected Council. The Council's main functions are to set directions to promote the advancement of geosciences, endorse activities and provide guidance for the execution of the activities of the Society.

The Council is supported by 6 Working Groups and 6 Regional Representatives. The Working Groups' main function is to promote advancement and exchange of knowledge in specific geoscience areas. The Regional Representatives' main function is to promote geosciences and implement the mission of the society within their respective geographical areas.

The Council is assisted by the Secretariat. The Secretariat assisted the Society in the administration of day-to-day activities of the Council, Working Groups and Regional Representatives.



Organisation Chart of the Society

3.0 Membership

As at 31st December 2013, the total number of members in the Society stands at 616. There is a huge overall drop of 175 when compared with the membership of 2012. The drop was mainly from Malaysia and was from the Full and Student categories. However there is quite a big increase in the Life Memberships, largely from Malaysia. The table below presents the breakdown in membership categories and their geographical breakdown.

PERTEMUAN PERSATUAN (MEETINGS OF THE SOCIETY)

Breakdowns of Membership

COUNTRY	Hon.	Life	Full	Assoc.	Student	Inst.	Total 2013	Total 2012	Variance (2013-2012)
Malaysia	1	263	143	3	120	2	532	722	-190
Australia	-	20	2	-	-	-	22	13	+9
Canada	-	3	-	-	-	-	3	3	0
China	-	1	-	-	-	-	1	3	-2
Europe	-	11	-	-	-	-	11	9	+2
Hong Kong	-	2	-	-	-	-	2	1	+1
Indonesia	-	7	-	-	-	-	7	9	-2
Japan	-	4	-	-	-	-	4	2	+2
Middle East	-	7	-	-	-	-	7	6	+1
Philippines	-	3	-	-	-	-	3	3	0
Singapore	-	8	1	1	-	1	11	10	+1
Thailand	-	3	-	-	-	-	3	2	+1
USA	-	10	-	-	-	-	10	9	+1
TOTAL 2013	1	342	146	4	120	3	616		
TOTAL 2012	2	297	217	11	258	6		791	
Variance (2013-2012)	-1	+45	-71	-7	-138	-3			

4.0 The Council

The Council for the Geological Society of Malaysia (GSM) for 2013/2014 session resumed their office after the 47th AGM on the 5th April 2013.

4.1 Council Members

The Council Members for 2012/2013 are as follows:

President:	Prof. Dr. Joy Jacqueline Pereira (UKM)
Vice President:	Dr. Mazlan Madon (PETRONAS)
Immediate Past President:	Dato' Yunus Abdul Razak (JMG)
Secretary:	Mr. Ling Nan Ley (JMG)
Assistant Secretary:	Mr. Lim Choun Sian (UKM)
Treasurer:	Mr. Ahmad Nizam Hasan (GeoSolution Resources)
Editor:	Associate Prof. Dr. Ng Tham Fatt (UM)
Councillors: (2012/2013)	Dr. Meor Hakif Amir Hassan (UM)
	Mr. Robert Wong (PETRONAS)
	Mr. Nicholas Jacob (JKR)
	Mr. Askury Abd Kadir (UTP)*
(2012/2014)	Mr. Tan Boon Kong (Consultant)
	Dr. Nur Iskandar Taib (UM)
	Dr. Tanot Unjah (UKM)
	Dr. Samsudin Hj Taib (UM)

* Co-opted by the Council after the resignation of Dr. Liaw Kim Kiat (BHP Billiton).

4.2 Council Meetings

During the 2013/2014 session, the Council met 6 times. The attendance of the council members to the meetings is presented in the table below. All the meetings were conducted at the meeting room of the Department of Geology, University of Malaya, Kuala Lumpur.

Attendance of Council Members at Council Meetings

NAME	28/5/13	1/7/13	6/9/13	15/11/13	23/1/14	10/4/14	Total
Prof. Dr. Joy J. Pereira	/	/	/	/	/	/	6/6
Dr. Mazlan Madon	/	/	/	0	/	/	5/6
Mr. Ling Nan Ley	/	/	/	/	/	/	6/6
Mr. Ahmad Nizam Hasan	/	/	/	0	/	/	5/6
Dr. Ng Tham Fatt	/	/	/	/	0	/	5/6
Mr. Lim Choun Sian	/	/	0	/	/	/	5/6
Dato' Yunus Abd. Razak	/	0	/	/	/	0	4/6

PERTEMUAN PERSATUAN (MEETINGS OF THE SOCIETY)

Dr. Meor Hakif Amir Hassan	/	0	/	/	0	0	3/6
Mr. Robert Wong	/	/	0	0	/	0	3/6
Mr. Nicholas Jacob	/	/	0	/	/	0	4/6
Mr. Askury Abd Kadir	/	0	/	/	0	0	3/6
Mr. Tan Boon Kong	0	/	/	/	0	/	4/6
Dr. Nur Iskandar Taib	/	/	/	0	/	/	5/6
Dr. Tanot Unjah	0	/	/	/	0	/	4/6
Dr. Samsudin Hj Taib	0	/	/	/	/	/	5/6

Note: / = present, 0 = absent with apology, - = resigned or prior to appointment

5.0 Working Groups

The Working Groups and the Chairs for Session 2013/2014 are as follows:

	WORKING GROUP	CHAIRMAN 2012/2013
1	Engineering Geology, Hydrogeology & Environmental Geology	Mr. Tan Boon Kong
2	Promotion of Geoscience & Young Geologists	Dr. Tanot Unjah
3	Economic Geology	Mr. Zakaria Endut
4	Regional Geology	Dr. Mohd Rozi Umor
5	Geophysics	Dr. Samsudin Hj Taib
6	Petroleum Geology	Mr. Robert Wong /Dr. Liaw Kim Kiat

6.0 Regional Representatives

The Society is trying to strengthen its delivery mechanism at the sub-national level through the appointment of Regional Representatives to work in conjunction with the local membership to advance geoscience in the respective regions. The Regional Representatives for Session 2013/2014 are as follows:

	REGION	REPRESENTATIVE 2011/2013
1	Southern Peninsular Malaysia	Dr. Edy Tonnizam Mohamad (UTM)
2	Perak	Mr. Jasmi Ab. Talib (UTP)
3	Northern Peninsular Malaysia	Dr. Kamar Shah Ariffin (USM)
4	Eastern Peninsular Malaysia	Mr. Hamlee Ismail (JMG)
5	Sarawak	Dr. Richard Mani Banda (JMG)
6	Sabah	Dr. Rodeano Roslee (UMS)

7.0 Activities

The Society has successfully organised Petroleum Geoscience Conference and Exhibition 2013 (PGCE 2013), National Geoscience Conference 2013 (NGC 2013), and other activities such as technical talks, field visit and short courses.

7.1 The Petroleum Geoscience Conference and Exhibition 2013 (PGCE 2013)

The 36th Petroleum Geoscience Conference and Exhibition (PGCE 2013) was successfully held at the Kuala Lumpur Convention Centre from 18-19 March 2013 (reported in the last AGM). A total amount of RM 300,000.00 from the profit of the event was presented to Yayasan UTP as part of our commitment to create value and enhance knowledge sharing amongst the geoscience community in Malaysia.

7.2 The National Geoscience Conference 2013 (NGC 2013)

With Minerals and Geoscience Department Malaysia and Universiti Teknologi PETRONAS as co-organisers, the National Geoscience Conference 2013 (NGC 2013) was successfully held from 8th to 9th June 2013 at Kinta Riverfront Hotel and Suites, Ipoh, Perak. The theme of NGC 2013 was *Geoscience for Environmental Wellbeing*. A total of 2 keynote papers, 58 orals and 48 posters were presented. A total of 247 geoscientists from academia as well as the public and private sectors attended the conference. The Pre-Conference fieldtrip was also successfully carried out.

7.3 Other Activities

During the session, the Council with the cooperation of Working Groups, Regional Representatives, and in collaboration with UKM, UM, JMG and USCI University were able to organise a total of 17 sessions of technical talk and a site visit.

7.3.1 Technical Talk

Summary of Technical Talks

Date	Activity	Topic	Speaker	Venue	Collaborator
8.5.13	Technical Talk	“Indikator-Indikator Struktur di dalam Zon Ricih Plastik di Jalur Timur Semenanjung Malaysia”	Achmad Rodhi (UKM)	UKM	Geology Programme, UKM
22.5.13	Technical Talk	“Engineering Considerations for Sustainable Infrastructure: A Case History of Northern Rail Double Track Project”	Ir. Dr. Ooi Lean Hock (Gamuda)	UM	-
4.6.13	Technical Talk	“A paleomagnetic study of Jurassic-Cretaceous redbeds from Peninsular Malaysia in Sundaland”	Yuji Moriyama (Kobe University)	UM	-
3.7.13	Technical Talk	“Karst Studies in Kuala Lumpur: SMART Tunnel”	Hareyani Zabidi (USM)	UM	-
4.9.13	Technical Talk	“Remediation of Contaminated Groundwater using Innovative Technologies”	Ed Fahnlne (Geosyntec)	UM	-
22.10.13	Technical Talk	“The Challenges of Malaysian Oil and Gas Industry: Imperative Issues for sustainable Growth to Meet Future Energy Expectations”	Ekeh Modesty Kelechukwu (Lecturer/Researcher, UCSI University and adjunct consultant, OCTAGON Petroleum Technology, Kuala Lumpur)	USCI University	USCI University
30.10.13	Technical Talk	“Root Causes of Extensive Mass Movements in Kundasang, Sabah”	Prof Emeritus Dr Tjia H.D (UKM)	UKM	Geology Programme, UKM
6.11.13	Technical Talk	“The Impact of Geology on the Design and Construction of KVMRT Underground Works”	Ir Dr Ooi Lean Hock & Low Yoke Yen (Gamuda)	UM	-
11.11.13	Technical Talk	“Rare Earth and Strategic Metal Mineralisation: Deposits Styles, Geochemistry, Discovery Strategies and Metal Recovery”	Emeritus Professor Ken Collerson PhD, FAusIMM Principal Consultant, Salva Resources	UM	Department of Geology, UM
16.12.13	Technical Talk	“A new sea turtle fossil from the Cretaceous of Morocco: Morphological evolution of sea turtles”	Masataka Yoshida (Waseda University, Tokyo)	UM	Department of Geology, UM
15.1.13	Technical Talk	“Slope Engineering”	Dato’ Ir Dr Gue See Sew (G&P)	UM	-
15.2.14	Geologists’ Night	“The provenance of the sandstone Belaga Formation through heavy mineral study”	Thomson Galin	Kuching	JMG, Sarawak
4.3.14	Technical Talk	“Basin Maturity Modelling - The Hole Truth?” & “Septarian Carbonate Concretions - An Update from the Jurassic of Scotland”	Dr Michael Pearson	UM	Department of Geology, UM
5.3.14	Chairman’s Lecture No.19	“Engineering Geology of the Ipoh-Simpang Pulai-Gopeng Segments of the North-South Highway, Peninsular Malaysia”	Tan Boon Kong	UM	Department of Geology, UM
12.3.14	Technical Talk	“Geothermal Potential In West Malaysia”	Prof. Dr. Karl Wagner Business School, Universiti Kuala Lumpur	UKM	Geology Programme, UKM
2.4.14	Technical Talk	“Application Of Applied Geophysical Methods In Subsurface Geological Investigation For Aquifer Potentials In Dent Group Sedimentary Rock, Lahad Datu, Sabah”	Hardianshah Saleh	UKM	Geology Programme, UKM
8.4.14	Malam EG	1.”The Effect of Tree Induced Suction on Slope Sustainability” 2. “Offshore Geohazards & Geotechnical Challenges of Offshore Field Development”	1. Mohd Fakhurrazi Bin Ishak (UMP) 2. Abd Rasid Jaapar (Asian Geos)	UM	Department of Geology, UM

7.5.2 Site Visit

A total of 24 members participated in the visit to Selinsing Gold Mine, Kuala Lipis, Pahang on 25th January 2014 (Saturday). The site visit was organised by Economic Geology Working Group.

