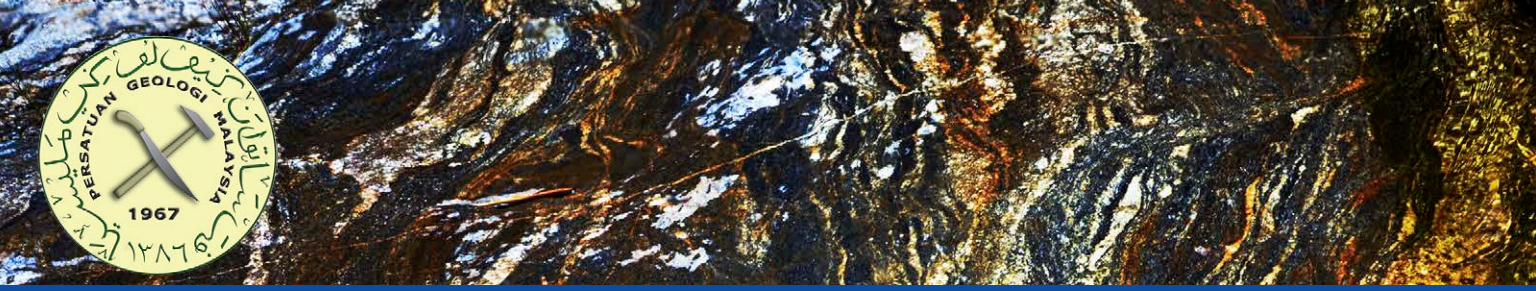

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Cover photo: Dextral shear bands in schist, Sg. Kenerong, Kelantan by T.F. Ng.

Paleogeography and carbonate facies evolution in NW Sarawak from the Late Eocene to the Middle Miocene

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Abstract: Following the intense Paleocene-Early Eocene Sarawak Orogeny (around 40-36 Ma), a shallow shelf developed in NW Sarawak, which included both the Luconia/Tinjar terranes and also rimmed the recently emerged and eroding Rajang Group hinterlands. With prevailing inner neritic depositional environment at that time, benthic foraminiferal limestone banks and ramps developed on sheltered shoals, separated from each other by clastic fairways with turbiditic channel deposits. By Early-Middle Oligocene times, carbonate deposition slowed as a consequence of increased subsidence and or, less likely, a strongly globally rising sea level. After a pause in which clastics dominated the area, a second carbonate system formed during the Early-Middle Miocene. These carbonates contain the first hard evidence of small bioherms, mainly corals and coralline algae. However, in the study area, there is not a single outcrop or well which shows an uninterrupted carbonate sequence from the Paleogene to the Neogene. Consequently, we believe, that both the Eo-Oligocene and Early-Middle Miocene carbonate systems are unique and not interconnected. In respect to the question where these platforms ended towards the northeast, there is circumstantial evidence that the original basin onlap of the carbonates lies today somewhat masked by tectonic events, in particular, by a Late Miocene to Early Pliocene fold and thrust belt. The latter also possibly overlies another even older tectonic boundary between the metamorphosed Rajang-Crocker formations and the Sarawak molasse.

Keywords: platform carbonates, Eocene, NW Sarawak, Oligocene, paleogeography, tectonics, Borneo

INTRODUCTION

This article serves as a short review of both exposed outcrops, and selected wells drilled in the Sarawak Foreland Basin. Recent and older well results, plus biostratigraphic studies carried out in the context of oil and gas exploration, and environmental research has allowed the investigation of a stratigraphic snapshot of the basin during the Late Eocene to Middle Miocene times.

GEOLOGICAL SETTING AND STRATIGRAPHY

A summary for the geological setting of NW Sarawak is provided by Kessler (2009) and Jong *et al.* (2016). From a tectonic standpoint, the study area encompasses the Baram Delta Block and the adjacent footwall terrane of Luconia/Tinjar Block. The hanging-wall Baram Delta Block was rapidly subsiding with clastic sedimentation, whilst the Luconia/Tinjar Block had a lower subsidence rate. Being only moderately folded, this terrane is characterized by a number of synclines with minor overthrusting (Figure 1). The Baram Line (or West Baram Line) acted as a tectonic discontinuity that links the relatively stable Luconia/Tinjar Block to the mobile and siliciclatic-dominated Baram Delta Block. The simplified chrono-stratigraphic summary for NW Sarawak/Brunei covering the study area is shown in Figure 2.

DATA POINTS AND FACIES CONTROL

The Eo-Oligocene stratigraphic sequence in NW Sarawak is relatively poorly constrained, due to the rarity of well penetrations in this older section. Hence paleogeographic models proposed in the past mainly by Shell authors, focussed on the Upper Oligocene and younger sections (from 27 Ma). A summary by Hutchison (2005, p. 99) is based mainly on outcrop studies and limited well information. Our approach for deducing the paleogeographic evolution is based on an integration of both outcrop and well studies including an updated view from the recent Engkabang West-1 results, in addition to seismic facies interpretation based on 2009/2010 2D seismic data acquired by JX Nippon.

Our data points for age control and facies determination in this study include:

The Batu Niah cliff/Subis-1: A predominantly Miocene-aged reef complex (Figure 3), now standing free in the landscape as a weathered-out (inselberg) remnant, is fringed by neritic Setap Shale clastics (Figure 4). The carbonates of shallow marine back reef characteristics are comprised of foraminiferal-algal packstone-grainstone; algal fragments, larger foraminifera, with presence of gastropod. Within the grainstone facies, we observe

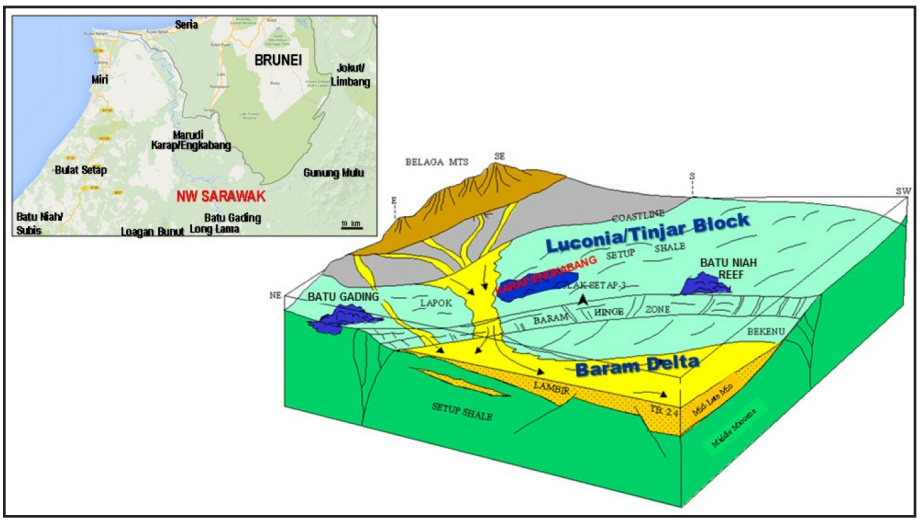

Figure 1: Schematic block diagram of NW Sarawak with a regional perspective of Late Miocene/Pliocene times. Luconia/ Tinjar Block constitutes the footwall, the Baram Delta the hanging NW of the Baram Hinge Zone. Given the folding of areas such as the Belait-Badas Syncline, Bukit Lambir, Miri etc., NW Sarawak serves as an example of relief-inversion (after Kessler, 2009; Jong *et al*., 2016). Inset map shows locations of outcrops and wells.

patches of coral reefs. The lagoonal facies are tight, slightly argillaceous and bioturbated wackestone-packstone to fine-grained wackestone with stylolites and calcite veins; cemented corals, algal fragments, and larger foraminifera (Sulaiman, 2008). The old **Subis-1** well (Shell, TD 3185 m) penetrated a carbonate sections older than Miocene, likely to be time-equivalent to the younger carbonate section of Karap/Engkabang Anticline (Jong *et al*., 2016).

The coastal Sarawak Suai-5 well: Drilled by Shell in the 1950's near Bintulu, this old well penetrated ?Early Miocene to Middle Miocene platform carbonates, which are potentially time-coeval with the Subis Limestone. There are, however, currently no better data available in absence of further onshore exploration in the area.

The well Bulak Setap-3: A well south of the Lambir Hills on the Luconia/Tinjar Block penetrated some 3353 m of Oligo-Miocene claystones, but without intercepting any major turbidite sandstones, carbonates or source-rock levels. The well is noteworthy for leaking methane-rich gas at the corroded wellhead located within a current oil palm plantation, which possibly points to the existence of a deep (?coaly Eocene) and highly mature source rock.

The Batu Gading quarry: An Eo-Oligocene section overlies a strongly chevron-folded, and slightly metamorphosed clastic basement with Late Cretaceous deepwater fauna (Figure 5). Above this, the Batu Gading quarry exhibits a sequence of foraminiferal packstones leading to thin-bedded mudstones of Te_{2-4} age. In one section of the quarry, now removed, one could see clusters of small bryozoan limestone-boundstone patches, surrounded by foraminiferal packstone. The lower section of the packstone beds also contains a significant percentage of quartz clasts. However, controversy remains regarding the age of the upper stratigraphic section. According to Peter Lunt (pers. comm.), the Oligocene is not "entirely absent" as indicated by Hutchison (2005, p.87; possibly mis-citing older data). According to Lunt's revised foraminifera dating, the area was therefore exposed for most of the Oligocene, and was transgressed only in the latest Oligocene time, represented by a sequence of thin-bedded, clayey and cherty limestones. Strangely though there is no good evidence for a pronounced unconformity within the quoted Oligocene sequence, and there is no sign of any karstification. Hence, if there is complexity in respect to stratigraphic ages, there is also complexity in respect of tectonics. The largest carbonate outcrop is called Hollystone Quarry, located within a graben flanked by and above the Rajang Group metamorphics, and was preserved from erosion. Most likely, the extent of Eo-Oligocene deposits was originally much larger, and only small remnants have escaped erosion. Only a few kilometres to the northwest, a tectonic contact between the Rajang Group and the foreland (Setap Shale) can be mapped. Folding, faulting and perhaps thrusting had occurred during the Late Miocene/Pliocene times, but the area had also likely seen tectonic movements ahead of the Late Miocene, as documented by Jong *et al*. (2013, 2015).

The Engkabang wells (see Jong et al., 2016; Figure 6): Engkabang-1 was drilled by Shell in a 1959-1960 campaign, and penetrated late Middle Eocene to Oligocene carbonates above non-metamorphic clastics of unknown age (which may not belong to the Rajang Group). The well proved sub-economic gas in a massive 272 m section of tightly cemented and dolomitized limestone, initially broadly assigned to a Late Eocene - Early Miocene age. The well Engkabang West-1 was drilled by JX Nippon in 2013-2014. It penetrated a separate culmination of mainly mudstone and wackestone, and the mapped carbonate reservoirs proved tight (JX Nippon, 2014). Seismic maps of the Karap/Engkabang area, calibrated with biostratigraphic studies in the wells indicate the presence of a number of key stratal events related to regional unconformities and hiatuses. The Karap/Engkabang area was a platform ramp area, which saw periods of compression, inversion and/or uplift. The biofacies study further indicated that the basal section of Engkabang

wells represented some of the oldest carbonate rocks penetrated by any wells in the region. It was similar in age to that of the Melinau Limestone outcrop section of NW Sarawak, previously investigated by Adams (1965), and as re-visited by Lunt (2014). However, should the interpretation of the TD section proved to be correct, it would infer that the molasse of Sarawak Foreland Basin is located in an entirely different tectonic block (no Rajang Group present), with a different and unknown basal sedimentary section.

The Gunung Mulu carbonates (see Wannier, 2009): A very large carbonate platform complex, of Eocene to Early Miocene age, which was biostratigraphically reviewed recently by Lunt (2014), and confirmed the age setting proposed by Adams (1965). Above the Mulu Formation lies the Melinau Limestone. This unit consists of a 2.1 km thick sequence of massive, thick bedded, strong and pale grey limestones of Late Eocene to Early Miocene age. These were deposited in a shallow sea between 20 and 40 million years ago. Because of the steep dip to the west (at around 60-70°), the Melinau Limestone now outcrops to the west of Gunung Mulu, forming a narrow, lenticular outcrop culminating in Gunung Api (Figure 7). Overlying the Melinau Limestone is the Setap Shale, which consists of a sequence of mudstones with occasional marly bands and thin sandstone beds. These rocks formed in deeper water during the Middle Oligocene to Early Miocene period, some 20-30 million years ago. Outcrops to the west of the park are forming a small escarpment. Although generally younger than the other two rock units, the softer nature of these rocks caused preferentially erosion to form the low-lying area to the west of Gunung Api.