7.5.3 Other Activities by Other Institutions in collaboration with GSM

Date	Activity	Topic	Speaker	Venue	Institution
4-5.6.13	Geosciences Technology Workshop	“Profits & Pitfalls of Shallow Seismic Anomalies”		Impiana Hotel	AAPG
22-26.7.13	Course	Moulding and Casting		UKM	Geology Programme, UKM
3-4.12.13	Seminar	Seminar Bencana Alam (BENCANA 2013), Universiti Malaysia Sabah		UMS	Universiti Malaysia Sabah
18.2.14	Technical Talk	“Oilfield Technology Advances & our Energy Future”	Prof Peter Lloyd	Department of Geology, UM	EAGE, UM Student Chapter
24-25.2.14	Short Course	“Risk & Volume Assessment in Exploration “	Prof. Dr. Jan de Jager, Utrecht University, The Netherlands		Department of Geology, UM

8.0 Other Major Upcoming Events

8.1 The National Geoscience Conference 2014 (NGC 2014)

The National Geoscience Conference 2014 (NGC 2014) will be held from the 13th to 14th June 2014 at the Hotel Grand Continental, Kuala Terengganu. The theme of NGC 2014 is *Climate and Sea-Level Change through Geologic Time*. NGC 2014 is co-organised with the Minerals & Geoscience Department Malaysia (JMG) Terengganu and Universiti Malaysia Terengganu (UMT). The Organising Committee of the Conference is chaired by Dr. Peter R. Parham of Universiti Malaysia Terengganu (UMT).

Post-Conference Fieldtrip: Pulau Bidong and surrounding islands on 15 June 2014.

9.0 GSM Awards

GSM has set up numerous awards for members as follows:

9.1 Honorary Membership

The GSM would confer Honorary Membership on Prof. Dato’ Dr. Ibrahim Komoo who has contributed long, distinguished and outstanding service to the advancement of geological sciences in this region in the 48th Annual General Meeting.

9.2 PGCE Student Excellence Award

PGCE Student Excellence Awards are given to outstanding students studying for a degree in Geology or Geophysics at Malaysian universities. Top students from 8 universities were awarded in PGCE 2013.

There was no PGCE in 2014.

9.3 Best Student Awards

These awards of value RM1000.00 each are administered by the Geology Departments of UM & UKM.

UM divided the award and gave the award as:

Langkawi Award (RM500): Shirley Bungan Njau

GSM Award (RM500): Ila Naquia Binti Ali Badaruddin

UKM gave the award as:

Hadiah Persatuan Geologi Malaysia (RM1000): Suraya Hilmi Hazim

9.4 Young Geoscientist Award

The Council did not receive any nomination for this award.

9.5 Geoscientist Award

Prof. Dato' Dr. Ibrahim Komoo who has contributed significantly to the development of Malaysian geology was awarded Geoscientist Award in NGC 2013.

10.0 Linkages and Collaborations

GSM maintained linkages with national and international institutions such as:

- Institute of Geology Malaysia
- Confederation of Scientific and Technological Association of Malaysia (COSTAM) – represented by two Council members: Mr. Tan Boon Kong and Mr. Nicholas Jacob
- Formation Evaluation Society Malaysia (FESM)
- American Association of Petroleum Geology (AAPG)
 - AAPG House of Delegates: represented by Dr. Mazlan Madon of PETRONAS. Mr. Askury Abd. Kadir of University Teknologi Petronas is the alternative representative
- EAGE
- Academy of Sciences Malaysia, specifically the Committee on Linkage with S&T Organisations and Professional Bodies
 - The President represents GSM in the ASM
- GEOSEA
 - GSM is the present host of the permanent Secretariat
 - In collaboration with Myanmar Geosciences Society, the Thirteenth Regional Congress on Geology, Mineral and Energy Resources of Southeast Asia (GEOSEA 2014) was successfully held from 10-11, March 2014 at Sedona Hotel, Yangon, Myanmar

For the Student's Geological Club Collaboration, only AAPG Student Chapter of University of Malaya is collaborating with GSM at present.

11.0 Acknowledgement

The Society would like to record its utmost appreciation to all the individuals and organisations in organising the Society's numerous activities during the session. Special mention must be made of the tremendous support by the Head and staff of the Geology Department, University of Malaya especially in the use of its premises for most of the Society's meetings and activities. The continued co-operation and support extended by JMG, PETRONAS, UKM, UTP and IGM is recorded with gratitude. The unwavering support of Ms. Anna Lee in the administration of GSM is also very much appreciated. Last but not least, the Council also wishes to record its appreciation to all GSM members for their advice, guidance and support throughout the session.

LING NAN LEY
Secretary
Geological Society of Malaysia

ASSISTANT SECRETARY'S REPORT 2013

The sales of the Society publications and the list of organizations and institutions that were exchanging publications with GSM are presented in the following tables.

Sales and stock of publications for 2013

Publications	Sales 2013	Stock remaining by end of 2012	Stock remaining by end of 2013
Bulletin 2	2	177	175
Bulletin 3	2	156	154
Bulletin 4	4	72	68
Bulletin 6	6	396	390
Bulletin 7	2	248	246
Bulletin 13	0	4	4
Bulletin 17	0	0	0
Bulletin 18	0	0	0
Bulletin 19	3	373	370
Bulletin 20	6	330	326
Bulletin 21	6	130	124
Bulletin 22	2	202	200
Bulletin 23	3	216	213
Bulletin 24	1	373	372
Bulletin 25	4	85	81
Bulletin 26	2	183	181
Bulletin 27	5	59	55
Bulletin 28	4	104	100
Bulletin 29	3	105	102
Bulletin 30	0	110	110
Bulletin 31	1	106	105
Bulletin 32	2	82	80
Bulletin 33	7	244	237
Bulletin 34	1	60	59
Bulletin 35	0	0	0
Bulletin 36	3	99	96
Bulletin 37	7	157	150
Bulletin 38	3	225	222
Bulletin 39	0	0	0
Bulletin 40	2	81	79
Bulletin 42	8	27	19
Bulletin 43	6	137	131
Bulletin 44	2	98	96
Bulletin 45	0	105	105
Bulletin 46	0	19	19
Bulletin 47	6	51	45

Publications	Sales 2013	Stock remaining by end of 2012	Stock remaining by end of 2013
Bulletin 48	0	52	52
Bulletin 49	3	312	309
Bulletin 50	2	339	337
Bulletin 51	11	246	235
Bulletin 52	7	238	231
Bulletin 53	6	335	329
Bulletin 54	8	289	281
Bulletin 55	5	306	301
Bulletin 56	9	366	357
Bulletin 57	12	87	75
Bulletin 58	791*	-	23
Abstract (Bulletin 6)	0	0	0
Proceeding AGC 2000	1	20	19
Proceeding AGC 2001	10	152	142
M'sian Stratigraphic guide	26	249	223
Lexicon of stratigraphy	25	63	38
Stratigraphic correlation	0	0	0
Rocks poster	0	0	0
Geology of Borneo (CD)	42	219	177
Geology of Borneo (Map)	46	858	812
Geol. Evolution of SEA	73	853	780
Geology of P. M'sia	150	1054	904

* inclusive of free copies to members

List of organizations and institutions that are exchanging publications with GSM

Item	Organization	Country
1	New South Wales Dept of Mineral Resources	Australia
2	Geologica Belgica a.s.b.I	Belgium
3	Ministry of Development	Brunei
4	University of Geosciences	China
5	The Episode	China
6	Nanking Institute of Geology	China
7	National Geological Library	China
8	Peking College of Geology	China
9	SOPAC Secretariat	Fiji
10	Suomalainen Tiedekatemia	Finland
11	Freie Universitat Berlin	Germany
12	National Museum of Natural History	Holland
13	Geological Society of Japan	Japan

PERTEMUAN PERSATUAN (MEETINGS OF THE SOCIETY)

14	Dept Mineral & Planetary Science, Hiroshima	Japan
15	Museum of Nature & Human Activities	Japan
16	National Science Museum	Japan
17	Natural History Museum and Institute	Japan
18	Institute of Geosciences	Japan
19	Geological Society of Korea	Korea
20	Dewan Bahasa dan Pustaka	Malaysia
21	Minerals and Geoscience Department Malaysia, Headquarters	Malaysia
22	Minerals and Geoscience Department Malaysia, Ipoh	Malaysia
23	Minerals and Geoscience Department Malaysia, Kuching	Malaysia
24	Minerals and Geoscience Department Malaysia, Kota Kinabalu	Malaysia
25	Kementerian Dalam Negeri	Malaysia
26	Perpustakaan Negara Malaysia	Malaysia
27	Library PETRONAS Berhad	Malaysia
28	Pusat Sumber Maklumat Negeri Sarawak	Malaysia
29	Perpustakaan Tun Sri Lanang, UKM	Malaysia
30	Program Geologi, UKM	Malaysia
31	Library, UM	Malaysia
32	Library, USM	Malaysia
33	Malaysian Institute of Nuclear Technology	Malaysia
34	Library of Congress, USA Embassy	Malaysia
35	Institute of Ecological & Nuclear Science	New Zealand
36	National Library	Singapore
37	Central Geological Survey	Taiwan
38	American Museum of Natural History, New York	USA
39	CIGESE Library	USA
40	Oklahoma Geological Survey	USA
41	US Geological Survey	USA
42	University of Kansas	USA
43	AAPG Foundation Library	USA
44	Faculty of Agriculture & Natural Resources, Africa University	Zimbabwe

LIM CHOUN SIAN
Assistant Secretary
Geological Society of Malaysia

EDITOR'S REPORT

Three issues of *Warta Geologi*: Volume 39 Issue 1, Issue 2 and Issue 3 & 4 were published in the year 2013. Volume 59 of the *GSM Bulletin* was also published last year. The *Bulletin* includes several full papers presented at the 48th CCOP Annual Session and was jointly edited by guest editors Dr. Anthony Reedman and Dr. Nguyen Thi Minh Ngoc.

The Society is grateful to authors for their contribution, and guest editor, members of the editorial board and reviewers for their time and effort to improve the quality of the Society's publications.

Ng Tham Fatt
Editor
Geological Society of Malaysia

TREASURER'S REPORT 2013

For the Financial Year 2013, the society's posted a financial surplus of RM 739,210.00 higher compared to year 2012 RM 339,477.00. The net current asset showed lower from RM 3,457,242.00 for 2012 to RM 2,459,096.00 for year 2013.

Operating revenue for year 2013 posted higher compared to year 2012 which is total income of RM 831,033.00 to RM 446,635.00 increased by 54%. Petroleum Geology Conference & Exhibition 2013 (PGCE 2013) posted net total collection of RM 742,323.00 compare to RM 407,906.00 for PGCE 2012. The revenue posted for Subscription shows lower from RM 24,908.00 of year 2012 to RM 22,800.00, Sales of Geology Peninsular Malaysia posted RM 15,590.00, National Geoscience Conference 2013 held in Ipoh posted nett profit of RM 11,417.00 and Sales of publications shows higher from RM 1,672.00 for year 2012 to RM 2,994.00 of year 2013. While lower revenue posted for Entrance fee, there are substantial incomes from fixed deposit interest of RM 35,209 for year 2013 compare to RM 8,963.00 for 2012.

Total operating expenditure for Financial Year 2013 shows slightly lower from RM 107,158.00 for year 2012 to RM 91,823.00. There is an increase showed from expenses of society AGM and Annual Dinner 2012, honorarium, postages, printing of bulletin and sundry expenses. While printing of *Warta Geologi* shows lower of RM 15,375.00 compare to RM 37,027.00 for year 2012.

The GSM Endowment Fund that was created in year 2012 shows a total amount of RM 900,000.00 held as fixed deposit (FD) in UOB Bank for financial year 2013 and posted an interest of RM10,471.23. The sources of fund are from the profits from PGCE 2012 and PGCE 2013.

The Hon. Treasure would like to express a great appreciation to the organizing committees of PGCE 2013 led by chairman Mr Mohd Redhani Abd Rahman for another tremendous income, of NGC 2013 by Dr Kamaluddin Hassan, Director of JMG Perak, who successfully managed a self-funded conference and posted a convincing profit. Last but not least the donors and sponsor for their contributions and supports throughout the year.

Ahmad Nizam Hasan
Treasurer
Geological Society of Malaysia

NOTES

1. The RM 37,163.00 is held in trust for the Evaluation Formation Working Group and RM 5,608.00 are AAPG-UM student chapter fund to finance their activities.
2. Young geoscientist award fund of RM 3,143.00 still held as no candidates nominated.
3. The differences of the total amount of income and expenditure between both PGCE 2013 and NGC 2013 account's to this audited report are due to the cutoff date for annual audited account are till December 2013 only. Therefore all the I&E 2013 differences accumulate from both event would be carrying forward to financial year statement of 2014.
4. Fund account of Petroleum Geology Conference and Exhibition (PGCE Fund) not being allocated as no PGCE 2014 will be held.
5. Hence, fund of National Geoscience Conference (NGC Fund) was an accumulation balance of previous year's profit gain from the event.