The Jokut quarry in Limbang (see Kessler, 2012): These limestone sequences, known as the Selidong and Keramit limestones, are strongly folded and lie interbedded in dark, probably anchi-metamorphic Setap Shale (Figure 8). Both limestone and shale sequences are of Late

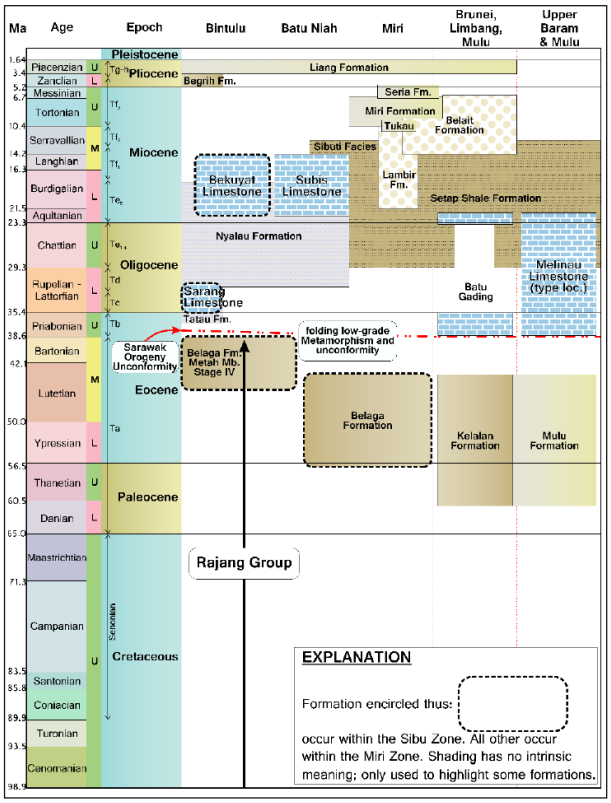

Figure 2: Chrono-stratigraphic table of the major formations of the Miri Zone covering NW Sarawak and Brunei. The Upper Cretaceous to Upper Eocene Rajang Group (flysch) forms the Sibu Zone and underlies the Miri Zone. The Sarawak Orogeny caused low-grade metamorphism and strong folding characterized by steep dips of the Rajang Group. The overlying formations (molasse) are much less deformed, and un-metamorphosed, except in localized shear zones. Modified after Hutchison (2005, Figure 22).

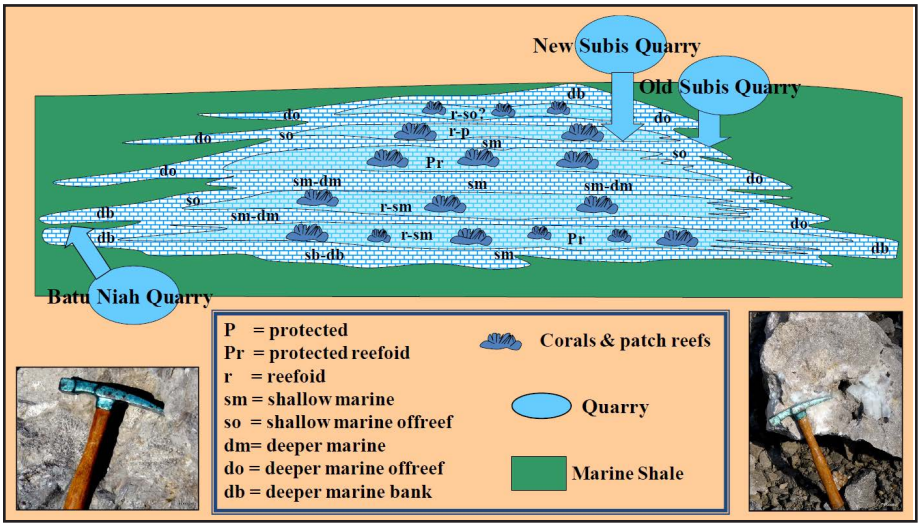

Figure 3: Schematic model of the Subis Limestone Complex (after Sulaiman, 2008). The section shows the Early Miocene carbonate platform. Inset photos: (left) Coral stock in Batu Niah that appears to be formed by a particularly pure limestone, (right) Larger coral stocks have frequently undergone freshwater-phreatic diagenesis leading to particularly clean clusters of calcite mono-crystal. Carbonate stringers, probably off-reef facies and neritic in nature, are also seen in the Oligocene section of the nearby well Subis-1.

Oligocene Te age, according to dating by Wilford (1964, citation in Hutchison 2005). The carbonate sequences consist of bioclastic carbonates - mudstones, wackestones, and very rarely packstones. The mudstone/wackestone beds are typically very finely laminated, implying a very low and steady sedimentation rate. Given the coastal areas of NW Sarawak (Miri) and coastal Brunei are essentially covered by Neogene deposits that camouflaged older rocks, the Jokut/Limbang area is unique in the sense that the Oligocene basin margin can be studied here both in terms of stratigraphic succession/facies and deformation.

The Loagan Bunut, and Long Lama area outcrops: These data points summarised below are important, since they characterize the clastic facies setting between carbonate platform areas, in addition to the Bulak Setap-3 well data. Several data points indicate turbiditic sandstones and siltstones in small channel complexes within the Setap Shale claystones. These are usually a couple of metres thick and up to 40 m wide; these small channels belong to turbidite fairways that bypassed isolated platforms during periods of lowstand (Figure 9).

A profile logged by Kessler and Jong (2015b) describes a rock column spanning probably from Late Oligocene to Pliocene in age. It shows a rarely seen outcrop example, where the profile dissects two major regional unconformities, namely the Mid-Miocene Unconformity, separating the ?Early-Middle Miocene Upper Setap Shale from the Lambir Formation (Figure 10), and further stratigraphically above, a pronounced angular Pliocene unconformity separating the folded sand-dominated Lambir Formation rocks from similar, but the unfolded deposits of the Tukau Formation. The Upper Setap Shale (bottom section of profile) is the most common outcrop rock exposed in the onshore Luconia/ Tinjar region. It constitutes a thick bottom-fill layer within a shallowing upwards mega-sequence of channels that probably accumulated in an upper slope environment. In some areas, the Upper Setap Shale is replaced by marls and limestones of the very shallow-marine Sibuti Limestone, not represented in the logged profile; instead we see marly shale with the occasional slumped sand blocks, and thin-bedded levees of turbidite sequences (see below). A few shelfal sandy beds may be interpreted as precursors of the sand-dominated deltaic Lambir Formation of the younger section. Sandy Pliocene deposits of the Tukau Formation sandstones are seen overlying the Lambir Formation above a marked angular unconformity and may have formed in a shoreface environment. The Tukau Formation contains also coal measures.

Figure 4: Top – Subis Limestone Complex, a highly elevated feature in comparison to the surrounding lowlands indicating the development of the carbonate build-up complex within the surrounding basinal sediments of the Setap Shale. However, the build-up topography is significantly altered by subsequent exposure and erosion. Bottom – Slump deposits of deep marine Setap Shale with beds of detrital limestone fragments located along the road to Sepupuk ca. 1 km from junction to Batu Niah (after Sulaiman, 2008).

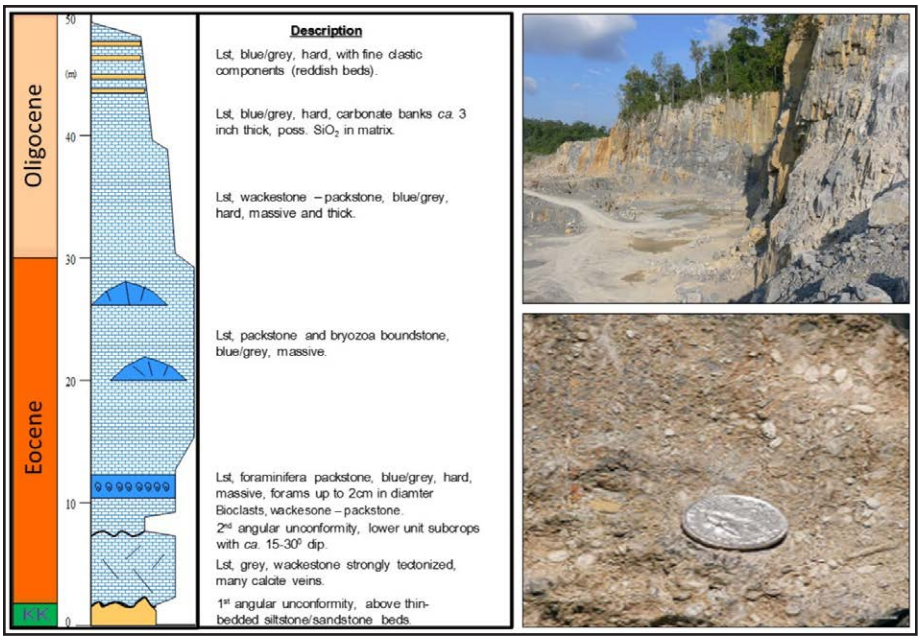

Figure 5: Vertical profile of Batu Gading limestones (Hollystone quarry). Top right: The Hollystone quarry is located in the vicinity of the discussed Baram-Luconia/ Tinjar tectonic segments, imbricated between older Kelalan metamorphics. However, there is no indication that the Batu Gading limestone has undergone metamorphism. Bottom right: Foraminiferal packstones in Batu Gading limestones of a ramp facies. These carbonates appear to contain always some clay component.

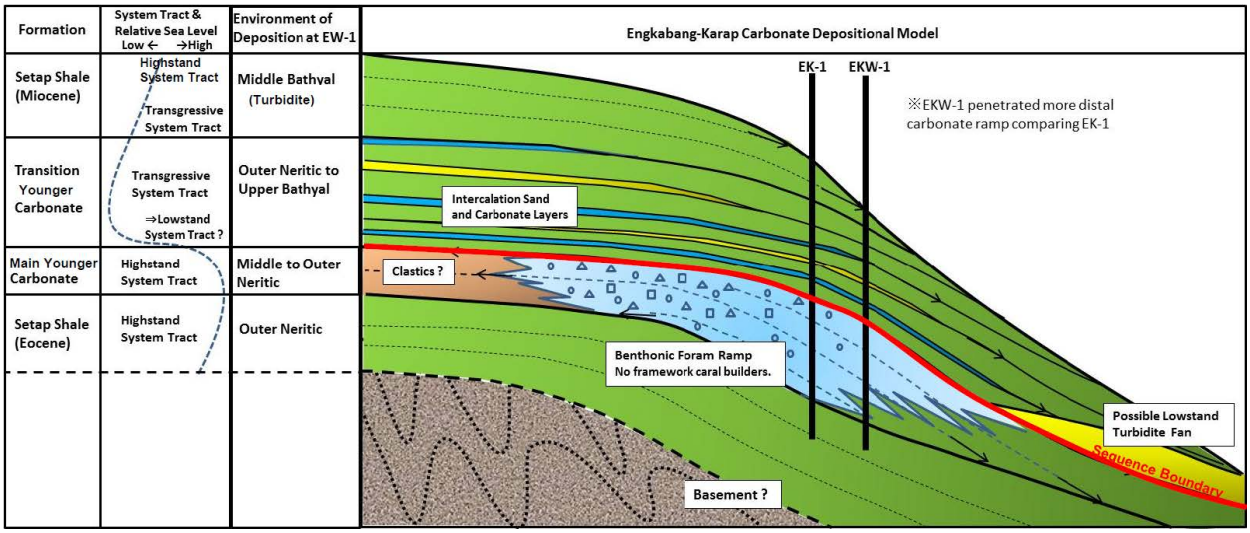

Figure 6: Postulated depositional model of the Karap/Engkabang carbonates with development of benthonic foram bioherm ramps (after JX Nippon, 2014). Note the Main Young Carbonate section penetrated was dated Late Eocene while the Older Carbonate section developed on the Melinau Limestone level remained untested.

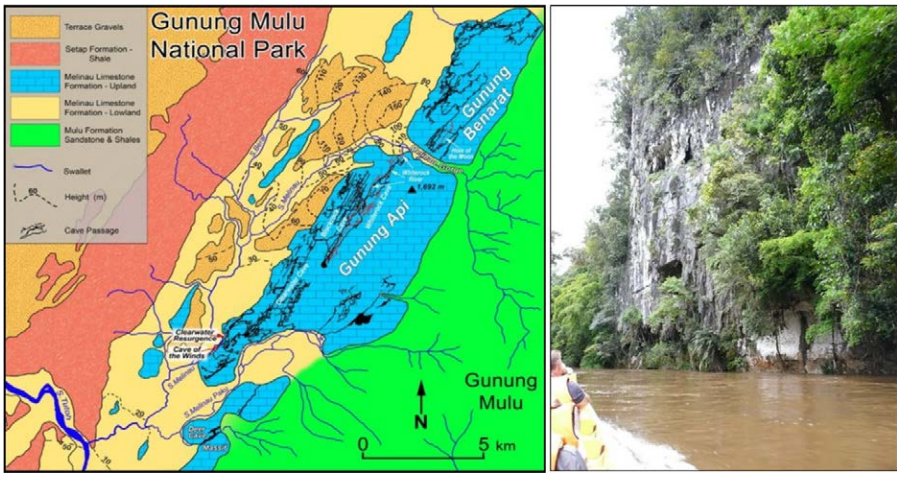

Figure 7: Left – Geological map in the vicinity of Gunung Mulu national park (after Liechti *et al*., 1960). Right – Photography of a carbonate outcrop of Gunung Api.

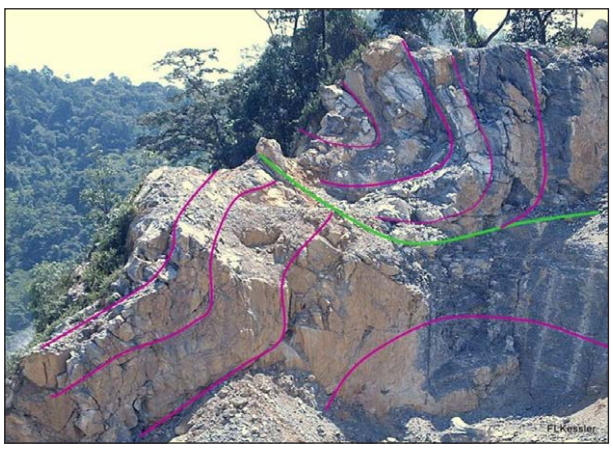

Figure 8: The Jokut Quarry is located NE of the Mulu Massif and forms probably the northernmost known occurrence of carbonates in this part of Sarawak. The exposed carbonates (called Selidong and Kerimit Limestones) are intensely folded and fractured, and float within an even more intensely folded and tectonized mass of shales and slates (after Kessler, 2012).

Several smaller sandy turbidite channels, as well as levee deposits, have been studied along the road from Bukit Peninjau (Petronas Gas station) to Beluru. The levees consist of siltstones, contain trace fossils and possibly imprints of medusae.

One marked turbidite channel was exposed in the past in the gray Upper Setap Shale on a branch road of the Long Lama road leading to the Empresa palm-oil plantation, but recently was found overgrown by creeper plants.

Another, but strongly tectonized turbidite channel outcrops was logged on the tributary road from the Long Lama road towards Loagan Bunut. Later research by Kessler and Jong (2015a, b) indicates proximity to a possibly very narrow and sandy Setap shelf (Figure 9), believed to be turbidites deposited in an outer shelf to slope environment.

Another small sandy turbidite channel was found at *ca.* km 3 on the Long Laput road counting from the Long Lama road junction.

Other outcrops: Although not investigated in this study, Peter Lunt (pers. comm.), mentioned the existence of a few additional remote outcrops that have probably not been reviewed since Liechti *et al.* (1960): The **Bekuyat Limestone**, formed by Late Oligocene to very Early Miocene foraminiferal limestone; the **Jelalong**, and **Tujoh-Saman** outcrops appear to be of similar (Late Oligocene) age.

PALAEOGEOGRAPHY AND TECTONIC BOUNDARIES

To establish a regional overview of the study area, two true horizontal-scale cross-sections have been generated in the study area (Figure 11): 1) Section A-B correlates the paleofacies from Engkabang-1 to Batu Gading and; 2) Section C-D linking Karap/Engkabang to Batu Niah. Platform carbonates are shown in blue, proven or potential bioherms in orange; turbidite sandstones are annotated in yellow, within clastic fairways that separate these proven or geophysically-inferred carbonate platforms.

From integrated outcrop data, seismic interpretation and the cross-sections, a preliminary Late Eocene to Late Oligocene paleogeographic map of NW Sarawak was attempted based on limited data. We show inferred water depths of the carbonates at the studied well and outcrop locations (Figure 12), based on discussion with our colleagues and other researchers. Water depth uncertainties of these carbonates remain a subject of an on-going debate and continued research. With such limitations in mind, a palaegeographic map was generated for the Late Oligocene to Middle Miocene interval supported by seismic interpretation of major carbonate occurrence and outcrop data from the Loagan Bunut and Marudi areas (Figure 13).

The map shows an inferred deep shelf/slope area in the vicinity of Miri, a sheltered-shelf area with two or more littoral reef complexes in Batu Niah and Karap/Engkabang that grew further away of the paleo-coastline, plus two more platform/reef complexes in Batu Gading and Gunung Mulu located proximal to the coastline. In between the carbonate highs, a couple of turbidite sedimentary fairways – the Empresa and Batu Blah incising into the Setap Shale are annotated. The considerable thickness of Gunung Mulu suggests a faster drowning of the area, deduced from the thickening of carbonates keeping pace with the rising sea. Given the offsetting effect of the Baram Line (movements started within the Oligocene), the areas of Karap/Engkabang, Batu Gading and Mulu were located an estimated 50 - 100 km further to the northwest, hence Batu Niah and Batu Gading were therefore located closer to each other than they are today.

The contact between the inverted Rajang Group and the Tertiary molasse of the foreland might have been a simple onlap, but this original tectonic boundary is difficult to reconstruct since it coincides with a fold thrust belt that originated at the Miocene/Pliocene border.

Figure 9: Top: Proximal turbidite channel, probably of Oligocene to Lower Miocene age, on the road from Long Lama to Long Laput. Turbidite channels like the one above appear to be incised into the Setap Shale and characterize topographic lows and fairways between carbonate platform elements. Middle: Gray Upper Setap Shale with sandstone olistoliths, shown in the middle section of the picture. The outcrop is located near to the road junction leading to the Empresa oil palm plantation. The sandstone slump blocks shown above illustrate the vicinity of a (probably narrow) sandy shelf, as well as the presence of a relevant angle such that mass gravity flow occurs (Kessler & Jong, 2015a, b). Bottom: Distal turbidite facies on the Long Lama Road near the junction with Miri-Kuching road. The section is probably time-coeval with the Lower Miocene section in Batu Niah (Subis-1).

Arguably, one can follow this suture from Sarawak to the Klias Peninsula, and to offshore South Sabah, where it is supposedly better defined by seismic. However, the question whether or not Neogene compressive tectonics are preceded by older ones, cannot be resolved at this point in time.

DISCUSSION AND CONCLUSION

Our current conclusion points to a picture, in which two relatively independent carbonate platforms had evolved during the Late Oligocene (Chattian) and then again during the Early to Middle Miocene. No outcrop or well has showed a vertical continuity of carbonate deposits from the Oligocene to the Miocene. Therefore, we can consider these two platforms as being genetically independent, albeit exhibiting some similarities in lithofacies:

The Chattian carbonates appear to be more continuous compared to the younger, rather patchy Miocene system, and are mostly foraminifera-dominated platform ramp carbonates. The extent of the platform is not well-known, but might have covered up to 70 % of the of the Sarawak Foreland Basin areas (between coastline and the Rajang Group mountains). Locally smaller stocks of bryozoan colonies have been reported within the often slightly muddy carbonates in Batu Gading, but do not seem to have formed large patch reefs.

In the Neogene Early to Middle Miocene carbonate system, we observe foraminifera-dominated platform carbonates together with isolated coral reefs, that could have led to patch reef development in places. Patch reefs such as seen in Batu Niah appear to have formed on local highs, whilst areas off-platform are characterized by clays and distal silts with few sandy turbidite deposits.

Hence, it is likely that both carbonate intervals have evolved due to relatively high sea levels flooding the Northern Borneo margin during the mentioned periods. This is considered an important conclusion in the context of tectonic movements affecting segments of Borneo (Jong *et al*., 2016).

Evidence for historic and recent uplift of segments of Borneo Island has been shown in earlier papers by Kessler & Jong (2014, 2015a, b, c), and Jong *et al.* (2016).

Other aspects to consider for the interpretation of the deposition of the carbonate sequences include the impact of atmospheric and oceanic changes in the water chemistry and species evolution. The former approach was taken up by Mihaljevic *et al.* (2014), inferring an Indo-Pacific marine biodiversity hotspot that originated between the Late Eocene and the Early Miocene. It coincides with an increase in availability of shallow-marine habitats driven by the opening of the South China Sea and the collision of Australia with the Pacific arcs and the Southeast Asian margin. Other possibilities are evolutionary trends during the Tertiary with the re-establishment of corals as reef builders as discussed by Wilson (2008). The author noted that, there is a marked

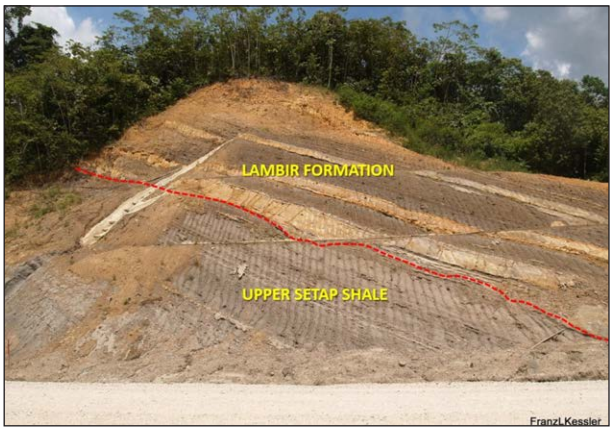

Figure 10: Transition between gray Upper Setap Shale and Lambir sandstones. Note the colour change from light gray (carbonate debris) of Setap Shale to brownish-gray claystones and the scouring channel sandstones at the base of Lambir Formation (after Kessler and Jong, 2015b).

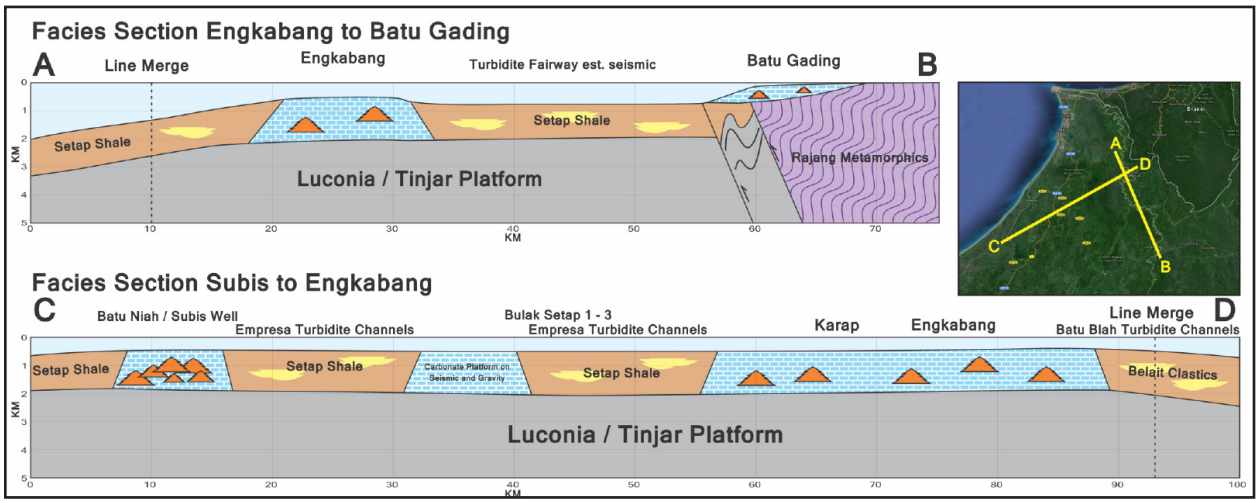

Figure 11: True horizontal-scale geological cross-sections of the study area generated based on inference from seismic interpretation. The younger Late Oligocene section is better imaged, and we also incorporating well and outcrop studies. These simplified sketches do not differentiate between the older and younger platforms for display reasons.

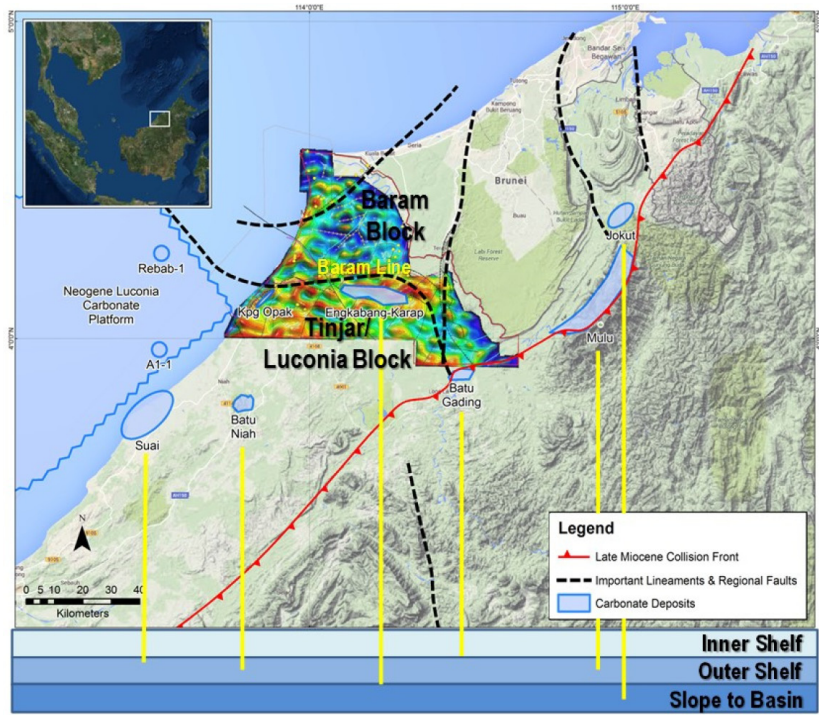

Figure 12: Distributions of carbonate deposits in NW Sarawak with inferred water depths of Late Eocene to Late Oligocene carbonate sections at various well and outcrop locations. However, water depth uncertainties remain tentative and deserve further studies. The offshore Rebab-1 and A1-1 wells have reportedly penetrated similar-aged carbonate. They have not been included in this study. Overlaid on the topographic map are gravity data acquired by JX Nippon (Jong *et al*., 2016) with Karap/Engkabang highlighted as positive anomalies. The Kpg. Opak outcrop (not investigated, see Khor e*t al*., 2014) also lies in an area of positive anomalies. The Baram Line as annotated subdivides the stable Tinjar/Luconia Block from the subsiding Baram Delta to the north.