**PERSATUAN GEOLOGI MALAYSIA
(GEOLOGICAL SOCIETY OF MALAYSIA)
(Registered in Malaysia)**

**REPORT AND ACCOUNTS
31 DECEMBER 2013**

**S.F. LEE & CO.
CHARTERED ACCOUNTANTS**

**PERSATUAN GEOLOGI MALAYSIA
(GEOLOGICAL SOCIETY OF MALAYSIA)
(Registered in Malaysia)**

**REPORT AND ACCOUNTS
31 DECEMBER 2013**

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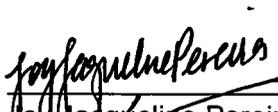
**PERSATUAN GEOLOGI MALAYSIA
(GEOLOGICAL SOCIETY OF MALAYSIA)
(Registered in Malaysia)**

MEMBERS INFORMATION

President	:	Prof. Dr. Joy Jacqueline Pereira (UKM)
Vice President	:	Dr. Mazlan Madon (PETRONAS)
Immediate Past President	:	Dato' Yunus Abdul Razak (JMG)
Secretary	:	Mr. Ling Nan Ley (JMG)
Assistant Secretary	:	Mr. Lim Choun Sian (UKM)
Treasurer	:	Mr. Ahmad Nizam Hasan (GeoSolution Resources)
Editor	:	Associate Prof. Dr. Ng Tham Fatt (UM)
Councillors (2013/2014)	:	Mr. Tan Boon Kong (Consultant) : Dr. Nur Iskandar Taib (UM) : Dr. Tanot Unjah (UKM) : Dr. Samsudin Hj Taib (UM)
(2012/2014)	:	Dr. Meor Hakif Amir Hassan (UM) : Mr. Robert Wong (PETRONAS) : Mr. Nicholas Jacob (JKR) : Mr. Askury Abd Kadir (UTP)

PERSATUAN GEOLOGI MALAYSIA (GEOLOGICAL SOCIETY OF MALAYSIA)
STATEMENT BY THE COUNCIL

We, Joy Jacqueline Pereira and Ahmad Nizam Hasan, being the President and Treasurer respectively, of the Persatuan Geologi Malaysia (Geological Society Of Malaysia) do hereby state that, in the opinion of the Council, the financial statements set out pages 4 to 9 are properly drawn up in accordance with applicable approved accounting standards so as to give a true and fair view of the financial position of the Persatuan Geologi Malaysia (Geological Society of Malaysia) as at 31 December 2013, and of the result and cash flows for the year then ended.



Joy Jacqueline Pereira
President



Ahmad Nizam Hasan
Treasurer

Kuala Lumpur

Dated : 20 MAR 2014

PERSATUAN GEOLOGI MALAYSIA (GEOLOGICAL SOCIETY OF MALAYSIA)
DECLARATION BY THE OFFICER PRIMARILY RESPONSIBLE FOR THE
FINANCIAL MANAGEMENT OF THE SOCIETY

I, Ahmad Nizam Hasan, the officer primarily responsible for the financial management of the Persatuan Geologi Malaysia (Geological Society Of Malaysia), do solemnly and sincerely declare that the accompanying financial statements set out on pages 4 to 9 are, to the best of my knowledge and belief correct, and I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the Statutory Declarations Act, 1960.

Subscribed and solemnly declared by)
the abovenamed Ahmad Nizam Hasan)
at Kuala Lumpur in Wilayah Persekutuan)
on 20 MAR 2014)



Ahmad Nizam Hasan

Before me,



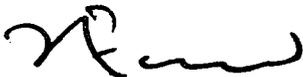
Lot 1.08, Tingkat 1
Commissioner for Oaths
Bangunan KWSP, Jln Raja Laut,
50350 Kuala Lumpur.
Tel: 019-6680745

REPORT OF THE AUDITORS TO MEMBERS OF THE
PERSATUAN GEOLOGI MALAYSIA (GEOLOGICAL SOCIETY OF MALAYSIA)

We have audited the financial statements set out on pages 4 to 9. These financial statements are the responsibility of the Council Members of the Society. It is our responsibility to form an independent opinion, based on our audit, on those financial statements and to report our opinion to you, as a body, and for no other purpose. We do not assume responsibility to any other person for the content of this report.

We conducted our audit in accordance with approved auditing standards in Malaysia. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by the Council Members, as well as evaluating the overall financial statements presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the financial statements give a true and fair view of the statement of assets and liabilities of the Society as at 31 December 2013 and of its statement of income and expenditure and cash flows for the financial year ended 31 December 2013 in accordance with the MASB approved accounting standards in Malaysia.



S.F. LEE & CO. (AF 0670)
Chartered Accountants



LEE SIEW FATT
(1179/9/14J)
Chartered Accountant

Kuala Lumpur

Date : **20 MAR 2014**

**PERSATUAN GEOLOGI MALAYSIA
(GEOLOGICAL SOCIETY OF MALAYSIA)
(Registered in Malaysia)**

STATEMENT OF ASSETS AND LIABILITIES AS AT 31 DECEMBER 2013

	Note	2013 RM	2012 RM
FUND ACCOUNTS			
ECONOMIC GEOLOGY WORKSHOP FUND		3,000	-
GENERAL FUND	3	2,394,345	1,655,135
STUDENT LOAN FUND		656	656
EVALUATION FORMATION WORKING GROUP FUND		37,163	52,649
YOUNG GEOSCIENTIST AWARD FUND		3,143	3,143
AAPG-UM STUDENT CHAPTER FUND		5,608	5,765
PETROLEUM GEOLOGY CONFERENCE AND EXHIBITION 2013 FUND		-	1,732,977
NATIONAL GEOSCIENCE CONFERENCE FUND		15,181	6,917
		<u>2,459,096</u>	<u>3,457,242</u>
Represented by:			
NON-CURRENT ASSETS			
PROPERTY, PLANT AND EQUIPMENT	4	20,894	23,411
CURRENT ASSETS			
Inventories	5	23,455	30,390
Deposits		600	600
Fixed deposits with licensed bank	6	1,696,876	1,393,580
Cash and bank balances		717,538	2,009,261
		<u>2,438,469</u>	<u>3,433,831</u>
CURRENT LIABILITIES			
Other payable		267	-
NET CURRENT ASSETS			
		2,438,202	3,433,831
		<u>2,459,096</u>	<u>3,457,242</u>

The accompanying notes are an integral part of these statements

**PERSATUAN GEOLOGI MALAYSIA
(Registered in Malaysia)**

**STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDED
31 DECEMBER 2013**

INCOME	2013	2012
	RM	RM
Entrance fee	700	1,750
Fixed deposits interest income	35,209	8,963
Subscription	22,800	24,908
Sales of publications	2,994	1,672
Petroleum Geology Conference	742,323	407,906
Short course : Jan de Jager	-	1,111
Geology of Peninsular Malaysia	15,590	-
National Geoscience Conference	11,417	-
Working Groups	-	325
	<u>831,033</u>	<u>446,635</u>
 EXPENDITURE		
Annual dinner	3,030	2,060
Annual General Meeting	-	503
Audit fee	1,200	1,100
Bank charges	85	64
Depreciation on property, plant and equipment	2,517	2,845
Geology of Peninsular Malaysia (GPM)	-	3,234
Honorarium	23,460	23,340
Income tax	848	742
Petroleum Geology Conference and Exhibition (PGCE)	-	5,040
Photo competition	-	2,300
Photocopy expenses	136	343
Postages	5,788	2,493
Printing and Stationery		
- Warta Geologi	15,375	37,027
- Bulletin	11,060	9,100
Refreshment	1,453	303
Speakers' account	5,632	2,724
Subscription to COSTAM	100	100
Sundry expenses	17,389	6,406
Short course	1,347	-
Students' award	1,000	1,000
Telefax	460	309
Telephone	943	1,025
Website development	-	5,100
	<u>91,823</u>	<u>107,158</u>
Surplus for the year	<u>739,210</u>	<u>339,477</u>

**PERSATUAN GEOLOGI MALAYSIA
(Registered in Malaysia)**

CASH FLOW STATEMENT FOR THE YEAR ENDED 31 DECEMBER 2013

	2013 RM	2012 RM
Cash flows from operating activities		
Surplus of income over expenditure for the year	739,210	339,477
Adjustments for:-		
Depreciation on property, plant & equipment	2,517	2,845
Interest income	<u>(35,209)</u>	<u>(8,963)</u>
Surplus before working capital changes	706,518	333,359
Increase in Economic Geology Workshop	3,000	-
Increase in National Geology Fund	9,142	6,917
Increase in Petroleum Geology Fund	(1,732,977)	1,212,957
Decrease in receivables	-	2,765
Decrease in inventories	6,935	4,728
(Decrease) / Increase in AAPG-UM Student Chapter Fund	(157)	6,332
(Decrease) / Increase in Evaluation Formation	(15,486)	25,904
Decrease in National Geoscience Conference	(878)	-
Increase in other payable	267	-
Cash (used in) / generated from operations	<u>(1,023,636)</u>	<u>1,592,962</u>
Purchase of plant and equipment	-	(2,020)
Interest income	35,209	8,963
Net cash (used in) / generated from operating activities	<u>(988,427)</u>	<u>1,599,905</u>
Net (decrease) / increase in cash and cash equivalents	(988,427)	1,599,905
Cash and cash equivalents at beginning of the year	3,402,841	1,802,936
Cash and cash equivalents at end of the year	<u>2,414,414</u>	<u>3,402,841</u>
Cash and cash equivalents comprised of:		
Deposits held with licensed banks	1,696,876	1,393,580
Cash and bank balances	<u>717,538</u>	<u>2,009,261</u>
	<u>2,414,414</u>	<u>3,402,841</u>

**PERSATUAN GEOLOGI MALAYSIA
(Registered in Malaysia)**

NOTES TO THE FINANCIAL STATEMENTS - 31 DECEMBER 2013

1. PRINCIPAL OBJECTIVES

The objective of the Society is to promote the advancement of the geological sciences in Malaysia.

2. ACCOUNTING POLICIES

(a) Basic of Accounting

The financial statements have been prepared under the historical cost convention and comply with applicable Approved Accounting Standards issued by the Malaysian Association Standards Board.

(b) Property, Plant and Equipment

Property, plant and equipment is stated at historical cost less accumulated depreciation. Depreciation on property, plant and equipment is computed on the reducing balance basis calculated to write-off the cost of the assets over their estimated useful lives.

The principal annual rates used are:-

Office equipment	10%
Information technology equipment	20%

The carrying values of the assets are reviewed for impairment when there is an indication that the assets might be impaired. Impairment is measured by comparing the carrying values of the assets with their recoverable amounts.

An impairment loss is charged to the income and expenditure account immediately, unless the asset is carried at revalued amount. Any impairment loss of a revalued asset is treated as a revaluation decrease to the extent of previously recognised revaluation surplus for the same asset.

Subsequent increase in the recoverable amount of an asset is treated as reversal of the previous impairment loss and is recognised to the extent of the carrying amount of the asset that would have been determined (net of amortisation and depreciation) had no impairment loss been recognised. The reversal is recognised in the income statement immediately, unless the asset is carried at revalued amount.

(c) INVENTORIES

Inventories consists of compass and maps valued at the lower of cost and net realizable value.

**PERSATUAN GEOLOGI MALAYSIA
(Registered in Malaysia)**

d) INCOME RECOGNITION

Membership subscription is payable annually at the beginning of the financial year. All subscriptions received during the financial year are recognised as income.

Income from sale of publications is recognised upon delivery of goods.

Income from organising conference is recognised on received and receivable basis.

Fixed deposit interest income is recognised on an accrual basis.

3. GENERAL FUND	2013 RM	2012 RM
At 1 January	1,655,135	1,315,658
Surplus for the year	739,210	339,477
At 31 December	2,394,345	1,655,135

4. PROPERTY, PLANT AND EQUIPMENT

	Cost			
	Balance at 1/1/2013	Additions	Disposal	Balance at 31/12/2013
	RM	RM	RM	RM
Office equipment	132,175	-	-	132,175
Information technology equipment	5,078	-	-	5,078
	137,253	-	-	137,253

	Accumulated depreciation			
	Balance at 1/1/2013	Charge for the year	Disposal	Balance at 31/12/2013
	RM	RM	RM	RM
Office equipment	110,525	2,165	-	112,690
Information technology equipment	3,317	352	-	3,669
	113,842	2,517	-	116,359

<u>Net Carrying Amount</u>	2013 RM	2012 RM
Office equipment	19,485	21,650
Information technology equipment	1,409	1,761
	20,894	23,411

**PERSATUAN GEOLOGI MALAYSIA
(Registered in Malaysia)**

5. INVENTORIES	2013	2012
	RM	RM
Maps	2,345	2,850
Compass	8,818	12,278
Magazines	12,292	15,262
	<u>23,455</u>	<u>30,390</u>

6. FIXED DEPOSITS WITH LICENSED BANK

The fixed deposits with licensed bank have a maturity of between 3 to 15 months (2012 : 3 to 15 months). Interest rates for the deposits ranged from 3.05% to 5% (2012 : 3.75% to 5%) per annum.