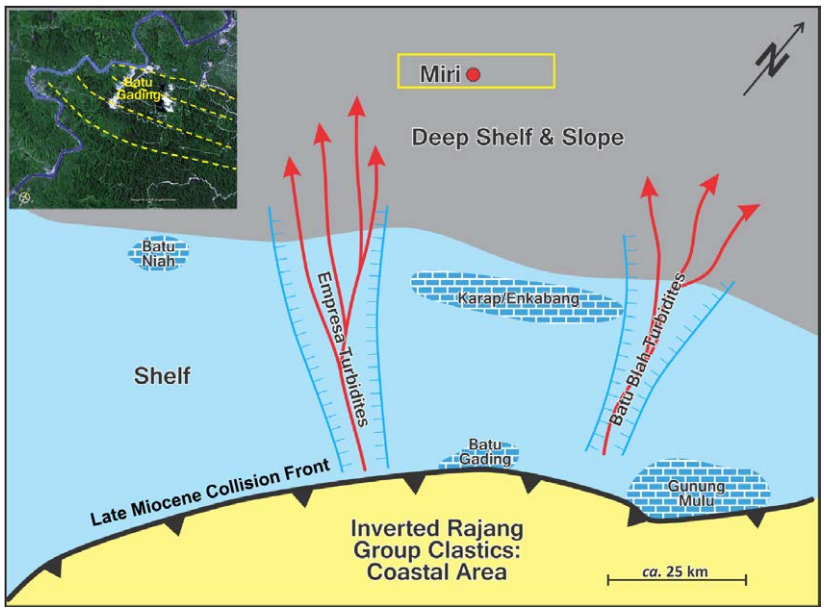

Figure 13: Paleogeography of NW Sarawak from the Late Oligocene to Middle Miocene times with major carbonate occurrences. Inset shows satellite picture of the Batu Gading area, where one can clearly identify the outcrop area (white), and the elongated Rajang fold thrust belt that originated during the Early Eocene, with a tectonic overprint (folding and thrusting, dashed yellow lines) occurring from the Late Miocene - Pliocene times. The Baram Line dissects the area in N/S direction, just to the west of the limestone outcrops.

change from larger benthic foraminifera to corals as dominant shallow-marine carbonate producers in SE Asia around the Oligo-Miocene boundary. Regional and global controls, including changing CO_2, regional tectonics and oceanography, nutrient input and precipitation patterns are inferred to be the main cause of this lag in equatorial reefs. It is suggested that moderate, although falling level of CO_2, Ca^{2+} and Ca\Mg when combined with the reduced salinities in humid equatorial waters all contributed to reduced aragonite saturation hindering reefal development compared with other warm and more arid regions during the Late Eocene to Oligocene.

By contrast, our own fieldwork indicated, that corals are exclusively seen in the Neogene carbonates, where the host rock appears particularly low in clay and sand content (Batu Niah). Adding to this, the Paleogene platform carbonates contain often a significant amount of sand and clay, suggesting a muddy benthos environment which is unfavourable for the growth of corals and other framework-building organisms. This brings us to the question of paleo-water depth. With the relative paucity of outcrops and wells, quality of data (cuttings mostly and only a few cores) the following conclusions remain tentative:

In Suai, and Batu Niah, Oligocene carbonates are discontinuous stringers and were most likely deposited in a slope setting. The Jokut Limestone and the Oligocene thin-bedded limestone sequences in the upper portion of the

Batu Gading quarry are cherty and fine-grained and could reflect a neritic to bathyal environment. Core material from Engkabang-1 contains plenty of *Echinodermata* remnants (Peter Lunt, pers. comm.), which is supportive for an interpretation as neritic environment. Only the lower (Eocene) sequence in Batu Gading and Gunung Mulu, appears to have been formed in relatively shallow water depth. In both Batu Gading and Gunung Mulu, we see deepening upwards trends, suggesting that the Eo-Oligocene platforms have gradually drowned, and hence created an environment unfavourable for shallow-marine reef builders. This said, we regard this conclusion still as tentative with many open questions.

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Discussion on omission of Sabah Pre-Cretaceous geology and geochronology data in Tate (2002), Balaguru *et al*. (2003), Lee *et al*. (2004) and Wan Nursaiedah Wan Ismail *et al*. (2014)

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Abstract: The age of Sabah oldest rocks cannot be based on fossiliferous rocks only. Known to date, the oldest fossiliferous rocks are limestone and chert of Early Cretaceous age. Based on field mapping and unconformity and geochronology data, Sabah oldest rocks are metamorphic rocks and granite and tonalite of minimum Early Jurassic or Triassic age. Sabah Pre-Cretaceous Geology and Geochronology data had been omitted in Tate (2002), Balaguru et al (2003), Lee et al (2004) and Wan Nursaiedah Wan Ismail et al (2014) resulting in non-fact/data-based conclusion that Cretaceous sedimentary and volcanic rocks and other basic/ultrabasic rocks to be Sabah oldest and basement.

Introduction

Aim of this Note is to reaffirm, based on currently known data and information, the minimum age and lithology of Sabah oldest rocks are metamorphic rocks and granites and tonalites of Early Jurassic/ Triassic age, and are not Cretaceous ophiolites. Reference is made to conclusion in Wan Nursaiedah Wan Ismail *et al*. (2014): "The ophiolitic chert in the study area represents the oceanic crust that was formed during Early Cretaceous and this association represents the oldest rocks in Sabah". Cretaceous ophiolites may be the oldest rocks outcropping in Kudat area. To extend the same conclusion to entire State of Sabah will require data in other areas. Previous to Wan Nursaiedah Wan Ismail *et al*. (2014), Sabah Pre-Cretaceous Geology and Geochronology data had been omitted in Tate (2002), Balaguru *et al*. (2003) and Lee *et al*. (2004).

Other Occurrences of Lower Cretaceous Chert and Limestone in Sabah

Lower Cretaceous radiolarian chert in Sabah was first reported 40 years ago in 1975 (Leong (1975, 1977, 2009). Since 1975, several areas in Sabah have yielded Lower Cretaceous radiolarian chert (Basir Jasin, 2000). Lower Cretaceous *Orbitolina*-bearing limestone (Leong, 1974) and *rudist*-bearing limestone (Fontaine and Ho, 1989; Leong, 1999) in eastern Sabah have also been reported.

Evidence of Pre-Cretaceous Geology in Sabah

Unconformity

Tuffaceous limestone and calcareous mudstone containing Cretaceous foraminifera *Globotruncana* unconformably overlie metamorphic rocks (amphibolites) in Upper Segama area (Wong and Leong, 1968; Leong, 1974, 1998; Fontaine and Ho, 1989). The metamorphic rocks cannot be of the same age as the overlying unmetamorphosed Cretaceous limestone and mudstone.

Field Mapping, Biostratigraphy and Radiometric Age Dates

The age of Pre-Cretaceous or Pre-ophiolitic Cretaceous-Early Teriary Danau Formation (renamed Chert-Spilite Formation) called Crystalline Schists (renamed Crystalline Basement) igneous and metamorphic rocks in Upper Segama east Sabah was predicted to lie between PreCambrian and Upper Palaeozoic in Reinhard and Wenk (1951).

Lower Cretaceous radiolarian chert and limestone are not the oldest rocks in Sabah on Geological Survey/ Mineral and Geosciences 2nd and 3rd Editions of *Geological Maps of Sabah* (Wilford, 1967; Lim, 1985). Sabah oldest rocks are shown to be Jurassic or older/Triassic or older Crystalline Basement of granite, granodiorite and tonalite and metamorphic rocks based on field mapping in Upper Segama area and radiometric ages of granite and tonalite (Kirk, 1964, 1968; Leong ,1971, 1974), re-affirmed by new geochronological and other data in Graves *et al*. (2000).

Tjia (1989) and Tjia *et al*. (1990) interpreted the Sabah Crystalline Basement igneous and metamorphic rocks as fragments of a Pre-Cretaceous continental margin crust. Tongkul (2005) had acknowledged in an interview to Daily Express Sabah dated 5 May 2005 the age of oldest rocks in Upper Segama area/Danum Valley area to be older than 150 Ma. The 150 Ma radiometric K:Ar age (minimum Jurassic) was obtained from tonalite containing high potassium indicative of continental origin by Kirk (1964, 1968)-(Leong 1974). Analytical results of several more granitic rocks showed significant concentrations of potassium (by contrast with ophiolite, which is deficient in potassium)-(Leong 1998). Graves *et al*. (2000) confirmed the granitic rocks could not have been derived from the Cretaceous ophiolites (Graves *et al*., 2000; Leong, 2009), also elaborated in Hazebroek *et al*. (2012).

The latest radiometric age (185 Ma) from granite and other data in Graves *et al*. (2000) have reaffirmed minimum Jurassic age of Sabah granitic rocks and vindicated 210 Ma radiometric K:Ar age in Leong (1971, 1974) as follows: "The oldest K:Ar age determined from a granitoid…is 210 Ma ± 3 Ma (Early Jurassic)(Leong 1974). We have added some additional dating which supports a Jurassic age…" and "the acidic rocks (granite, granodiorite, tonalite) belong to the calc alkaline series…and could not have been derived from the ophiolites" (210 Ma K:Ar age is minimum Early Jurassic or Triassic based on Geologic Time-Scale reference source).

Lack of Evidence for Elimination of Sabah Pre-Cretaceous Geology

There are no records of geological field work on granitic rocks and new radiometric age dates of the granitic rocks in Upper Segama Sabah in Tate (2002), Balaguru *et al*. (2003), Lee *et al*. (2004) and Wan Nursaiedah Wan Ismail *et al*. (2014). No new data are presented in Wan Nursaiedah Wan Ismail *et al*. (2014) and none in Tate (2002), Balaguru *et al*. (2003) and Lee *et al*. (2004) to refute Jurassic radiometric age from granite in Graves *et al*. (2000). In the case of Tate (2002), Sabah oldest rocks were shown as "Cretaceous crystalline basement" altered from Jurassic or older/Triassic or older Crystalline Basement in *Geological Maps of Sabah* (Wilford, 1967; Lim, 1985). Cretaceous fossiliferous sedimentary rocks had been included in "Cretaceous crystalline basement" of Tate (2002). In Balaguru *et al*. (2003), Sabah oldest rocks were shown to be Cretaceous spilite and serpentinite in reference to Lim (1985). But in Lim (1985) *Geological Map of Sabah*, the oldest rocks shown are Triassic or older Crystalline Basement of granitic and metamorphic rocks. In Lee *et al*. (2004), Sabah Geology began from Cretaceous sedimentary rocks. The unconformity of Cretaceous fossiliferous sedimentary and volcanic rocks overlying metamorphic rocks in Upper Segama (Wong and Leong, 1968; Leong, 1974) was omitted. In Lee *et al*. (2004), the entire Pre-Cretaceous Geology of Sabah had been omitted.

Conclusions

The minimum age of Sabah oldest rocks cannot be based on fossiliferous rocks only. Igneous and metamorphic rocks must also be investigated in the field, analysed and researched.The minimum age of oldest rocks in Sabah must take into consideration geological field mapping and stratigraphic relationships of various rock units (e.g. unconformities and biostratigraphy), radiometric ages of the granitic rocks and other key analytical data. The unconformity between Cretaceous Chert-Spilite Formation limestone and mudstone un-conformably overlying metamorphic rocks had ruled out Cretaceous Chert-Spilite Formation (ophiolites) as Sabah oldest rocks.

Minimum Jurassic radiometric ages of tonalite and granite in Kirk (1964, 1968), Leong (1971, 1974) and Graves *et al*. (2000) had also ruled out Cretaceous Chert-Spilite Formation as Sabah oldest. To date, the Crystalline Basement comprising granite, granodiorite and tonalite and metamorphic rocks are Sabah oldest rocks of minimum Early Jurassic or Triassic age (210 Ma K:Ar age) and minimum Jurassic ages (150 Ma; 185 Ma) determined from tonalite and granite. Based on present data, both Sabah oldest fossiliferous rocks (Lower Cretaceous) and oldest radiometric 210 Ma K:Ar age (Triassic or Early Jurassic) occur in Upper Segama area, east Sabah. Miles and miles of Pre-Cretaceous granitic and metamorphic rocks outcrops in Upper Segama area Sabah do not simply disappear and vanish.

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PERSATUAN GEOLOGI MALAYSIA
GEOLOGICAL SOCIETY OF MALAYSIA

50th ANNUAL GENERAL MEETING & ANNUAL REPORT 2016

29th April 2016
Hotel Hilton, Petaling Jaya, Selangor

AGENDA

Date: 29th April 2016
Time: 5.30 pm
Venue: Hotel Hilton, Petaling Jaya, Selangor

The Agenda for the Annual General Meeting is as follows:

1. Welcoming Address by the President for Session 2015/2016
2. Confirmation of Minutes of the 49th AGM held on the 24th April 2015
3. Matters Arising (49th AGM Minutes)
4. Annual Report for Session 2015/2016
   a. President's Report
   b. Secretary's Report
   c. Editor's Report
   d. Treasurer's Report
   e. Honorary Auditor's Report
   f. Endowment Fund Report
5. Election of Honorary Auditor
6. Other Matters (written notice received by the 21 April 2016):
   a. Matters submitted by member Dr. H.D. Tjia (Received: 30 March 2016)
7. Announcement of New Council for 2016/2017
8. Presidential Address for 2016/2017

PERSATUAN GEOLOGI MALAYSIA
GEOLOGICAL SOCIETY OF MALAYSIA (GSM)

MINUTES OF THE 49th ANNUAL GENERAL MEETING (AGM)

Date : 24th April 2015
Time : 5.30pm
Venue : Department of Geology, University of Malaya, Kuala Lumpur

Members Present

1. Abd. Rasid Jaapar
2. Ahmad Nizam Hasan
3. Ahmad Tariq Ahmad Ziyad
4. Arthur Chu Yun Shing
5. Askury Abd Kadir
6. Azman A Ghani
7. Cheang Kok Keong
8. Chok Pit Yuen
9. Dony Adriansyah Nazaruddin
10. Fateh Chand (Datuk)
11. Felix Tongkul
12. James Bachat
13. Jasmi Hafiz Abdul Aziz
14. Jose A G Vintaned
15. Joy J Pereira
16. Lee Chai Peng
17. Leong Khee Meng
18. Lim Choun Sian
19. Lim Tow Ho
20. Low Keng Lok
21. M Muqtada Ali Khan
22. Mazlan Madon
23. Meor Hakif Amir Hassan
24. Mohd Badzran Mat Taib
25. Ng Chak Ngoon
26. Ng Ping Ping
27. Ng Tham Fatt
28. Nicholas Jacob
29. Nur Iskandar Taib
30. Robert Wong
31. Samsudin Hj Taib
32. Sia Hok Kiang (Dato')
33. Tan Bock Kang
34. Tan Boon Kong
35. Tanot Unjah
36. Yunus Abd Razak (Dato')
37. Zakaria Endut
38. Zuhar Zahir Tuan Harith

1. Welcoming Address by the President for Session 2014/2015

Dr Mazlan Madon, the President of Geological Society of Malaysia acted as the Chairperson of the AGM and called the meeting to order at 5.30pm. He commended the overwhelming response of the members to the AGM that was held in Department of Geology UM for the second time consecutively.

2. Adoption of Agenda

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

1. Welcoming Address by the President for Session 2014/2015
2. Confirmation of Minutes of the 48th AGM held on the 25th April 2014
3. Matters Arising (48th AGM Minutes)
4. Annual Report for Session 2014/2015
   a. President's Report
   b. Secretary's Report
   c. Editor's Report
   d. Treasurer's and Honorary Auditor's Reports
   e. GSM Endowment Fund Report
5. Election of Honorary Auditor
6. Other Matters:
   a. Election of Honorary Membership
   b. 50th Anniversary and AGM by T.T.Khoo
   c. Follow-Up on Elimination of Sabah Pre-Cretaceous in GSM Tate (2002) Geology of Borneo Island Map by K.M.Leong
7. Announcement of New Council for 2015/2016
8. Presidential Address for 2015/2016

The agenda was unanimously accepted.

2. Confirmation of Minutes of the 48th AGM held on the 25th April 2014

The Minutes of the 48th AGM was tabled for confirmation.
Askury Abd Kadir proposed that the minutes be confirmed, seconded by Datuk Fateh Chand.
The minutes were unanimously confirmed without any amendment.

3. Matters Arising (48th AGM Minutes)

a. Promoting Geoscience in School
The work is still progressing under Promotion of Geoscience & Young Geoscientist Group.

b. GSM Office
The Council is in talks with the Head, Department of Geology, UM, for its continued support for the GSM office to remain in the departmental premises as well as for other possible collaboration between GSM and the Dept of Geology, UM.

4. Annual Report for Session 2014/2015

a. President's Report
Mazlan Madon tabled the President's Report (Appendix 1).
Dato' Yunus Abd Razak proposed that the President's Report be accepted, seconded by Nicholas Jacob.

b. Secretary's Report
Lim Choun Sian tabled the Secretary's Report which included Assistant Secretary's Report (Appendix 2).
The AGM discussed the following matters:
- Abd. Rasid Jaapar proposed to Council to promote membership for Student and Full Member.
- Datuk Fateh Chand proposed to Council relook whether to reduce number of Council Meeting.
- Lee Chai Peng proposed to Council to consider having Council Members from outside Klang Valley.

Action: Incoming Council

Joy Pereira proposed that the Secretary's Report be accepted, seconded by Robert Wong.

c. Editor's Report
Ng Tham Fatt tabled the Editor's Report (Appendix 3).
Dato' Yunus Abd Razak commended the effort for GSM online publication and proposed that the Editor's Report to be accepted, seconded by Robert Wong.

d. Treasurer's and Honorary Auditor's Reports
Ahmad Nizam Hasan tabled the Treasurer's and Honorary Auditor's Report (Appendix 4).
The AGM discussed the following matters:
- Dato' H.K Sia commented on the GSM running expenses in deficit but still manageable.
- Datuk Fateh Chand proposed to Council to generate income from conferences or short courses, i.e. exhibition space. Abd. Rasid Jaapar informed about the possibility of IAEG conference in Kuching.
- Mazlan Madon informed AGM about the strategy for sustaining NGC or earthscience themed conferences and to hold them in Klang Valley and on the possibility of Petronas PGCE donation to GSM.
- Leong Khee Meng proposed a donation drive from GSM members.
- AGM also requested GSM to hold more activities and short courses for members.

Action: Incoming Council

Dato' H.K Sia proposed that the Treasurer's and Honorary Auditor's Report be accepted, Leong Khee Meng seconded.

e. GSM Endowment Fund Report
Dato' Yunus Abd Razak, Chairman in Board of Trustees of the GSM Endowment Fund tabled the GSM Endowment Fund Report and Recommendation from the Board of Trustees (Appendix 5).
Recommendation from the Board of Trustees was accepted by AGM, tasked the Incoming Council to the followings:

i. The In-Coming GSM Council be requested to appoint tax consultant to obtain "tax deductible" status of GSM to inform potential donors on the tax deductible status of their donation;

ii. The In-Coming GSM Council prepare an annual budget proposal for the Endowment Fund, covering programmes specified in the 48th GSM (also in Appendix 5) to be tabled for endorsement by the Board of Trustees;

iii. The In-Coming GSM Council be requested to increase the principal amount in the GSM Endowment

Fund through fund raising activities; and

iv. The In-Coming GSM Council be requested to consider transferring a portion of the fixed deposit of the GSM operating accounts to the Endowment Fund to increase the principal amount.

Action: Incoming Council

Lee Chai Peng proposed that the Treasurer's and Honorary Auditor's Report be accepted, Nicholas Jacob seconded.

5. Election of Honorary Auditor

Ahmad Nizam Hasan proposed to continue appointing S.F Lee & Co as the Honorary Auditor for the year 2015. The AGM unanimously agreed to the appointment.

6. Other Matters:

a. Election of Honorary Membership
In the AGM, Dato' H.K Sia was presented Honorary Membership of GSM for his contribution in geosciences fraternity.

b. 50th Anniversary and AGM by T.T.Khoo
The preparation for GSM 50th Anniversary and AGM was discussed in the AGM.
Suggestions by AGM include: contacting members and past council members to contribute in writing and related old photos for an anniversary publication, perspective of geosciences and achievement of GSM after 50 years.

Action: Incoming Council

c. Follow-Up on Elimination of Sabah Pre-Cretaceous in GSM Tate (2002) Geology of Borneo Island Map by K.M.Leong (Appendix 6).
K.M Leong presented his view on GSM Tate (2002) Geology of Borneo Island Map.
The AGM took note of the presentation and is unanimously of the opinion that the issue should be discussed in a separate technical platform.

Action: Incoming Council

7. Announcement of New Council for 2015/2016

The result from Election for GSM New Council 2015/2016 chaired by Joy Pereira was read out by Lim Choun Sian:

President :	Dr. Mazlan Madon (PETRONAS)
Vice-President :	Mr. Abd Rasid Jaapar (Asian Geos)
Immediate 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 : Assoc. Prof. Dr. Ng Tham Fatt (UM)	
Councillors (2 years) 2016/2018 :	Mr. Tan Boon Kong (Consultant)
	Dr. Nur Iskandar Taib (UM)
	Dr. Tanot Unjah (UKM)
	Dr. Jasmi Hafiz Abdul Aziz (UM)
Councillors (1 year) 2015/2016:	Dr. Meor Hakif Amir Hassan (UM)
	Mr. Robert Wong (PETRONAS)
	Mr. Mohd Badzran Mat Taib (JMG)
	Assoc. Prof. Askury Abd Kadir (UTP)

8. Presidential Address for 2015/2016

The newly-elected President Mazlan Madon expressed that it is a great honour for him to be elected to serve as the President and thanked the members for their support and confidence. He pledged that he and the new Council would try their best to serve for the good of the Society.

The AGM was adjourned at 7:05 pm.

LIM CHOUN SIAN
Secretary 2014/2015
1 June 2015

APPENDIX I

PRESIDENT'S REPORT 2015/2016

Since the 49th Annual General Meeting (AGM) on 24 April 2015, the Society continued with its usual activities by organizing conferences, seminars and talks. Under challenging economic circumstances, falling oil prices and consequently financial constraints, the Society was able to maintain normal activities to meet its general objectives, of advancing the geological sciences in the country.

At last year's AGM, I proposed that the incoming council focus its efforts on several key activities, namely: (1) flagship conference events, (2) membership, geoscience promotion and outreach, and (3) publications. While our flagship conference (i.e. NGC) is still maintained, more efforts are needed for membership, promotion and outreach, which the incoming council will take on board. The honorary editor will update on the publications.

The main activities undertaken during 2015/2016 included the National Geoscience Conference (NGC 2015), Workshop on Paleogene of the Eastern Margin of Sundaland, short courses and technical talks. The Working Groups and Regional Representatives also organized their activities. I shall highlight below the key activities undertaken by the Society during the year 2015/16.

The National Geoscience Conference (NGC) 2015 with the theme "Geoscience for Societal Benefits and National Development" was successfully held on 31 July to 1 August 2015 at the Perdana Hotel, Kota Bahru, Kelantan, co-hosted with the Universiti Malaysia Kelantan's newly established Faculty of Earth Science, Jabatan Mineral dan Geosains (JMG) Kelantan and Perbadanan Menteri Besar Kelantan (PMBK). The event was officiated by the Menteri Besar of Kelantan, Dato' Haji Ahmad bin Yakob. With generous support from various donors, we managed to run it at a modest cost and more or less within budget. The Society would like to record its appreciation to the Chairman of the Organising Committee, Dr. Mohammad Muqtada Ali Khan, of UMK, and his co-chairs, Tn Hj Mohd Nazan Awang (Director of JMG Kelantan), Tn Hj Zakie Ahmad Shariff (CEO of PMBK) and Mr Ahmad Nizam Hassan (GSM) for their valuable contributions towards the successful organization of the event. For the NGC 2016, to be held in Kuantan, Pahang, on 14-15 November 2016, the Society is collaborating with Universiti Malaysia Pahang (UMP) and JMG Pahang.

Since its establishment fifty years ago, the Society operates out of the premises of the Geology Department at the University of Malaya and does not have a place of its own. As stated at the last AGM (49th, 2015), the Council has been in talks with the Head of the Department to formalize the symbiotic ("win-win") relationship between the Society and the Department (Universiti of Malaya) in the form of a Memorandum of Understanding (MOU). Consequently, a general understanding has been reached, whereby the Department will allow GSM to continue using its current space in return for a nominal monthly contribution of RM2000 to the department. In addition, the council has agreed to allocate RM2000 annually, on per claims basis, to the Department towards book purchases for its library. A formal MOU is being drafted and will be signed by the incoming council.