Agenda: GSM Endowment Fund

1. The AGM in 2012 approved the proposal of the GSM Council to create the “PGCE Endowment Fund”, which will be administered by GSM in a separate account, where the principal sum remains in perpetuity with the interest to be used to build capacity in petroleum geoscience.
2. The AGM in 2013 endorsed the Terms of Reference prepared by Advocates and Solicitors, Messrs Yeap, Yong and Amy. The AGM also agreed that (i) “PGCE Endowment Fund” be renamed the “GSM Endowment Fund”; (ii) the Council obtain “tax deductible” status to encourage donations directly into the “GSM Endowment Fund”; and (iii) that the interest portion accrued be used to meet expenses incurred in the implementation of programmes run by the Society.
3. Since the last AGM, the matter was discussed in the GSM Council and meetings were held with the Honorary Auditor, a tax consultant and lawyers engaged by the Society to implement the proposal. The outcome is as follows:-
 - i. A separate account has been opened at UOB. As of 31 December 2013, the principal amount totals RM 900,000.00 and the interest accrued is RM10,471.23. The principal amount stands at RM 1,050,000.00 as of 17 April 2014, with the addition of RM 100,000 from GSM and RM 50,000 from Malaco Group of Companies (Dato’ HK Sia).
 - ii. GSM has “tax deductible” status as provided in the letter from the Income Tax Department to the then President D. J. Gobbet dated 12 October 1967. Donations to the GSM Endowment Fund and for all other GSM events and activities are “tax deductible”.
 - iii. The GSM Endowment Fund should be administered with proper processes to ensure accountability and prevent conflict of interest. **The GSM Council requests the AGM to accept and endorse an amendment to the Terms of Reference prepared by Advocates and Solicitors, Messrs Yeap, Yong and Amy.** The amendment is to provide for the establishment of the “Board of Trustees of the GSM Endowment Fund”, whose members shall comprise the President, Immediate Past President, Secretary, Treasurer, Editor and at least three independent Full Members “in good standing”, to be appointed at the AGM. Appointment of members to the Board is for a period of three years and the Chairman of the Board will be appointed by the GSM Council. The Board will meet at least once a year to scrutinise the administration of the GSM Endowment Fund, to ensure that the terms of reference are adhered to, and to approve the annual report prepared for the AGM thereafter.
 - iv. **The GSM Council also proposes and seeks the agreement of the AGM to appoint the following persons as members of the Board of Trustees of the GSM Endowment Fund:-**
 - Chairman: Dato’ Yunus Abd Razak
 - GSM Council Members: GSM President, Immediate Past President, Secretary, Treasurer and Editor
 - GSM Members: Dato’ H.K. Sia, Datuk Fateh Chand and Mr. Ahmad Said
 - v. **The GSM Council requests the agreement of the AGM to use the interest portion accrued, for the following items:-**
 - Book prize and awards for students and geoscientists;
 - Scholarships for education and training;
 - Fellowships for capacity building, research and internships;
 - Honorarium for invited speakers and other contributors;
 - Community service and geoscience education and awareness;
 - Education and training workshops;
 - Organisation of scientific meetings;
 - Publication of scientific material;
 - Subscription and purchase of scientific publications; and
 - Any other activity deemed by the Council to enhance the objectives of GSM.

TERMS OF REFERENCE FOR GSM SPECIAL ENDOWMENT FUND

1. The Geological Society of Malaysia (hereinafter referred to as “the Society”) shall maintain a GSM Endowment Fund (hereinafter referred to as “the fund”) subject to the approval of a majority of the members of the Society present at the next Annual General Meeting of the Society.
2. If such approval shall be forthcoming, an account shall be opened at an appropriate bank (hereinafter referred to as “the account”) for the sum of RM600,000.00 (hereinafter referred to as the “the initial principal amount”), which shall remain the minimum amount to be kept in the account at all material times. The initial principal amount may be increased at the discretion of the Council Members of the Society, comprising the President, Immediate Past President, Secretary, Treasurer, Editor and at least three independent Full Members in good standing appointed at any AGM, who will serve in the Board of Trustees of the GSM Endowment Fund, subject to the approval of a majority of members present at an Annual General Meeting of the Society. Appointment to the Board is for a period of three years and the Chairman of the Board will be appointed by the GSM Council. The Board will meet at least once a year to scrutinise the administration of the GSM EndowmentFund, ensure the terms of reference are adhered to and approve the annual report prepared for the AGM thereafter.
3. The fund shall be maintained in perpetuity and shall be overseen by the Council Members of the Society, who shall have the absolute discretion to withdraw the interest portion accruing from the account to meet expenses incurred in the implementation of programmes run by the Society.
4. The Council Members of the Society shall render an account of the fund to all members present at each Annual General Meeting of the Society.
5. The fund shall be subject to an annual audit and the findings reported by the Treasurer of the Society to the members present at each Annual General Meeting of the Society.
6. These Terms of Reference shall be legally binding and incorporated as part of the agenda of every Annual General Meeting of the Society, unless and until a majority of the members of the Society decide otherwise by ballot.

THE FUTURE OF PGCE, REVISITED

History

The Geological Society of Malaysia (GSM) has fostered knowledge advancement in the oil and gas sector over the decades through its flagship event as follows:-

- | | |
|------------|--|
| 1977-1979: | Petroleum Seminar organised by GSM. Inaugural event organised by a former Council Member and Vice-President of the Society, the late Mr. Jimmy Khoo from the Minerals and Geoscience Department of Malaysia. |
| 1980-1993: | Petroleum Geology Seminar organised by GSM. |
| 1995-2000: | Petroleum Geology Conference organised by GSM. |
| 2001-2011: | Petroleum Geology Conference and Exhibition (PGCE) co-organised by GSM and PETRONAS |
| 2012-2013: | Petroleum Geoscience Conference and Exhibition (PGCE) co-organised by GSM and PETRONAS |

Having noted above the history of the PGCE and its precursor, the Petroleum Seminar, it is useful to recall that the concerns regarding “The Future of PGCE” that is being brought to the attention of the present AGM in 2014 are not new but have been raised in 2010. Hence, this would be the second time the matter is being raised for discussion.

In March 2012, the Intellectual Property Corporation of Malaysia granted GSM sole ownership of the trademark for Petroleum Geoscience Conference and Exhibition (PGCE).The GSM Council initiated the

filing of intellectual property rights for the 'PGCE' trademark as originator of the flagship and in line with the objective of its establishment to advance geological knowledge in the country and surrounding region.

In March 2012, the President of GSM sent a letter dated 1 Mac 2012 to the Senior Manager of Petroleum Management Unit of PETRONAS, informing him that PGCE will be co-organise under a new profit-sharing arrangement, whereby the net profit is to be shared equally between GSM and Yayasan UTP. This was an outcome of the meetings held on several occasions between senior members of the GSM Council and representatives of PETRONAS (16 May 2011, 1 August 2011, 20 January 2012) to address concerns to address concerns related to the PGCE. The profit-sharing arrangement was implemented in the organisation of PGCE 2012 and subsequently for PGCE 2013. The GSM Council also signed agreements with the EAGE as event manager for PGCE 2012 and PGCE 2013. The agreement stipulated that EAGE Asia Pacific Sdn. Bhd. will serve as manager/service provider and acknowledge GSM as organiser and owner of the intellectual property rights of PGCE.

Recent Developments

In February 2014, the President of GSM received a letter dated 11 February 2014 from the Vice-President PETRONAS and CEO PETRONAS Exploration stating that the profit-sharing arrangement is terminated and that the Board of PETRONAS has entrusted its subsidiary, namely the International Conference and Exhibition Professionals (iCEP) to organise all conferences and exhibitions hosted by PETRONAS. The letter was tabled at the GSM Council Meeting on 10 April 2014 after which the President sent a letter dated 15 April 2014 to the Vice-President PETRONAS thanking him for the collaboration and contribution by PETRONAS over the years, and informing him that GSM has sole ownership of the PGCE trademark.

The GSM Council was also made aware by Ms. Anna Lim a brochure promoting Asia Petroleum Geoscience Conference and Exhibition 2015 (APGCE) to be hosted by PETRONAS on 11-13 October 2015 in KLCC. The President informed the Council that according to both GSM's trademark agent and lawyer, the use of "PGCE" can be construed as an infringement of GSM's intellectual copyright for which legal action can be taken. Whilst the contribution of PETRONAS as co-organisers has tremendously increased proceeds obtained from the PGCE, GSM's intellectual copyright also needs to be protected.

It should be noted also, Dr Mazlan Madon, in his personal capacity and as incoming President, has registered his strong reservations, both during that Council meeting and through subsequent email responses to the Council, regarding the strong language that is used in communicating with PETRONAS, citing potential impacts on the good relationships between PETRONAS and GSM thus far. Dr Mazlan's opinion is that the PGCE issue should be viewed in its wider context and the underlying reasons for this development need to be understood.

The Council Meeting decided to bring this matter to the attention of the AGM to seek guidance on the future of PGCE as a flagship and the protection of GSM's intellectual property rights.

AGM 2014: Improvement to GSM Editorial Processes; GSM Tate (2002), Geology of Borneo Island Map; Sabah Pre-Cretaceous Geology (K.M.Leong)

First, GSM Council, in particular Editor Dr T. F. Ng, are to be commended for improving and enhancing GSM editorial processes, pre-acceptance reviews, selection of reviewers. The timely improvement will contribute to the effective implementation of GSM object- *promote advancement of earth sciences, particularly in Malaysia, SEAsia*. GSM constitution is **very serious** on implementation of GSM object by Council.

At **AGM 2013** VP Dr Mazlan Madon made a proposal for GSM map Tate (2002) prior to its further sales. A brief on the progress by Council is welcome. **Was Tate (2002) pre-accept pre-sales reviewed by 2/more reviewers?**

Background

Topic of Debate: **Sabah Oldest Rocks: Age, Lithology, Crustal Type**. The eradication of Sabah Pre-Cretaceous from Geology of Malaysia in Tate (2002), a serious major change, requires closer scrutiny. In GSM map Tate (2002), Sabah oldest rocks were denoted as *Cretaceous Crystalline Basement*. Omitted in Tate (2002) was Sabah Pre-Cretaceous geology, known as Crystalline Basement, in Geological Survey

of Malaysia (JMG), Geological Maps of Sabah (Wilford, 1967; Lim, 1985) and Mineral Distribution Map of Sabah (Leong, 1976). Sabah Crystalline Basement comprise of K:Ar dated Jurassic/Triassic or older tonalite, granite and metamorphic rocks, based on extensive geological fieldwork and mapping of Upper Segama Valley area, field samples chemical analyses and K:Ar ages determinations in Kirk (1964, 1968) and Leong (1971, 1974). Also omitted in Tate (2002) was Jurassic radiometric age from granite (continental) by USA oil co. ARCO Swauger, Hutchison et al. (1995)/Graves, Hutchison et al. (2000): *'The oldest K:Ar radiometric age determined from a granitoid in the nearby Kawag Gibong river.... Is 210 Ma ±3 Ma (Early Jurassic) (Leong 1974). We have added additional dating in this province, which supports a Jurassic age'; 'The acid rocks (Leong 1974) belong to the calc alkaline series...and could not have been derived from the ophiolites'*. In GSM map Tate (2002), *'Cretaceous crystalline basement'* were shown as Sabah oldest rocks, which had not been supported pre-printing by ARCO Jurassic radiometric age from granite in Graves, Hutchison et al. (2000). A similar case was Tectogene Hypothesis (Hutchison 1968) (after Hutchison 1966 Ph.D.,UM), basis was Cretaceous ophiolites (oceanic) were Sabah oldest (Leong 1974). A Jurassic K:Ar age from tonalite containing high potassium indicative of continental origin in Kirk (1964, 1968) was omitted in Hutchison (1968). Malaysia National Oil Co. Petronas (2007) in reference to Holt (1998 Ph.D. London) on Sabah basement rocks stated the following: *'Gravity and magnetic interpretations suggest continental metamorphics with granitic basement exist below ophiolitic complexes (Leong 1974; Holt 1998)'*.

ANNOUNCEMENT OF NEW COUNCIL FOR 2014/2015

Upon the closing of nominations, only single nominations were received respectively for the positions of President, Vice President, Secretary, Treasurer, Assistant Secretary and Editor, and there were three nominations for the four 2-year Councillor positions.

The Council for 2014/2015:

President	:	Dr. Mazlan Madon (PETRONAS)
Vice-President	:	Mr. Abd Rasid Jaapar (Asian Geos)
Imm. Past President	:	Prof. Dr. Joy Jacqueline Pereira (UKM)
Secretary	:	Mr. Lim Choun Sian (UKM)
Assistant Secretary	:	Mr. Nicholas Jacob (JKR)
Treasurer	:	Mr. Ahmad Nizam Hasan (GeoSolution Resources)
Editor	:	Associate Prof. Dr. Ng Tham Fatt (UM)
Councillors (2 years)	:	Dr. Meor Hakif Amir Hassan (UM) Mr. Robert Wong (PETRONAS) Mr. Askury Abd Kadir (UTP) (Vacant)*
Councillors (1 year)	:	Mr. Tan Boon Kong (Consultant) Dr. Nur Iskandar Taib (UM) Dr. Tanot Unjah (UKM) Dr. Samsudin Hj Taib (UM)

*To be co-opted by the incoming Council

48th ANNUAL GENERAL MEETING



Advancing Geoscience Knowledge in Southeast Asia: Thirteenth Regional Congress on Geology, Mineral and Energy Resources of Southeast Asia (GEOSEA 2014)

JOY JACQUELINE PEREIRA¹, YUNUS ABDUL RAZAK² AND U SOE MYINT³

¹Southeast Asia Disaster Prevention Research Initiative,
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³Myanmar Geosciences Society

INTRODUCTION

The Regional Congress on Geology, Mineral and Energy Resources of Southeast Asia (GEOSEA) is a premier geoscience event in the Southeast Asian region. The event serves to foster information sharing, the exchange of ideas, and cooperation among geoscientists in geology, minerals and energy resources of Southeast Asia. GEOSEA also serves as a platform for the Presidents of the geological societies in Southeast Asia to network and discuss issues of mutual interest via its Business Meetings. The inaugural GEOSEA was held in 1972 at University of Malaya, Kuala Lumpur, Malaysia, organized by the four co-founding institutions: Geological Society of Malaysia, Ikatan Ahli Geologi Indonesia, Geological Society of the Philippines, and Geological Society of Thailand. Since then, each co-founding institution has taken turns to host GEOSEA on a rotational basis.

The Thirteenth Regional Congress on Geology, Mineral and Energy Resources of Southeast Asia (GEOSEA 2014) at Sedona Hotel, Yangon on 10-11 March 2014 was convened by the Myanmar Geosciences Society. The event marks a new era of collaboration among geoscience institutions in the region, as it was organized for the first time by a new member of the GEOSEA family. The Myanmar Geosciences Society is ten years old with 1000 members comprising retired and practicing geoscientists from academia, government and the private sector. GEOSEA 2014 was organized in collaboration with the Geological Society of Malaysia, Ikatan Ahli Geologi Indonesia, Geological Society of Thailand, Geological Society of The Philippines, Myanmar Geologists Society Singapore and the Australian Research Council Centre of Excellence in Ore Deposits (CODES), University of Tasmania.

GEOSEA 2014 saw the participation of some 200 geoscientists from the region as well as from East Asia and other parts of the world including Australia, the United Kingdom and United States. Four keynote addresses and over 70 technical papers were presented over two days. The papers were clustered in thematic sessions comprising economic geology; geohazards and mitigation; stratigraphy and sedimentology; geotectonics and general geology. The scientific session was augmented with a Business Meeting that took into account the state of geoscience knowledge in Southeast Asia and discussed means for its future advancement. This article provides a brief account of the scientific sessions and business meeting held during GEOSEA 2014. It concludes with future plans for GEOSEA in the region.

SCIENTIFIC HIGHLIGHTS

The scientific session of GEOSEA 2014 commenced with four keynotes that provided context on the contribution of geoscience to economic growth and societal well-being in the pursuit of sustainable development. Keynotes on Metallogeny of Mainland Southeast Asia (Khin Zaw, CODES-University of Tasmania), Granites Mineralisation and Tectonic Events in Myanmar (A.H.G. Mitchell, Myanma Precious Resources Group) and Tectonic Suture Zones in Eastern Indochina (Hai Thanh Tran, Hanoi University of Mining and Geology) laid out the complex geology and tectonic evolution of the region, which influences the distribution of metals and minerals. This knowledge is important to the mining industry that supports economic growth, promotes societal development and contributes to poverty eradication in the developing countries of the region. The Keynote on Emerging Issues for Disaster Prevention in a Changing Climate (J.J. Pereira, SEADPRI- Universiti Kebangsaan Malaysia) stressed the importance of geological knowledge for climate change adaptation. Geological knowledge is an untapped resource for developing early warning systems, enhancing risk assessment and serving as the basis in formulating new models for risk sharing and understanding of future challenges on human security and well-being.

The session on economic geology comprised various studies on the genesis, mineralisation styles, spatial distribution and exploration experiences related to metals and minerals such as tin, tungsten, manganese, gold, chromite, sapphire, jadeite, rare earth elements and massive sulphide deposits, among others. The development of an ASEAN mineral database and information system to raise transparency on mineral information was also presented. The intent of the initiative is to facilitate trade and investment in minerals, promote environmentally and socially sustainable mineral development and strengthen capacity of the minerals sector in the region.

The session on stratigraphy and sedimentology consisted of several papers on the dating of rock sequences using conodonts and ammonoids (Shan State) and radiolarian fauna (Kachin State) in Myanmar as well as other macrofossils in south Thailand and northern Peninsular Malaysia. These papers as well as others on the lithostratigraphy, sedimentology and provenance studies provided insights for paleogeographic interpretation and geological correlation of the region. The session on geotectonics focused essentially on mainland Southeast Asia, from the Himalaya to Thailand, covering aspects such as structural development and mechanics as well as tectonic evolution. There were also presentations on the granitoids and volcanic rocks in Thailand and Peninsular Malaysia.

The session on geohazards and mitigation commenced with an overview of the role Coordinating Committee for Geosciences in East and Southeast Asia (CCOP) in geohazard assessment and mitigation. Other papers covered aspects such as integrated geohazard assessment for town planning, seismic hazards mapping as well as application of remote sensing and geophysical techniques. The session on general geology captured aspects of environmental geoscience including impact assessments of landfills, mining operations and geohazards associated with offshore field development. The potential for geoheritage conservation and geotourism was also explored in this session.

TRANSACTIONS

The Business Meeting of GEOSEA 2014 was held on 11 March 2014 chaired by the President of Myanmar Geosciences Society, with participation of Presidents and representatives from Ikatan Ahli Geologi Indonesia, Geological Society of Malaysia, Geological Society of The Philippines, Geological Society of Thailand and Vietnam Union for Geological Sciences. In line with the GEOSEA spirit of friendship and goodwill all decisions were made based on unanimous agreement. The GEOSEA Secretariat hosted by the Geological Society of Malaysia was commended for maintaining the communication between geological societies in the region and was requested to continue its support for another term.

Geological societies provide a common non-partisan platform to bring together geoscientists from academia, government, non-government organisations and the private sector on a routine basis. A common platform is important to promote scientific advancement and facilitate inter-generational transfer of theoretical, applied and experiential geoscience knowledge by connecting retired, practicing and future geoscientists in the form of student members. In this respect, the existence and participation of geological societies or its equivalent from all countries of the region is an issue of interest in GEOSEA. Efforts are underway to enhance the participation of geoscientists in GEOSEA and the support of intergovernmental bodies such as the Coordinating Committee for Geosciences in East and Southeast Asia (CCOP) and the ASEAN Senior Officials Meeting on Minerals (ASOMM) is important for this undertaking.

Communication and exchange of information is an important factor in enhancing linkages between geological societies in Southeast Asia. In-coming GEOSEA hosts are encouraged to make arrangements to publish papers from scientific sessions in indexed peer reviewed journals within their countries or in publications such as the Bulletin of the Geological Society of Malaysia or Journal of Asian Earth Science. A GEOSEA website has also been developed [www.geosea.asia] to enhance communication. The website is intended to link GEOSEA members to major institutions such as the CCOP, ASOMM and geological societies in East Asia, where possible on a reciprocal basis. Geological societies in Southeast Asia have volunteered to support the website by providing updated information.

Geological societies have a critical role to play in enhancing public awareness on the role of geoscience. Local issues vary in the region but it appears that natural hazards are of central concern particularly geological and climate related hazards. The means of raising public awareness on the role of geoscience with respect to natural hazards would differ among geological societies depending on national circumstances and respective capacities. Geological societies are encouraged to report initiatives on raising awareness in their own websites and these will be highlighted in the GEOSEA website as they become available.

THE WAY FORWARD

In the closing ceremony of GEOSEA 2014, it was announced that the President of Ikatan Ahli Geologi Indonesia has offered to host GEOSEA XIV in 2016 to maintain ties within the geoscience fraternity of Southeast Asia. Participants were also informed that the President of the Vietnam Union of Geological Sciences has offered to host GEOSEA XV in 2018 as their contribution to sustain regional networking among geological societies in the region. GEOSEA 2014 concluded with a banquet and performances that provided a magnificent insight into the culture of Myanmar.

PERTEMUAN PERSATUAN (MEETINGS OF THE SOCIETY)



Participants from Malaysia at GEOSEA 2014, held in Yangon on 10-11 March 2014.



President of Myanmar Geosciences Society, U Soe Myint, delivering his Opening Address at GEOSEA 2014.



President of Geological Society of Malaysia, Prof. Dr. Joy Jacqueline Pereira, delivering her Keynote Address at GEOSEA 2014.



Immediate Past President of Geological Society of Malaysia, Dato' Yunus Abdul Razak with Dato' Dato' H.K. Sia at the Opening Ceremony of GEOSEA 2014.



The GEOSEA flag is handed over by the President of Myanmar Geosciences Society, U Soe Myint, to the President of Ikatan Ahli Geologi Indonesia, Rovicky Dwi Putrohari, the hosts of GEOSEA XIV in 2016. With this, the grand tradition of handing over the flag to the next host has now recommenced.



Members of the Business Meeting of GEOSEA 2014 held on 11 March 2014. The GEOSEA flag is in the background.

NATIONAL GEOSCIENCE CONFERENCE 2014 (NGC 2014)

National Geoscience Conference 2014 (NGC 2014) adalah anjuran bersama Persatuan Geologi Malaysia (GSM), Universiti Malaysia Terengganu (UMT) dan Jabatan Mineral dan Geosains Terengganu (JMG) telah berlangsung pada 13 hingga 14 Jun 2014 di Hotel Grand Continental, Kuala Terengganu. Seminar Kebangsaan yang bertemakan 'Climate and Sea-Level Change through Geologic Time' telah dirasmikan oleh Yang Berbahagia Prof. Emeritus Dato' Ibrahim bin Komoo.

Seminar ini telah berlangsung selama dua hari bermula pada 13 hingga 14 Jun 2014 di Hotel Grand Continental, Kuala Terengganu manakala kerja lapangan di Pulau Bidong dan sekitarnya pada 15 Jun 2014. Seminar kebangsaan ini telah berjaya mengumpul penyertaan seramai 200 orang yang terdiri dari pensyarah, penyelidik, pegawai geologi, sektor awam, pegawai-pegawai serta pelajar-pelajar dari seluruh Malaysia dan antarabangsa yang membentangkan hasil penyelidikan mereka.

Shaharul Suhaila binti Hj. Ismail,
Setiausaha, Jawatankuasa Penganjur



Third International Conference on the Palaeontology of South East Asia (ICPSEA3)

The International Conference on the Palaeontology of South East Asia (ICPSEA) is a triennial meeting of palaeontologists, biostratigraphers, geologists and biologists interested in the ancient biota of South East Asia and their interaction with the tectonic and geologic history of the region. ICPSEA3 was held at the PETRONAS University of Technology, Tronoh, Perak, from the 7th to 9th October 2013. This is the third consecutive ICPSEA conference, and this is the first time that the meeting is held outside of Thailand.

ICPSEA3 was also held as a joint conference with the International Geoscience Programme (IGCP) Project 596: Climate Change and Biodiversity Patterns in the Mid-Palaeozoic. It is co-organized by IGCP596, Geological Society of Malaya, Department of Geology, University of Malaya, Paleontological Research and Education Centre, Mahasarakham University, Thailand, and VNU, University of Science Hanoi, Vietnam.

The conference welcomed approximately 80 attendees, including academics, industry workers and students from numerous countries (Malaysia, United Kingdom, Russia, Germany, Mongolia, Poland, Indonesia, Vietnam, Thailand, United States, Turkey, Japan).

A total of 33 papers and 8 posters were presented, divided into five sessions. Program and Abstracts can be downloaded from www.icpsea3.org.

First Session 7th October: IGCP 596 Climate change and biodiversity patterns in Mid Palaeozoic

The first session focused on IGCP Project 596 and started with a keynote presentation by Dr. Peter Koenigshof (Senckenberg Institute). A total of 12 papers were presented, covering topics such as the Devonian and Carboniferous biostratigraphy, biodiversity, climate change, sedimentology and geochemistry of Peninsular Malaysia, Thailand, Vietnam, Siberia, Mongolia and Morocco.