To keep a proper record of its Standard Operation Procedures (SOP) the council has been compiling and indexing its minutes of meetings (MOM) for the proper archival and reference. SOPs are needed for reference on established practice of the council to aid in decision-making. So far, the SOP for the management of Endowment Fund has been completed. Other SOPs being looked at are: (1) Dissemination to GSM members; (2) Organising NGC; (3) Organising other events; (4) Nomination of GSM Council Members & Officers. This is an ongoing effort, and it is hoped the incoming council will be able to complete it within its term of office.

Since its inception, the Society has been giving out Society Awards to deserving individuals, including students, who have contributed to the geological sciences. Lately, there appears to be a lack of interest in these awards, perhaps due to poor publicity and initiative on both the society side and the universities. The council therefore decided to rejuvenate the three already existing awards by renaming them in honour of past luminaries of the Society:

a. "Hutchison Best Student Award", previously the "GSM Best Student Award", initiated in 1991 for eligible final year geology students at the local geology departments.
b. "N.S.Haile Publication Award", previously the "Young Geoscientist Award" mooted in 1978 by the Society's co-founder and first president Prof. N. S. Haile, for good publications by young geologists below the age of 30.

c. "DJ Gobbett Award", previously the "Geoscientist Award", initiated in 1995 for distinguished members/group of members who have made significant contribution to research and the development of Malaysian geology.

To administer these awards, an award nomination committee has been set up, headed by Dr Jasmi of UM. Funds for these awards will be sourced from the GSM Endowment Fund.

Besides those awards, the Society continues to receive requests for sponsorships of student activities related to geoscience, and have endeavored to entertain those requests on a case-by-case basis. The Society views these sponsorships as part of the overall effort in the promotion of geoscience, and to arrest the decline in membership. The Society, however, should not be perceived as merely a sponsoring body and.needs to be more proactive in reaching out to potential members. It is hoped that we can do better in promoting geoscience and membership to the Society, led by the chair of the WG on geoscience promotion.

At the 49th AGM, it was proposed that a special publication will be compiled to commemorate the Society's 50th Anniversary in 2017. Relevant materials are to be solicited from past and present members, officebearers and council members for inclusion in this publication. This proposal has been taken on board by the council, which has set up a Special Committee on 50th Anniversary Celebrations chaired by Vice-President, Mr. Abdul Rasid Jaapar. The committee is tasked to organize (i) the GSM 50th Anniversary National Geoscience Conference (NGC 2017), (ii) the publication of the GSM's 50th Anniversary "Coffee Table" Book, and (iii) the 50th Anniversary special issue of the GSM Bulletin. The council has appointed, with consent, Prof. Lee Chai Peng as the guest editor for the two special publications to be published in 2017. To date, the 50th anniversary special issue of the Bulletin has received more than 30 titles of papers on various aspects of Malaysian geoscience. This will be an excellent commemoration of Malaysian geoscience after fifty years of the Society's establishment. More materials are needed for the coffee-table book.

Besides the above activities the GSM-IGM Joint Committee (JC), which is made up of council members from both organisations and co-chaired by the respective Presidents, met twice during the current term to review ongoing and future collaborations. The GSM-IGM Flagship on Geoscience to Action for Disaster Risk Reduction (G2A4DRR) launched on 9 April 2015, has resulted in several technical meetings of relevant practitioners and stakeholders, and is continuing smoothly. To move the project forward, it is understood that a bid for further funding has been put together, led by SEADPRI-UKM, and submitted to the funding body.

The JC is also finding ways for the two organisations to collaborate. At the meeting on 1 April 2016, the JC agreed to set up a Taskforce on Joint GSM-IGM Programmes, chaired by Dato' Yunus Abdul Razak and comprising the Vice-President and one Council Member from both GSM and IGM. The Joint Programme Task Force (JPTC) will develop the terms of reference and propose a plan for a Public Lecture Series for nongeoscientists to enhance their awareness in various aspects, e.g., natural hazards. On another mandate of the JC, the JPTC will identify and approach a suitable candidate as Chairperson of the Subcommittee on Geoscience Curricula in Malaysia. This initiative would be a significant contribution to capacity and capability building in geoscience in Malaysia.

On behalf of the Society, I would like to thank council members and everyone who contributed their time and effort over the past year. My deepest gratitude and appreciation go to the respective organising chairpersons, Working Group leaders and their committee members, as well as partner organisations – University of Malaya, Institute Geologi Malaysia, Universiti Malaysia Kelantan, Jabatan Mineral dan Geosains, PETRONAS, Universiti Teknologi PETRONAS, Universiti Kebangsaan Malaysia, Universiti Malaysia Sabah and all other collaborators – for their support and contributions to GSM.

The Society would also like to record its special appreciation to the University of Malaya for allowing GSM to use its facilities at the Department of Geology as the home of the GSM secretariat. Last but not least, I would like take this opportunity to thank the Council Members and, Anna Lee and Wan Aida Wan Zahari for their work and assistance rendered to the council and the Society during the term 2015/2016.

MAZLAN MADON
President 2015/2016
Geological Society of Malaysia

APPENDIX IIa

SECRETARY'S REPORT 2015/16

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.

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.

A Special Committee was created to commemorate the Society's 50th Anniversary in 2017 in managing the preparation, organisation, publication and matters relating to the event. This committee will be chaired by Vice-President, Mr. Abdul Rasid Jaapar.

Membership

As at 31st December 2015, the total number of members in the Society stands at 613, increased from 553 as of 2014. 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.

COUNTRY	Hon.	Life	Full	Assoc.	Student	Inst.	Total 2015	Total 2014	Total 2013
Malaysia	2 (2)	287 (280)	130 (106)	3 (6)	120 (86)	2 (2)	544	482	532
Australia	-	17 (15)	0 (2)	1(0)	-	-	18	17	22
Canada	-	3 (3)	-	-	-	-	3	3	3
China	-	1 (1)	-	-	1(0)	-	2	1	1
Europe	-	13 (13)	-	-	-	2 (1)	15	14	11
Hong Kong	-	2 (2)	-	-	-	-	2	2	2
Indonesia	-	5 (5)	-	-	-	-	5	5	7
Japan	-	3 (3)	-	-	-	-	3	3	4
Middle East	-	3 (7)	-	-	-	-	3	7	7
Philippines	-	2 (2)	-	-	-	-	2	2	3
Singapore	-	7 (5)	0 (1)	1 (1)	-	1 (1)	7	7	11
Thailand	-	2 (3)	-	-	-	-	2	3	3
USA	-	7 (7)	1	-	-	-	7	7	10
TOTAL 2015	**2**	**352**	**130**	**4**	**121**	**6**	**613**	**-**	**-**
TOTAL 2014	2	346	108	7	86	4	-	553	-

Breakdowns of Membership

Note: 1. X(Y) — X=Number for year 2015, Y=Number for year 2014
2. Country — based on Mailing Address, not Nationality

The Council

The Council for the Geological Society of Malaysia for 2015/2016 session resumed their office after the 49th AGM on the 24th April 2015.

COUNCIL FOR 2015/2016

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 2015/2016:

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 (1 year) :	Dr. Meor Hakif Amir Hassan (UM)
2015/2016	Mr. Robert Wong (PETRONAS)
	Assoc. Prof. Askury Abd Kadir (UTP)
	Mr. Mohd Badzran Mat Taib (JMG)
Councillors (2 years) :	Mr. Tan Boon Kong (Consultant)
2015/2016-2016/2017	Dr. Nur Iskandar Taib (UM)
	Dr. Tanot Unjah (UKM)
	Dr. Jasmi Hafiz Abdul Aziz (UM)

Council Meetings

During the 2015/2016 session, the Council met 9 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

Abdul Rasid Jaapar, Mr	/	0	/	/	0	/	0	/	/	6/9
Ahmad Nizam Hasan, Mr.	/	/	0	/	/	0	/	0	/	6/9
Askury Abd Kadir, Mr.	0	0	0	/	/	0	/	0	/	4/9
Jasmi Hafiz Abdul Aziz	/	/	/	/	/	/	0	0	/	7/9
Joy J. Pereira, Prof	/	/	0	0	0	0	0	/	/	4/9
Lim Choun Sian, Mr	/	/	/	/	/	/	/	/	/	9/9
Mazlan Madon, Dr	/	/	0	/	/	0	/	/	0	6/9
Meor Hakif Amir Hassan, Dr	/	/	0	/	/	/	/	0	/	7/9
Mohd Badzran Mat Taib, Mr	0	0	/	0	0	0	0	/	0	2/9
Ng Tham Fatt, Dr	/	0	/	/	/	/	/	/	/	8/9
Nicholas Jacob, Mr	0	0	0	/	/	/	/	/	/	6/9
Nur Iskandar Taib, Dr	/	/	0	/	/	/	/	/	/	8/9
Robert Wong, Mr.	0	0	0	/	0	0	/	0	/	3/9
Tan Boon Kong, Mr.	/	/	/	0	0	/	/	/	0	6/9
Tanot Unjah, Dr	0	0	0	/	/	0	0	/	/	4/9

Working Groups

The Working Groups and the Chairs for Session 2015/2016 are as follows:

	WORKING GROUP	CHAIRMAN 2015/2016
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/ Dr Zuhar Zahir Tuan Harith
6	Petroleum Geology	Mr. Robert Wong/ En. Othman Ali Mahmud

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 2015/2016 are as follows:

	REGION	REPRESENTATIVE 2015/2016
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 (JMG)
6	Sabah	Dr. Rodeano Roslee (UMS)

Activities

The Society has successfully organised National Geoscience Conference 2015 (NGC 2015), and other activities such as technical talks, field visit and short courses.

The National Geoscience Conference 2015 (NGC 2015) was held on 31 July to 1 August 2015 at the Perdana Hotel, Kota Bahru, Kelantan, co-hosted with the Faculty of Earth Science of UMK, Jabatan Mineral dan Geosains (JMG) Kelantan and Perbadanan Menteri Besar Kelantan (PMBK).

Other Activities

During the session, the Council with the cooperation of Working Groups, Regional Representatives, and in collaboration with UKM, UM, UMS, IGM, LESTARI, Geoheritage Group of Malaysia and JMGs were able to organise a total of 22 sessions inclusive of technical talks, workshops, conferences, a short course and a site visit.

Summary of Activities

No	Date	Activity	Topic	Venue	Collaborator
1	31 July – 1 Aug 2015	Conference	National Geoscience Conference 2015	Kelantan	UMK, JMG Kelantan & PMBK
2	5 Aug 2015	Technical Talk	Managed Aquifer Recharge (MAR): Maximising Groundwater Storage, by Dr. Saim Suratman (NAHRIM)	Univ. Malaya, K.L.	UM Geology Dept.
3	27 Aug 2015	Technical Talk	A review of the Bentong-Raub Suture vis-à-vis new insight of the tectonic evolution of Malay Peninsula, by Dr Aftab Alam Khan (UM) and Dr Mustaffa Kamal Shuib (UM)	Univ. Malaya, K.L.	UM Geology Dept.
4	1 Sept 2015	Technical Talk	Geological Mapping of Slopes and Landslides: A Case Study of Each to Illustrate the Issues Involved, by Mr Ng Chak Ngoon (Subsurface Engineering)	Univ. Malaya, K.L.	UM Geology Dept.
5	2 Sept 2015	Short Course	Industrial Mineral Properties and their Applications to the Industries, by Dr. K.K. Cheang (Trainer)	Univ. Malaya, K.L.	UM Geology Dept. & Dr KK Cheang
6	29 Sept 2015	Technical Talk	Documentary: On the Trail of Primitive Life (the Cambrian Period), by José Antonio Gámez Vintaned (UTP)	Univ. Malaya, K.L.	UM Geology Dept.
7	7 Oct 2015	Technical Talk	A review of the Bentong-Raub Suture vis-à-vis new insight of the tectonic evolution of Malay Peninsula by Dr. Aftab Alam Khan	UKM	UKM Geology Prog
8	14 Sept 2015	Workshop	Paleogene of the Eastern Margin of Sundaland: Understanding the Remaining Hydrocarbon Potential	Univ. Malaya, K.L	UM Geology Dept. & IAGI KL Chapter

9	28 Nov 2015	Technical Talk, Fieldwork & Geologists Night	Geology and mineral resources of the Sintang-Silantek Area, by Dr Richard Mani	Banquet Restaurant, Kuching	JMG Sarawak
10	1-5 Nov 2015	Conference	Regional Geoheritage Conference 2015,	Langkawi Kedah	LESTARI & Geoheritage
11	5 Nov 2015	Technical Talk	The Northwest Sabah overthrust system: In outrops and in regional context, by Prof. Emeritus Dr. Tjia H.D	UM	UM Geology Dept.
12	4 Nov 2015	Technical Talk	The Northwest Sabah overthrust system: In outrops and in regional context, by Prof. Emeritus Dr. Tjia H.D	UKM	UKM Geology Prog
13	18 Nov 2015	Technical Talk	Geophysical Survey for Marine Geohazard Study, by Woo Chaw Hong (Petroseis)	UM	UM Geology Dept.
14	23 Dec 2015	Technical Talk	Implications of Natural Damming (Debris Flow) on Infrastructure Projects in the Indian Himalaya, by Yogendra Deva (IAEG Vice President for Asia)	UM	IAEG Malaysia, IGM & UM Geology Dept.
15	14 Jan 2016	Workshop	IAEG Malaysia Workshop on "Geological Terrain Mapping and the Way Forward"	UM	IAEG Malaysia, IGM & UM Geology Dept.
16	23 March 2016	Technical Talk	Journey to The Most Southern World of Earth: Antarctica, by Dr. Goh Thian Lai	UKM	UKM Geology Prog
17	23 March 2016	Technical Talk	Approaches to Communicating Geoscience Information, by Dr. Jane Poole (Cuesta Consulting Limited, UK)	UM	GSM-IGM Flagship on DRR
18	9 March 2016	Workshop	Workshop on Science for Managing Disaster Risks	PJ Hilton	GSM-IGM Flagship on DRR
19	2 Mac 2016	Technical Talk	Setap and Temburong are Separate Formations, by Prof. Emeritus Dr. Tjia H.D	UKM	UKM Geology Prog
20	9 March 2016	Technical Talk	Strength Mobilisation of Rock Masses in Relation to Deep Seated Landslides, by Dr. Ferdaus Ahmad (JMG)	UM	UM
21	20 April 2016	Technical Talk	Overview on Hydropower Dam Safety Program with Focus on Geology and Geotechnical Investigation, by Ir Dr Jansen Luis (Senior Engineer TNB)	UKM	UKM Geology Prog
22	29 April 2016	Technical Talk	Soil Science and Risks of Climate Related Hazards, by Dr. S. Paramananthan, (Param Agricultural Soil Surveys (M) Sdn. Bhd)	PJ Hiton	GSM-IGM Flagship on DRR
23	13 May 2016	Technical Talk	Briefing on the implications of the Trans Pacific Partnership Agreement (TPPA) and its implications for geoscience, by Mr. Muralitharan A/L Paramasua (NRE)	Rumah Kelab Alumni UM	GSM-IGM Flagship on DRR

Other Major Upcoming Events

- The National Geosience Conference 2016 (NGC 2016) - The next NGC 2016, will be held on 14-15 November, at the MS Garden Hotel Kuantan, Pahang. The organising committee include Universiti Malaysia Pahang and JMG Pahang.
- Co-publish selected papers of 4th International Conference on Integrated Petroleum Engineering and Geosciences

2016 (ICIPEG2016) in GSM Special Bulletin.

- This training proposal is offered to the Geological Society of Malaysia for their consideration in promoting the following classes for Subsurface Consultants & Associates LLC (SCA): Applied Subsurface Geological Mapping – November 21-25, 2016; and Quality Control Techniques for Reviewing Prospects and Acquisitions – November 27-30, 2016.

GSM Contribution or donation to support student geoscience student activities:

- Universiti of Teknologi Petronas's Geoscience Exhibition and Competition 2015 (GenC) event - AAPG-UM Student Chapter representing University of Malaya
- UM Geology Interaction Day 4 Oct 2015
- UM Geoscience Industrial Week 2016
- UKM Fiesta Gala Geology 2016

GSM Awards

GSM has set up numerous awards for members as follows and their status:

- Honorary Membership – No nomination received
- PGCE Student Excellence Award - There was no PGCE in 2015/6.
- "Hutchison Best Student Award", previously the "GSM Best Student Award" - The Council yet to receive complete nomination for this award.
- "N.S.Haile Publication Award", previously the "Young Geoscientist Award" - The Council yet to receive complete nomination for this award.
- "DJ Gobbett Award", previously the "Geoscientist Award", - The Council yet to receive complete nomination for this award.

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
- Newton Ungku Omar Fund and IGM-GSM Flagship since July 2015
- GeoSEA
  - GSM is the present host of the permanent Secretariat
  - During the GEOSEA 2014 in Myanmar, IAGI offered to host the next GEOSEA in Indonesia in October 2016

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

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, UMS, UTP, IGM and Newton-Ungku Omar Fund 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.

LIM CHOUN SIAN
Secretary 2015/2016
Geological Society of Malaysia

APPENDIX IIb

ASSISTANT SECRETARY'S REPORT 2015/2016

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

Sales and stock of publications for 2015

Publications	Sales 2015	Stock remaining by end of 2013	Stock remaining by end of 2014	Stock remaining by end of 2015
Bulletin 1	0	0	0	0
Bulletin 2	6	175	175	169
Bulletin 3	9	154	153	144
Bulletin 4	9	68	67	58
Bulletin 6	8	390	389	381
Bulletin 7	5	246	245	240
Bulletin 13	2	4	2	0
Bulletin 17	0	0	0	0
Bulletin 18	0	0	0	0
Bulletin 19	6	370	367	361
Bulletin 20	9	326	323	314
Bulletin 21	8	124	122	114
Bulletin 22	8	200	198	190
Bulletin 23	8	213	211	203
Bulletin 24	8	372	370	362
Bulletin 25	9	81	79	70
Bulletin 26	9	181	179	170
Bulletin 27	8	55	52	44
Bulletin 28	9	100	98	79
Bulletin 29	7	102	101	94
Bulletin 30	5	110	110	105
Bulletin 31	7	105	103	96
Bulletin 32	8	80	78	70
Bulletin 33	7	237	235	228
Bulletin 34	6	59	58	52
Bulletin 35	0	0	0	0
Bulletin 36	9	96	94	85
Bulletin 37	9	150	146	137
Bulletin 38	9	222	212	203
Bulletin 39	0	0	0	0
Bulletin 40	9	79	76	67
Bulletin 42	9	19	17	8
Bulletin 43	9	131	127	118
Bulletin 44	10	96	47	37
Bulletin 45	16	105	95	79
Bulletin 46	0	19	0	0
Bulletin 47	8	45	40	32
Bulletin 48	11	52	42	31
Bulletin 49	9	309	300	291
Bulletin 50	8	337	332	324
Bulletin 51	14	235	217	203
Bulletin 52	9	231	225	216
Bulletin 53	8	329	322	314
Bulletin 54	9	281	273	264
Bulletin 55	8	301	296	288
Bulletin 56	10	357	348	338
Bulletin 57	13	75	63	50
Bulletin 58	8	23	21	13
Bulletin 59	11	-	113	102
Bulletin 60	548**	-	-	102
Bulletin 61	588**	-	-	62
Abstract (Bull 6)	0	0	0	0
Proceeding AGC 2000	7	19	17	10
Proceeding AGC 2001	11	142	132	121
M'sian Stratigraphic guide	57	223	57	0
Lexicon of stratigraphy	21	38	21	0
Stratigraphic correlation	0	0	0	0
Rocks poster	0	0	0	0
Geology of Borneo (CD)	83	177	107	24
Geology of Borneo (Map)	83	812	778	695
Geol. Evolution of SEA	243*	780	697	454

** Inclusive of free copies as souvenirs to speakers in NGC 2015

** 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.	Suomalaineu Tiedeakatemia	Finland
11.	Freie Universitat Berlin	Germany
12.	National Museum of Natural History	Holland
13.	Geological Society of Japan	Japan
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
45.	Senckenberg Research Institute and Natural History Museum Frankfurt	Germany

NICHOLAS JACOB
Assistant Secretary 2015/2016
Geological Society of Malaysia

APPENDIX III

EDITOR'S REPORT 2015/2016

In 2015, two issues of Warta Geologi (Volume 41, Issue 1 & 2 and Issue 3 & 4) and one volume of the GSM Bulletin (Volume 61) were published.

Since its establishment last year, the GSM online publication website has been viewed by more than 4,500 visitors from 41 countries, with more than 14,000 views and downloads.

In conjunction with GSM's 50th anniversary next year, the council is planning to publish a special publication on the society's history and achievements, and a special issue of Bulletin. Dr. Lee Chai Peng has been appointed as the guest editor for the special publications.

The Society is grateful to authors for their contribution, members of the editorial board and reviewers for their time and effort to improve the quality of the Society's publications. I would like to take this opportunity to thank Anna Lim for her assistance during the editorial process.

NG THAM FATT
Editor 2015/2016
Geological Society of Malaysia

APPENDIX IV

TREASURER'S REPORT 2015/2016

For the Financial Year 2015, the society's posted a surplus of RM 71,915.00 compared to deficit of RM 2,202.00 in year 2014. The net current asset showed an increase of RM 2,586,010.00 compare from RM 2,478,186.00 for year 2014.

Operating revenue for year 2015 posted higher with a total income of RM 140,453.00 compared to year 2014 of RM 115,808.00. Balance of Petroleum Geology Conference & Exhibition (PGCE) from previous PGCE account given a net total collection of RM 62,240.00. The revenue posted for Subscription shows higher from RM 17,761.00 of year 2014 to RM 20,508.00 for year 2015, Sales of "Geology Peninsular Malaysia" book posted RM 310.00, income for National Geoscience Conference (NGC) hosted by University Malaysia Kelantan posted RM 2,882.00, Sales of publications are RM 2,201.00, slightly higher compared to RM 1,656.00 for year 2014 and Entrance fee revenue posted RM 1,000.00. There is slightly higher revenue of interest from fixed deposit of RM 33,488.00 for year 2015 compare to RM 28,462.00 for year 2014.

Total operating expenditure for Financial Year 2015 shows lower from RM 118,010.00 for year 2014 to RM 68,538.00. Honorarium shows slightly lower from RM 39,650.00 of 2014 to RM 37,360.00 for year 2015. Balance sponsoring GEOSEA Myanmar 2014 are RM 808.00 and balance expenses of NGC 2015 are RM 2,680.00.

Nevertheless others posting low expenses are organizing society`s AGM and Annual Dinner 2015 that was held at Geology Department University Malaya are cost natural, Depreciation on property, plant and equipment values, printing of Warta Geologi and Bulletin posted slightly lower. Finally expenses on refreshment and sundry also posted lower of RM 1,664.00 for year 2015 compared to total RM 8,499.00 for year 2014.

For year 2015, Endowment fund with a total amount of RM 1,099,897.00 held as fixed deposit (FD) in UOB Bank with an accrued interest of RM 49,879.48 The Hon.Treasure would like to express a great appreciation to all organizing committee of NGC 2015 led by chairman Dr. Mohammad Muqtada Ali Khan of University Malaysia Kelantan, Chairman of Short Course by Dr Jan de Jager, SEA Paleogene Workshop chairman, Dr Meor Hakif Amir Hassan and Mineral Workshop by Dr Cheang K.K for their support on successfully managing a self-funded conference and seminar. Last but not least to rest of the donors and sponsors on their contributions and supports throughout the year.

AHMAD NIZAM HASAN
Hon. Treasurer 2015/2016
Geological Society of Malaysia

NOTES: 1. The RM 3,000.00 is held for the Economic Geology Workshop Fund and RM 7,806.00 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 fixed deposits with licensed bank have a maturity of between 6 to 15 months (2015 : 3 to 15 months). Interest rates for the deposits ranged from 2.85% to 2.95% per annum lower compare to year 2014 of 3.05% to 5% per annum.

APPENDIX V

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

REPORT AND ACCOUNTS
31 DECEMBER 2015

S.F. LEE & CO.
CHARTERED ACCOUNTANTS

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

REPORT AND ACCOUNTS
31 DECEMBER 2015

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

MEMBERS INFORMATION

President	:	Dr. Mazlan Madon (PETRONAS)
Vice President	:	Mr. Abd Rasid Jaapar (Asian Geos)
Immediate 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)
(2015/2016)	:	Dr. Meor Hakif Amir Hassan (UM)
	:	Mr. Robert Wong (PETRONAS)
	:	Mr. Mohd Badzran Mat Taib
	:	Assoc. Prof. Askury Abd Kadir (UTP)
Councillors (2015/2017)	:	Mr. Tan Boon Kong (Consultant)
	:	Dr. Nur Iskandar Taib (UM)
	:	Dr. Tanot Unjah (UKM)
	:	Dr. Jasmi Hafiz Abdul Aziz (UM)

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

We, Mazlan Madon 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 2015, and of the result and cash flows for the year then ended.

Mazlan Madon
President

Ahmad Nizam Hasan
Treasurer

Kuala Lumpur

Dated : 07 MAR 2016

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 0 7 MAR 2016)

Ahmad Nizam Hasan

Before me,

PESURUHJAYA SUMPAH
No: W465
Nama: KAPT. (B) JASNI BIN YUSOFF
MALAYSIA

Commissioner for Oaths

Bangunan KWSP, Jln Raja Laut,
50350 Kuala Lumpur.
Tel: 019-6680745

S.F. LEE & CO (AF : 0670)

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 2015 and of its statement of income and expenditure and cash flows for the financial year ended 31 December 2015 in accordance with the MASB approved accounting standards in Malaysia.