Second Session 7th October: Terrestrial palaeoenvironments of South East Asia with focus on palynology

The second session held during the afternoon of 7th October mainly focused on palynology. Dr. Robert Morley started the session with a keynote presentation on Southeast Asian palynostratigraphy and sequence biostratigraphy. A total of 6 papers were presented, covering topics on Mesozoic to Tertiary palynology, palynostratigraphy and palaeobotany of various localities, including Peninsular Malaysia, Borneo, Sudan and the Mississippi.

Third Session 9th October: Terrestrial palaeoenvironments of South East Asia with focus on vertebrate fauna

The third session focused on vertebrate palaeontology, with 6 papers covering Mesozoic fish and dinosaurs from Thailand (including the announcement of new dinosaur taxa), and Pleistocene mammals from Thailand, Indonesia and Vietnam.

Fourth Session 9th October: Late Palaeozoic biodiversity and biostratigraphy

The focus shifted in the afternoon to the Late Palaeozoic, with 4 papers covering various topics such as Permian carbonates of the Indochina Terrane, Permian echinoderms from Oman and Australia, Carboniferous and Permian brachiopods from Thailand and the Mississippian/Pennsylvanian boundary in Iran.

Fifth Session 9th October: Mesozoic-Cenozoic carbonate platforms and reefs and the origins of biodiversity

Five papers were presented in the final sessions. Dr. Manuel Pubellier gave a keynote presentation on the tectonics of Borneo. The other papers covered topics such as Tertiary and Pleistocene carbonate sedimentology of Borneo, stromatolite biostromes of Mongolia and Miocene biostratigraphy in Turkey.

Field excursions

The Pre Conference Field Excursion was conducted from 30th September to 4th October, with the participants, led by Prof. Ta Hoa Phuong, visiting Ha Long Bay in Vietnam, which is a UNESCO world heritage site.

A Mid-Conference Excursion to the Limestone Hills of Ipoh was led by Prof. Manuel Pubellier on the 8th October. This included a visit to the cave temples in the Kinta Valley, caves of the Banjaran and exposures in the Lost World of Tambun.

A Post-Conference Field Excursion was also held, led by Dr. Aaron Hunter and Dr. Meor Hakif, this time visiting the Palaeozoic succession of Kedah, Perlis and Langkawi, Malaysia. Highlights of the trip include visiting Langkawi Geopark and Pulau Langgun, Gunung Keriang and the Palaeozoic succession of Perlis.

Seminar Bencana Alam 2013 (BENCANA 2013)

Seminar Bencana Alam 2013 (BENCANA 2013) was held on the 3rd to 4th of December 2013 at the Library Auditorium, Universiti Malaysia Sabah, Kota Kinabalu organized in collaboration with the Natural Disaster Studies Unit, School of Science and Technology (SST), Universiti Malaysia Sabah (UMS) and the Geological Society of Malaysia (GSM). This seminar is a continuation from the previous Seminar Bencana Alam 2011 (BENCANA 2011). The seminar was officiated by the Dean, School of Science and Technology, UMS, Assoc. Prof. Dr. Baba Musta. Followed by keynote presentation from Assoc. Prof. Dr. Phua Mui How a lecturer from School of International Tropical Forestry who is also one of the research fellows in Natural Disaster Studies Unit, SST, UMS with his paper entitled "Forest Fire Research in a Warming World". Prof. Dr. Felix Tongkul who is the Director of Centre of Research and Innovation, UMS completed the closing ceremony by giving out awards for two best poster's presentation and also a token of appreciation to the representative of Geological Society of Malaysia, Mr. Rodeano Roslee. Later that day a dinner was also held at Courtyard Hotel, 1Borneo, providing networking opportunities for the participants and to celebrate the success of the seminar with some multimedia presentation about Natural Disaster Studies Unit, SST, UMS.

This seminar is aimed to provide a platform for discussing the current natural hazards especially those occurring in Malaysia focusing on the issues of human activities that contributes to the phenomena, management and preventive measures in controlling them. The talks also raise awareness on the rising issues of natural hazards and highlight the importance of research.

BENCANA 2013 has attracted participants from various government agencies and local universities in Malaysia namely the Mineral and Geoscience Department, Meteorological Department, Department of Irrigation and Drainage, Kota Kinabalu City Hall, Public Works Department, Department of Environment, Lands and Surveys Department, Department of Forestry, Sabah Parks, World Wide Fund for Nature, Universiti Sains Malaysia, Universiti Malaysia Terengganu and Universiti Teknologi MARA as well as researchers from UMS itself. A total of 20 research papers were presented comprised of 11 oral and 9 poster presentations covering the scopes of Forest Fire and Haze, Flood, Climate Change, Earthquake, Environmental Geology, Coastal and Stream Erosion, Tropical Typhoon, Landslide and Disaster Management.

Bencana Alam 2013 (BENCANA 2013) was successfully organized by the committee members whom are mostly the research fellows of the Natural Disaster Research Unit, UMS. The event is one of Natural Disaster Research Unit bi-annual activity and it is hoped that it will continue in the future, and to expand and produce more research on natural disaster in Malaysia and its surrounding region through the gathering of experiences from various of institutions.

On behalf of the Chairman and Head of Unit we would like to express our heartiest thankful to Geological Society of Malaysia for being the co-organizer of this seminar. Hope that GSM will continue their support to Natural Disaster Research Unit, SST, UMS in the future activities and collaboration works.



Chairman of Seminar BENCANA 2013, Dr. Justin Sentian (left) with Dr. Ismail Abd Rahim, Head of Natural Disaster Studies Unit, SST, UMS (right) presenting token of appreciation to Assoc. Prof. Dr. Baba Musta, Dean of School of Science and Technology (middle) for officiating the seminar.



Prof. Dr. Felix Tongkul, Director of Centre of Research and Innovation, UMS (right) presenting token of appreciation to Geological Society of Malaysia representative, Mr. Rodeano Roslee.

CERAMAH TEKNIK TECHNICAL TALK

Slope Engineering

Gue See Sew (G&P)

15 Jan 2014

Department of Geology, University of Malaya

The talk on Slope Engineering was presented by Dato' Ir Dr Gue See Sew (G&P) on 15th Jan, 2014 at the Department of Geology, University of Malaya, Kuala Lumpur.

Dr Gue gave a comprehensive account of the processes involved in slope engineering, including site investigation, laboratory tests, selection of design parameters (c , ϕ , etc), slope design and analysis, stabilization works, maintenance, etc. He also discussed some misconceptions about stability of slopes/slope failures. Several local and overseas case histories were presented as illustrations.

Dr Gue also discussed briefly the role and contributions of geology/engineering geology in slope engineering; and made a comparison of the Engineering Geologist vs the Geotechnical Engineer. His conclusion: the two fields complement each other.

As the presentation ended ahead of schedule, there was ample time for Q&A, and as usual, there were lively discussions.

We thank Dr Gue for his support and contribution to the Society's activities.

Tan Boon Kong,

Chairman, W/G on Engineering Geology, Hydrogeology & Environmental Geology



VISIT TO SELINSING GOLD MINE

A total of 24 participants visited the Selinsing Gold Mine, Sg. Koyan, Kuala Lipis, Pahang on 25th January 2014. The participants are from various backgrounds including academician, mine geologist, gemologist, mining engineer and geology student. The visit was organised by the Economic Geology Working Group of GSM. The objective of the visit was to expose the members to mining activities. They visited the main Selinsing Mine pit and Buffalo Reef pit. They were also given the opportunity to visit other sites of the mine including the processing plant and the tailing storage facility.

I would like to thank the Selinsing Mine management for allowing us to visit the mine site and generously providing us with breakfast and lunch. Appreciation was also extended to Jabatan Mineral and Geosains for providing the transportation for the group from Kuala Lumpur.

Zakaria Endut

Chairman

Economic Geology Working Group



CERAMAH TEKNIK TECHNICAL TALK

The provenance of the Belaga Formation through heavy mineral studies

Thomson Galin (Minerals and Geoscience Department Malaysia, Sarawak)

15 Feb 2014

Heliconia, Kuching, Sarawak

The Technical Talk cum Geologists' Night was held in collaboration with Minerals and Geoscience Department Malaysia, Sarawak on 15 February 2014 at the Heliconia, Kuching, Sarawak. The programme was organised by Dr. Richard Mani Banda, the GSM Regional Representative for Sarawak, together with Mr. Freddy Heward Chinta, Mr. Clarence Anyau Tibu, Mr. Kennedy Mohd Imran and Ms. Delen Jalil. Mr. Alex Unya Ambun, the Director of Minerals & Geoscience Sarawak, has graciously served as the patron for the night.

Mr. Thomson Galin, Geologist from the Minerals and Geoscience Department Malaysia, Sarawak gave an informative talk entitled "The provenance of the Belaga Formation through heavy mineral studies". A total of 43 participants comprising geologists and their spouses attended the event. Among the geologists present were from Minerals and Geoscience Department Malaysia, Sarawak, Sarawak Energy Berhad, Sarawak Natural and Environmental Board, CMS Quarry Sdn. Bhd., Global Minerals (Sarawak) Sdn. Bhd., Jurutera Jasa (Sarawak) Sdn. Bhd., Ukin Engineering and Antap Georesources Sdn. Bhd.

Abstract: The provenance of the Belaga Formation was studied in 2012-2013 in collaboration with the Southeast Asia Research Group (Royal Holloway, University of London). The study utilised heavy mineral analyses and zircon dating by U-Pb laser ablation (LA-ICP-MS) method. From this study, the heavy minerals in the Belaga Formation sandstones consist mostly of zircon and tourmaline with small amount of rutile, garnet, apatite, chlorite and traces of chrome spinel. The zircons are mostly colourless, although purple and brown zircons are present. The zircon shapes vary from euhedral and anhedral to rounded. U-Pb zircon ages obtained from the Layar, Kapit, Pelagus and Metah members of the Belaga Formation have shown that the Belaga Formation zircons are predominantly Cretaceous and Permo-Triassic grains with few Precambrian grains. The youngest age of zircon from each member analysed seems to support the previously assigned age and a northward younging of the Belaga Formation. Various sources have been suggested for the Belaga Formation: from the south, Schwaner Mountains, Indochina, Thailand, Malay Peninsula, Sundaland, Sunda Shield and the north. In this study, the zircon age data implied two main sediment sources. The Malay Peninsula source is characterised by a mature tourmaline-dominated heavy mineral assemblage with abundant Precambrian zircons. The SW Borneo source has more diverse heavy mineral assemblages, including zircon, tourmaline, rutile, garnet, chlorite and apatite and is typically zircon-dominated. Both source areas were active throughout the deposition of the Belaga Formation, with variable contributions from each of these source areas through time.



Mr. Alex Unya Ambun, the patron for Geologist Night 2014 giving his speech.



Presentation of souvenir to the speaker, Mr. Thomson Galin by Dr. Richard Mani Banda, the GSM Regional Representative for Sarawak.

Chairman's Lecture No. 19

Engineering geology of the Ipoh-Simpang Pulai-Gopeng segments of the North-South Highway, Peninsular Malaysia

Tan Boon Kong

5 Mar 2014

Department of Geology, University of Malaya

Chairman's Lecture No. 19 entitled "Engineering Geology of the Ipoh-Simpang Pulai-Gopeng Segments of the North-South Highway, Peninsular Malaysia" was delivered by Sdr Tan Boon Kong on 5th March, 2014 at the Department of Geology, University of Malaya, Kuala Lumpur.

The Lecture covers the various rock slope problems associated with different lithologies encountered along the highway, namely limestone, granite and schist (Kinta Geology); and how these rock slope problems were overcome. Some post-construction incidents/failures were also discussed, and these include a major debris flow and the failure of an anchored cut-slope. Problematic colluvium was also addressed.

The abstract for the Lecture is attached below.

As usual, there was a lively Q&A session after the Lecture.

Tan Boon Kong,

Chairman, W/G on Engineering Geology, Hydrogeology & Environmental Geology

Abstract: The Ipoh-Simpang Pulai-Gopeng segments of the North-South Highway in Peninsular Malaysia traverse various interesting geologic/rock formations, namely: limestone, granite, schist and colluvial deposits – basically Kinta Valley geology with its famous, picturesque limestone hills. The construction of the North-South Highway in this region encountered a slew of problems which are directly related to the nature of these rock formations and soil deposits. This paper discusses the engineering geologic problems encountered during the construction of the Highway, which, among others, include the following:

- a) Granite rock slope stability,
- b) Limestone hill slope stability,
- c) Stability of cut-slope in schist intruded by aplite dykes,
- d) The problematic colluvial deposits.

Various techniques were used to overcome these problems, and they were by-and-large successful. However, there were also some post-construction failures and incidents, including a major debris flow which damaged part of the Highway. Figure 1 shows a view of the Highway under construction, depicting contrasting geologic formations.



Figure1: North-South Highway under construction, looking north. G. Tempurung (limestone) on the left, schist in cut-slope on the right, and granite further right (Main Range). Colluvium occurs along the Highway mainly as valley fills.



CERAMAH TEKNIK TECHNICAL TALKS

1. **Geology in Civil Engineering Education**
Hayati Awang (UiTM Shah Alam)
2. **Laboratory and Field Work for the Assessment of Slope Stability**
Mohd Fakhurrazi bin Ishak (University of Malaysia Pahang)
3. **Geological Input in Site Investigation and Foundation**
Mohamad Faizal Tajul Baharuddin (Tun Hussein Onn University)

15 May, 2014

Department of Geology, University of Malaya

Abstract 1: In civil engineering education at UiTM, the program was developed for the purpose of preparing future civil engineers who are responsible for the design of building structure, road, bridge, dam, slope etc. All these structures are built on, or in, the earth, thus information on soil and rock properties, groundwater, and even earthquakes should be considered in their design. The most related parts of geology and civil engineering is geotechnical division where they started with engineering geology in first year followed by soil mechanics, geotechnical principles and foundation design on the following years. Other subjects that related to geological study is site investigation and rock engineering. Many universities, local and abroad hire academicians with geology background to teach geology in civil engineering departments. However many of them have a background in education and training in the field of geology alone. In order to achieve an effective learning out come for the civil engineering program in universities or colleges, the academicians who teach the geology subject must have a good back ground on both field of studies which are geotechnical or civil engineering and geology. Therefore by having these multidisciplinary education or training background, the geology in civil engineering program not only provide the civil engineers some knowledge of geology for civil engineers to appreciate but to have a strong understanding on the subject for decision making, either as a contractor, consultant or client of the civil engineering projects.

Abstract 2: Many steep slopes in residual soils have a deep ground water table. Ground investigation using borehole drilling is usually conducted to collect undisturbed and disturbed samples. In the laboratory, index test such as Atterberg limit, specific gravity, particle size distribution and etc. were conducted to classified soils type. The important parameters in the analysis of slope stability are engineering properties, including geotechnical tests such soil shear strength (CIU, UU & UCT), soil permeability, soil compressibility (settlement & consolidation). Field in-situ strength such as standard penetration test (SPT) does not given soil strength parameter directly but required empirical correlation. The unit weight of soil can be determined by in-situ field density test (sand cone replacement method). In-situ porewater pressure (PWP) can be determined through standpipe piezometers and in-situ negative porewater pressure (matric suction) can be measured by tensiometer. The application of the right or suitable parameter with the right slope stability method, which can replicate the condition of the slope, is very important to produce a reliable slope factor of safety (FOS).

Abstract 3: Site investigation is the process of collecting information and evaluating the geological conditions of the construction site. The information can be used for the purpose of designing and constructing the structures foundation of building, plant and bridge. Foundation on rock formation requires a geological inputs data such as types of rock, rock quality designation, discontinuities parameters and accurate subsurface profiles that can be obtained by followed proper procedure in site investigation works. In Malaysia, the site investigation works are conducted following the guidance and standardized procedures of Malaysian Standard MS 2038:2006: Site Investigation-Code of Practice, Malaysian Standard MS 1056: 2005: Soils for Civil Engineering Purposes-Test Method, Preambles to Schedule of Rates Revision: January 1997 and JKR Specification for Site Investigation Works: Carried out under Contract (Revision: January 1980). The usual method of determining allowable bearing pressures is to use published tables or building codes relating allowable values to rock type. However, in a circumstance where the rock conditions do not match description on the building code, it is more appropriate to semi-empirical methods incorporating appropriate geological inputs parameters. The qualitative data on geological condition obtained from site investigation were used for semi-empirical equations (quantitative) in calculating bearing capacity allowable on rock formation of the site.

CERAMAH TEKNIK TECHNICAL TALK

Dolomitization and Porosity

Rick P Major (Universiti Teknologi Petronas)

21 May 2014

Department of Geology, University of Malaya

Prof Dr Rick Major presented a talk entitled “Dolomitization and Porosity” on 21 May 2014 at University of Malaya. Dr. Major is Shell Chair in Petroleum Geoscience at the Department of Geosciences, Faculty of Geosciences and Petroleum Engineering, Universiti Teknologi PETRONAS. The talk chaired by Dr. Ralph Kugler was attended by academics and postgraduates from University of Malaya and geoscientists from the industry.

Abstract: In the late 1950s and early 1960s Shell researchers at the Bellaire Research Center in Houston presented two contradictory hypotheses for how altering limestone to dolomite influences porosity. Peter K. Weyl proposed, and published, a mole-per-mole (conservation-of-mass) model for dolomitization which resulted in increased porosity (Weyl, 1960). F. Jerry Lucia proposed, but did not publish, a volume-for-volume plus cementation model that resulted in decreased porosity. In 1983 Robert B. Halley and James W. Schmoker, both with the U.S. Geological Survey, independently arrived at the same conclusion as Lucia (Halley and Schmoker, 1983). These two “endpoint” models, and a third “in between” model, are still debated inside and outside Shell today.

Weyl based his model on two observations. First, the enormous and prolific oil reservoirs in the Permian Basin of west Texas and southeastern New Mexico are dolomite; there are no major limestone reservoirs. Second, most modern groundwaters contain very little carbonate. He proposed that the source of carbonate must be the original limestone. Inasmuch as dolomite is a more dense mineral, conservation of mass would result in a smaller mineral volume and increased porosity.

Lucia based his model on observations of the Plio-Pleistocene Seroe Domi Formation on Bonaire, Netherlands Antilles. Dominantly aragonite fore-reef grainstones, which had been stabilized to low-magnesium calcite during early exposure to meteoric water, were subsequently dolomitized by downward and outward flowing hypersaline brines. Updip dolomites have low porosities, downdip dolomites have higher porosities, and farther downdip limestones have the highest porosities. Importantly, the boundary between updip dolomites and downdip limestones is composed of partly dolomitized rocks which contain both replacement dolomite and dolomite cement. The rocks started to lose porosity as soon as dolomitization began (Major and others, 1992a; Lucia and Major, 1994; Lucia, 2004).

A number of workers have suggested a third hypothesis. This model proposes that during dolomitization replacement occurs first, resulting in increased porosity. This is followed at a later time by dolomite cementation, which decreases porosity (for example, Jones and Xiao, 2005). Lucia has seen no data to support this hypothesis, although it has been used as the basis for published computer simulations and remains the subject of both formal and informal discussion.

Observations on Bonaire led Major and others (1992b) to propose that the geochemical composition of some dolomites may be used to interpret the pathways of dolomitizing fluids. Dolomite unit cell dimensions in the Seroe Domi Formation of Bonaire are more compact proximal to the source of dolomitizing fluids and less compact distal to the source. This is a fast and inexpensive method for interpreting the pathways of dolomitizing fluids and may serve to both constrain the source of these fluids and predict porosity patterns. Dolomite unit cell dimensions in some Permian and Ordovician rocks have apparently preserved dolomitizing fluid pathways formed early in their diagenetic history.

Halley, R. B., and Schmoker, J. W., 1983, High-porosity Cenozoic carbonate rocks of South Florida: progressive loss of porosity with depth: American Association of Petroleum Geologists Bulletin, v. 67, no. 2, p. 191–200.

Jones, G. D., and Xiao, Y., 2005, Dolomitization, anhydrite cementation, and porosity evolution in a reflux system: insights from reactive transport models: American Association of Petroleum Geologists Bulletin, v. 89, no. 5, p. 577–601.

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Lucia, F. J., and Major, R. P., 1994, Porosity evolution through hypersaline reflux dolomitization, in B. Purser, M. Tucker, and D. Zenger, eds., Dolomites: a volume in honor of Dolomieu: International Association of Sedimentologists, Special Publication No. 21, p. 325–341.

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- Major, R. P., Lucia, F. J., and Ruppel, S. C., 1992b, Geochemical tracers of dolomitizing fluid pathways: a tool for predicting diagenetically controlled porosity on a reservoir scale (abs.): *American Association of Petroleum Geologists Bulletin*, v. 76, no. 4, p. 579.
- Weyl, P. K., 1960, Porosity through dolomitization: conservation-of-mass requirements: *Journal of Sedimentary Petrology*, v. 30, no. 1, p. 85–90.

CERAMAH TEKNIK TECHNICAL TALK

Finite Element Modelling for Underground Nuclear Waste Repository

Tey Chun Yean (Gamuda)

25 June 2014

Department of Geology, University of Malaya

The talk on “Finite Element Modelling for Underground Nuclear Waste Repository” was presented by Ir. Dr Tey Chun Yean (Gamuda) on 25th June, 2014, at the Dept. of Geology, Univ. Malaya, K.L.

The materials for the talk form part of Dr. Tey’s Ph.D. thesis at Cardiff Univ., Wales. The research looked at the behavior of various media (lining materials and bedrock) forming the nuclear waste repository, specifically the thermal and hydraulic behavior of the media. Experimental measurements, numerical modelling and field validations were conducted. It would appear that the field data correlated well with the predicted behavior from the Finite Element modelling.

As usual, there were lively discussions after the presentation.

Tan Boon Kong,

Chairman, W/G on Engineering Geology, Hydrogeology & Environmental Geology

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CERAMAH TEKNIK TECHNICAL TALKS

1. **Occurrence of Early Eocene to Middle Eocene Planktic Foraminifera from Bedded Shale at The Suang Pai Quarry, Kudat, Sabah: A Preliminary Interpretation**
Junaidi Asis (UMS)
2. **Effects of Moisture and Clay Minerals on the Strength of Soil Along Kota Belud – Ranau Road, Tamparuli, Sabah**
Mohd Ali Yusuf (UMS)

16 May 2014

School of Science & Technology, UMS

Abstract 1: Early Eocene to Middle Eocene planktic foraminifera have been successfully extracted from a shale unit at the Suang Pai Quarry Kudat, Sabah. The shale unit is green in colour and about 8 meters thick. The shale unit is unconformably overlain by the Oligocene to Early Miocene limestone unit of the Kudat Formation. Four samples of shale have been collected and processed according to micropaleontological technique. Foraminiferal specimens were examined under binocular microscope and well-preserved specimens were photographed by using Scanning Electron Microscope (SEM). All samples contain an abundance of planktic and benthic foraminifera. A total of sixteen taxa of planktic foraminifera have been identified and eleven selected species are used for age determination. They comprise *Acarinna bulbrooki*, *Acarinina pentacamerata*, *Acarinina wilcoxensis*, *Morozovella aragonensis*, *Morozovella spinulosa*, *Muricoglobigerina soldadoensis angulosa*, *Muricoglobigerina soldadoensis soldadoensis*, *Orbulinoides beckmanni*, *Subbotina eocaena*, *Subbotina inaequispira* and *Subbotina linaperta*. The planktic foraminiferal assemblage represents an age of Ypresian to Bartonian (Early Eocene to Middle Eocene). The age and characteristic of the shale unit can be interpreted as part of the Crocker Formation.

Abstract 2: The research area is located in the West Coast of Sabah, in a subdistrict of Kota Kinabalu known as Tamparuli, it is bounded by the longitude 6° 05' N to 6° 11' N and the latitude 116° 24' E to 116° 29' E. The study area is underlain prominently by Crocker Formation aged from Eocene to Lower Miocene. The objective of the study is to determine the effects of moisture, mineral and microstructure on the strength of soil. Research samples cover the major landslides along the major road of Kota Belud – Ranau and sandstones of selected location. Moisture analysis was applied by using manipulation of Unconfined Compression Test by treating the samples with 5% of increment and decrement of moisture from the optimum moisture content. The analysis yielded the strength of soil ranges from 50.5 kPa to 131 kPa for optimum moisture, 20.5 kPa to 50 kPa for 5% increment and 98 kPa to 210.5 kPa for 5% decrement. The term Shear Strength Difference is introduced in this research, it is defined as the percentage of shear strength difference of the samples to its optimum moisture shear strength. The highest shear for strength difference gain is 201% and for shear strength difference loss is 81%. Sandy soil has a higher shear strength when subjected to less moisture and clay soil has a lower shear strength when more moisture is added. Mineralogy analysis is performed with petrography and X-Ray Diffraction (XRD) Analysis. Petrography analysis for rock sample shows dominant percentage of quartz grain and lithics in the rock sample all together, with minor amounts of muscovite, plagioclase, alkali feldspar and iron oxides. XRD analysis yielded that clay minerals such as montmorillonite, halloysite, rectorite and illite are abundant in the study area. Microstructure analysis is executed by Scanning Electron Microscopy (SEM) observation. Illite, rectorite and montmorillonite is often observed and characterized by their unique features. As a conclusion, this research shows that effect of moisture is characterized by the mineral and microstructure properties of the sample and it has a direct impact on the shear strength of soil.

3. Sub-Stratum Interpretation and Aquifer Potential Identification of Dent Group Sedimentary Rock, Lahad Datu, Sabah by Using Applied Geophysical Methods

Hardianshah Saleh (UMS)

4. Integrasi Kaedah Penderiaan Jauh dan Sistem Maklumat Geografi (GIS) Dalam Pemetaan Kawasan Berpotensi Air Tanah Sekitar Kota Kinabalu, Sabah

Zulherry Isnain (UMS)

6 June 2014

School of Science & Technology, UMS

Abstract 3: Vertical Electrical Sounding (VES), 2D-Electrical Resistivity Imaging (ERI) and Induced Polarization (IP) survey techniques were carried out to interpret the sub-stratum and to identify the aquifer potential in the sedimentary rocks of Dent Group in Lahad Datu, Sabah. The sedimentary rocks are composed of three formations namely Sebahat, Ganduman and Togopi Formations. 56 VES station was carried out using the ABEM SAS 300C terrameter within the area. A maximum electrode spacing of 500m current electrode spread using the Schlumberger array was adopted for this survey with maximum current penetration of 120 m. ERI and IP surveys were also conducted along 18 profiles by using the ABEM SAS1000 terrameter. Schlumberger array was also applied for this survey with maximum length of 400 m and depth of investigation about 70m. Correlation of the interpreted VES, ERI, and IP with the lithologic logs from the borehole sections in the study area produced seven geo-electrical profiles and labelled as S1 (in Sebahat Formation area), G1, G2, G3, G4, G5 (in Ganduman Formation area) and T1 (in Togopi Formation area). The results suggest that the Sebahat Formation is made of massive and thick layers of mudstone with low resistivity value (2-11 Ω .m). The Ganduman Formation consists of four different lithologic layers with variable thicknesses. The first layer with resistivity values ranging from 10 Ω .m to 400 Ω .m representing topsoil. The second layer has resistivity ranging from 20 Ω .m to 200 Ω .m representing thick sandstone layer partly associated with clay and calcareous lenses. The third layer has resistivity ranging from 1 Ω .m to 20 Ω .m representing mudstone layer. The fourth layer has resistivity ranging from 200 Ω .m to 2000 Ω .m representing sandstone layer. The Togopi Formation consists of topsoil layer, followed by clay (8-20 Ω .m) and sandstone layers (30-100 Ω .m) with fractured limestone blocks (400-4000 Ω .m). Results of the study indicate that the Sebahat Formation dominated by aquitard and aquiclude layers. Good aquifer layers was interpreted was formed in thick sandstone layer in Ganduman Formation and limestone with sandy layer in Togopi Formation.

Abstract 4: Permintaan terhadap sumber air tanah meningkat dari semasa ke semasa disebabkan oleh bekalan air permukaan yang tidak mencukupi bagi menampung permintaan yang semakin meningkat. Peningkatan permintaan sumber air tanah ini adalah disebabkan oleh banyak faktor seperti peningkatan populasi, proses urbanisasi dan aktiviti pertanian. Kajian yang dijalankan di kawasan sekitar Kota Kinabalu, Sabah ini merangkumi lima peringkat iaitu pengumpulan dan penyediaan data asas, analisa data satelit, pembinaan pangkalan data ruang, analisa ruang dan proses integrasi. Kajian ini dijalankan dengan mengambilkira parameter-parameter yang menyumbang kepada potensi kewujudan air tanah. Sebelas parameter yang digunakan dalam kajian ini iaitu ketumpatan lineamen, gunatanah, taburan hujan, litologi, ketinggian topografi, kecuraman cerun, ketumpatan saliran, jenis tanah, nisbah pasir dan lempung serta zon sesar utama dan zon sinklin. Parameter-parameter ini dikumpul, diproses, dianalisis dan diintegrasikan dengan menggunakan kaedah Penderiaan Jauh dan Sistem Maklumat Geografi (GIS) untuk menghasilkan peta-peta tematik yang berkaitan. Setiap poligon di dalam peta-peta tematik ini diberikan nilai pemberat yang sesuai mengikut pengaruhnya dalam penghasilan air tanah. Dua perisian yang telah digunakan dalam kajian ini iaitu ERDAS 8.4 dan ILWIS 3.3. Akhir sekali, proses integrasi dilakukan ke atas semua lapisan peta tematik menggunakan kaedah Tindihan Indeks dan Proses Analisis Hierarki (AHP) bagi menentukan kawasan berpotensi air tanah. Peta akhir potensi air tanah kawasan kajian dibahagikan kepada lima kategori atau zon iaitu sangat tinggi, tinggi, sederhana, rendah dan sangat rendah.

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UPCOMING EVENTS

September 1 – 5, 2014: The International Mineralogical Association 21st general meeting (IMA 2014 – Delving Deeper: Minerals as Mines of Information). Johannesburg, South Africa. <http://www.ima2014.co.za>

September 15-18, 2014: IAEG X11 Congress. Torino, Italy. Theme: “Engineering Geology for Society and Territory”. <http://www.iaeg2014.com/>

September 15-16, 2014: Deep Earth Processes: Windows on the Working of a Planet, London, UK. Contact: Naomi Newbold, email: naomi.newbold@geolsoc.org.uk

September 22-23, 2014: William Smith Meeting 2014: The Future of Sequence Stratigraphy: Evolution or Revolution, London, UK. Contact: Naomi Newbold, email: naomi.newbold@geolsoc.org.uk; website: www.geolsoc.org.uk/events

September 29-30, 2014: Introduction to the Downstream Petroleum Industry, Calgary, Canada. Contact: Richard.Heenan@peice-training.com

September 30 - October 3, 2014: Rock Typing – Reservoir Characterisation and Quality from Drill Cuttings, Perth, Australia. Contact: training@hoteng.com; website: www.hoteng.com

October 6-10, 2014: Carbonate Geology for Oil and Gas Exploration & Development, Kuala Lumpur, Malaysia. Contact: training@hoteng.com; website: www.hoteng.com

October 19-26, 2014: The Third International Symposium of the International Geoscience Programme Project 589. Development of the Asian Tethyan Realm: Genesis, Process and Outcomes. Tehran, Iran. Email: igcp589@gmail.com

October 28-29, 2014: International Tin Chemical Conference & Exhibition, Kuala Lumpur, Malaysia. Contact: The Secretariat, Tin Industry (Research & Development) Board, Tel: 603 21616171; Fax: 603 21616171; email: mcom@mcom.com.my; Web: www.malaysianminerals.com

October 30-31, 2014: 10th Deepwater Asia Pacific 2014, Jakarta, Indonesia. Contact: Elva Qiu; Tel: +86 21 63931899 – 2041; Fax: +86 21 68407632; email: elvaq@cdmc.org.cn; web: www.cdmc.org.cn

November 2-6, 2014: Integrated Petrophysics for Reservoir Characterisation, Dubai, UAE. Contact: training@hoteng.com; website: www.hoteng.com

November 12 – 19, 2014: IUCN World Parks Congress 2014, Sydney, Australia. The Congress will serve as a vital link to achieving IUCN’s overall vision of a “just world that values and conserves nature”. <http://www.iucn.org/>

November 13-14, 2014: China Oil & Gas Convention 2014, Beijing, China. Contact: Elva Qiu; Tel: +86 21 63931899 – 2041; Fax: +86 21 68407632; email: elvaq@cdmc.org.cn; web: www.cdmc.org.cn

November 17-21, 2014: Basin Analysis and Petroleum Systems, Vienna, Austria. Contact: training@hoteng.com; website: www.hoteng.com

November 23-25, 2014: Effective Technical Writing for Exploration and Production Staff – A Structured System, Abu Dhabi, UAE. Contact: training@hoteng.com; website: www.hoteng.com

November 24-28, 2014: Pore Pressure, Fracture Pressure and Wellbore Stability Management, Vienna, Austria. Contact: training@hoteng.com; website: www.hoteng.com

December 2-5, 2014: OSEA2014 International Conference, The Platinum Edition, Marina Bay Sands, Singapore. Contact: Elaine Dang, Tel: 65 62336627; email: elaine.dang@sesallworld.com; web: www.osea-asia.com

December 4-5, 2014: 12th Asia Gas Congress Japan 2014, Osaka, Japan. Contact: Elva Qiu; Tel: +86 21 63931899 – 2041; Fax: +86 21 68407632; email: elvaq@cdmc.org.cn; web: www.cdmc.org.cn

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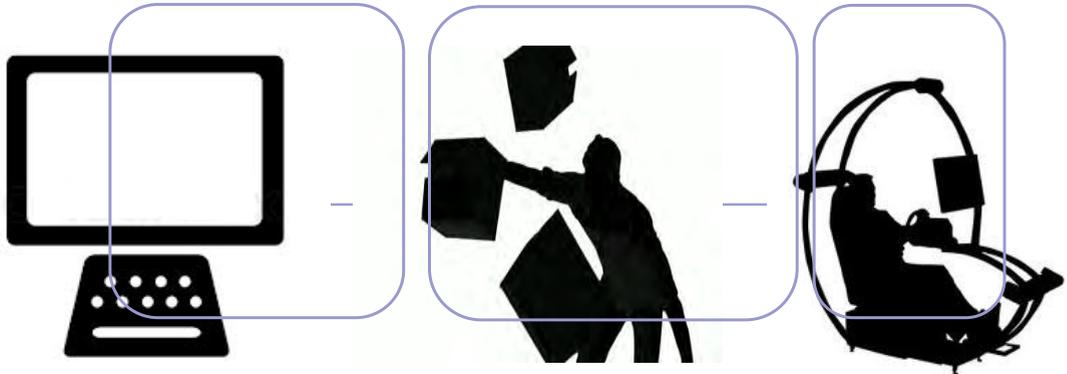
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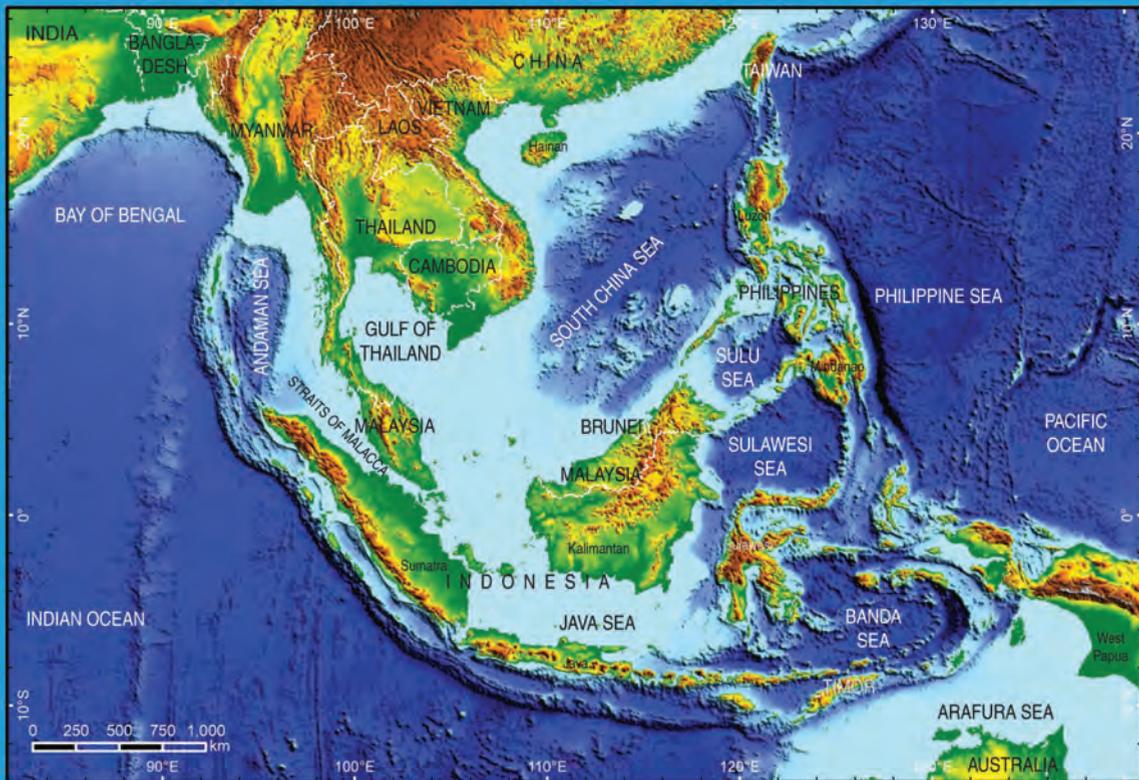
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