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

LEE SIEW FATT
(1179/9/16J)
Chartered Accountant

Kuala Lumpur

Date : 07 MAR 2016

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

STATEMENT OF ASSETS AND LIABILITIES AS AT 31 DECEMBER 2015

	Note	2015 RM	2014 RM
FUND ACCOUNTS			
GENERAL FUND	3	1,453,600	1,381,685
ENDOWMENT FUND	4	1,099,897	1,084,157
ECONOMIC GEOLOGY WORKSHOP FUND		3,000	3,000
STUDENT LOAN FUND		955	656
YOUNG GEOSCIENTIST AWARD FUND		3,143	3,143
AAPG-UM STUDENT CHAPTER FUND		7,806	5,545
GEOSCIENCE GRANTS	5	17,609	-
		2,586,010	2,478,186
Represented by:			
NON-CURRENT ASSETS			
PROPERTY, PLANT AND EQUIPMENT	6	16,685	18,664
CURRENT ASSETS			
Inventories	7	-	8,178
Deposits		600	600
Fixed deposits with licensed bank	8	2,142,535	2,142,535
Cash and bank balances		543,728	522,000
		2,686,863	2,673,313
CURRENT LIABILITIES			
Other payables		117,538	213,791
NET CURRENT ASSETS		2,569,325	2,459,522
		2,586,010	2,478,186

The accompanying notes are an integral part of the financial statements

PERSATUAN GEOLOGI MALAYSIA
(Registered in Malaysia)

STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31 DECEMBER 2015

INCOME	**2015 RM**	**2014 RM**
SEA paleogene workshop	8,605	-
Speakers account	4,106	-
Entrance fee	1,000	1,120
Fixed deposits interest income	33,488	28,462
Subscription	20,508	17,761
Sales of publications	2,201	1,656
Petroleum Geology Conference	62,240	33,000
Short course : Jan de Jager	4,331	6,535
Geology of Peninsular Malaysia	310	12,135
National Geoscience Conference	2,882	14,479
Working Groups	-	660
Geological Evolution of Southeast Asia	248	-
Sales of compass	182	-
Minerals workshop	352	-
	140,453	115,808
EXPENDITURE		
Annual dinner	66	3,008
Audit fee	1,200	1,200
Bank charges	99	99
Depreciation on property, plant and equipment	1,979	2,230
Map/CD	1,080	-
Geosea	808	17,570
Honorarium	37,360	39,650
Income tax	981	848
National Geoscience Conference	2,680	8,506
Petroleum Geology Conference and Exhibition (PGCE)	-	954
Photocopy expenses	376	459
Postages	4,487	3,562
Printing and Stationery		
- Warta Geologi	3,180	11,675
- Bulletin	11,321	12,750
Refreshment	171	778
Speakers' account	-	5,337
Subscription to COSTAM	100	100
Miscellaneous expenses	1,493	7,721
Telefax	663	619
Telephone	494	944
	68,538	118,010
Nett surplus / (deficit) for the year	71,915	(2,202)

PERSATUAN GEOLOGI MALAYSIA
(Registered in Malaysia)

CASH FLOW STATEMENT FOR THE YEAR ENDED 31 DECEMBER 2015

	2015 RM	2014 RM
Cash flows from operating activities		
Surplus / (Deficit) of income over expenditure for the year	71,915	(2,202)
Adjustments for:-		
Depreciation on property, plant & equipment	1,979	2,230
Interest income	(33,488)	(28,462)
Surplus / (Deficit) before working capital changes	40,406	(28,434)
Increase in student loan fund	299	-
Increase in Geoscience fund	17,609	-
Increase in Endowment Fund	15,740	73,699
Decrease in National Geology Fund	-	(15,181)
Decrease in inventories	8,178	15,277
Increase / (Decrease) in AAPG-UM Student Chapter Fund	2,261	(63)
(Decrease) / Increase in other payable	(96,253)	176,361
Cash (used in) / generated from operations	(11,760)	221,659
Interest income	33,488	28,462
Net cash generated from operating activities	21,728	250,121
Net increase in cash and cash equivalents	21,728	250,121
Cash and cash equivalents at beginning of the year	2,664,535	2,414,414
Cash and cash equivalents at end of the year	2,686,263	2,664,535
Cash and cash equivalents comprised of:		
Deposits held with licensed banks	2,142,535	2,142,535
Cash and bank balances	543,728	522,000
	2,686,263	2,664,535

PERSATUAN GEOLOGI MALAYSIA
(Registered in Malaysia)

NOTES TO THE FINANCIAL STATEMENTS - 31 DECEMBER 2015

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**	**2015 RM**	**2014 RM**
At 1 January	1,381,685	1,383,887
Net surplus / (deficit) for the year	71,915	(2,202)
At 31 December	1,453,600	1,381,685

4. **ENDOWMENT FUND**	**2015 RM**	**2014 RM**
As at 1 January	1,084,157	1,010,458
Add : Donation	-	50,000
Fixed deposit interest income	15,740	23,699
As at 31 December	1,099,897	1,084,157

5. **GEOSCIENCE GRANTS**	2015 RM	2014 RM
As at 1 January	-	-
Add : Grants	50,000	-
	50,000	-
Less : Annual Dinner	840	-
National Geoscience Confenance	3,000	-
Printing and Stationery	6,511	-
Refreshment	2,030	-
Secretarial services	3,000	-
Telephone charges	441	-
Travelling	16,569	-
As at 31 December	17,609	-

PERSATUAN GEOLOGI MALAYSIA
(Registered in Malaysia)

6. PROPERTY, PLANT AND EQUIPMENT

	Cost			
	Balance at 1/1/2015	Additions	Disposal	Balance at 31/12/2015
	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 1/1/2015	Charge for the year	Disposal	Balance at 31/12/2015
	RM	RM	RM	RM
Office equipment	114,638	1,754	-	116,392
Information technology equipment	3,951	225	-	4,176
	118,589	1,979	-	120,568

Net Carrying Amount	**2015**	**2014**
	RM	**RM**
Office equipment	15,783	17,537
Information technology equipment	902	1,127
	16,685	18,664

7. INVENTORIES

	2015	**2014**
	RM	**RM**
Maps	-	1,613
Compass	-	4,818
Magazines	-	1,747
	-	8,178

8. FIXED DEPOSITS WITH LICENSED BANK

The fixed deposits with licensed bank have a maturity of between 6 to 15 months (2014 : 3 to 15 months). Interest rates for the deposits ranged from 2.85% to 2.95% (2014 : 3.05% to 5%) per annum.

APPENDIX VI

GSM ENDOWMENT FUND: BOARD OF TRUSTEES REPORT
50TH ANNUAL GENERAL MEETING OF THE GEOLOGICAL SOCIETY OF MALAYSIA

Background

1. The 47th AGM in 2013 reconfirmed the establishment of the GSM Endowment Fund endorsed the Terms of Reference prepared by Advocates and Solicitors, Messrs Yeap, Yong and Amy. The AGM also agreed that the Council obtain "tax deductible" status to encourage donations directly into the "GSM Endowment Fund"; (iii) and that the interest portion accrued, be used to meet expenses incurred in the implementation of programmes run by the Society.

2. The 48th AGM in 2014 approved an amendment to the Terms of Reference 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.

3. The 49th AGM accepted the following recommendations of the Board of Trustees:-
    i. The In-Coming GSM Council be requested to appoint a tax consultant to obtain "tax deductible" status of GSM to inform potential donors on the tax deductible status of their donation;
    ii. The In-Coming GSM Council prepare an annual budget proposal for the Endowment Fund, covering programmes specified in the 48th GSM AGM (see Appendix 2) to be tabled for endorsement by the Board of Trustees;
    iii. The In-Coming GSM Council be encouraged to increase the principal amount in the GSM Endowment Fund through fund raising activities; and
    iv. The In-Coming GSM Council to consider transferring a portion of the fixed deposit of the GSM operating account to the Endowment Fund to increase the principal amount.

Report of the Board of Trustees

1. This report covers the period since the 49th AGM to 19 April 2016, when the Board of Trustees met to scrutinise the administration of the GSM Endowment Fund. The meeting was chaired by Dato' Yunus Abd Razak. Members in attendance were GSM President, Dr. Mazlan Madon; Immediate Past President, Prof. Joy Jacqueline Pereira; Secretary, Mr. Lim Choun Sian; Treasurer, Mr. Ahmad Nizam Hasan; Editor, Assoc. Prof. Dr. Ng Tham Fatt; and GSM Members Dato' H.K. Sia, Datuk Fateh Chand and Mr. Ahmad Said.

2. Since 2014 the principal amount of RM 1,050,000.00 has been deposited with United Overseas Bank Malaysia (UOBM). A special operating account was also maintained with UOBM to receive interest accrued from the principal.

3. The total interest accrued from inception as of 31 December 2015 is RM 91,897.47.

4. In 2015, an interest amount of RM 41,999.99 was added to the principal amount bringing the total principal amount to RM 1,091,999.99. The balance in the interest account as of 31 December 2015 is RM 49,897.48.

5. The interest portion accrued has not been utilised to-date. The interest is kept in a GSM current account at UOBM (which is separate from the operational account of GSM at the Standard Chartered Bank Bhd).

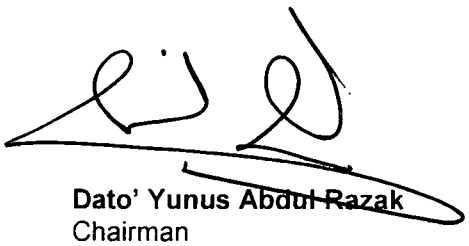
6. Since the 49th AGM
   i. The In-Coming GSM Council has identified a tax consultant to obtain "tax deductible" status of GSM to inform potential donors on the tax deductible status of their donation;
   ii. The annual budget proposal for utilising the accrued interest portion of the Endowment Fund has been tabled and endorsed by the Board of Trustees;
   iii. The GSM Council has increased the principal amount in the GSM Endowment Fund by utilising RM 41,999.99 from the interest accrued.

Recommendations to the 50th AGM of the GSM

The Board of Trustees of the GSM Endowment Fund makes the following recommendation to be considered by the 50th AGM of the GSM to be held on 29 April 2016:-

   i. The GSM Council should "think out of the box" to focus on increasing the Endowment Fund in any way possible;
   ii. The GSM Council explore the possibility of transferring some funds from the GSM Fixed Deposit into the GSM Endowment Fund to get a higher interest;
   iii. The AGM accept and endorse the Standard Operating Procedure for the GSM Endowment Fund (Appendix 1).

On behalf of the Board of Trustees, I declare that I am satisfied that the GSM Endowment Fund is being administered in a satisfactory manner and that the terms of reference are adhered to. I hereby approve the report prepared for the 50th AGM of the GSM.



Dato' Yunus Abdul Razak
Chairman
Board of Trustees of the GSM Endowment Fund
Geological Society of Malaysia
19 April 2016

GEOLOGICAL SOCIETY OF MALAYSIA

APPENDIX 1

STANDARD OPERATING PROCEDURE – GSM ENDOWMENT FUND

INTRODUCTION

1. The Geological Society of Malaysia's Annual General Meeting in 2012 approved the proposal of the GSM Council to create the "PGCE Endowment Fund" that 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"; (iii) and that the interest portion accrued, be used to meet expenses incurred in the implementation of programmes run by the Society.

3. The AGM in 2014 accepted and endorsed an addition to the Terms of Reference prepared by Advocates and Solicitors, Messrs Yeap, Yong and Amy. The addition is on the establishment of "Trustees of the GSM Endowment Fund", which comprises the President, Immediate Past President, Secretary, Treasurer, Editor and three independent Full Members in good standing, to be appointed at the AGM. 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 Endowment Fund, ensure the terms of reference are adhered to and approve the report prepared for the AGM thereafter.

4. The AGM in 2014 approved the following persons to serve as Trustees of the GSM Endowment Fund for a period of three years (2014-2017):- Dato' Yunus Abd Razak (Chairman); GSM President, Immediate Past President, Secretary, Treasurer and Editor (GSM Council Members); Dato' H.K. Sia, Datuk Fateh Chand and Mr. Ahmad Said (GSM Members).

5. The AGM in 2014 also agreed that the interest portion accrued could be used 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

The Terms of Reference for the GSM Endowment Fund is extracted from the Minutes of the 47th Annual General Meeting (AGM) held on 5 April 2013, Eastin Hotel, Petaling Jaya (Item 6.1: GSM Endowment Fund and Appendix 5).

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 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 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 Endowment Fund, ensure the terms of reference are adhered to and approve the 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.

RESPONSIBILITIES

1. The GSM Council shall maintain at an appropriate bank the sum of RM600,000.00 as the initial principal amount of the GSM Endowment Fund, which shall remain the minimum amount to be kept in the account at all material times.

2. The GSM Council shall maintain the initial principal amount in perpetuity and 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.

3. The GSM Council shall ensure that the annual audited accounts and the findings for the GSM Endowment Fund are reported by the Treasurer of the Society at each AGM.

4. The GSM Council shall ensure that the status of the GSM Endowment Fund is a standing agenda item at the AGM of the Society.

5. The Board of Trustees of the GSM Endowment Fund will meet at least once a year to scrutinise the administration of the GSM Endowment Fund, ensure the terms of reference are adhered to and sign the report prepared for the AGM thereafter. The Chairman of the Board will present the report for approval of the AGM.

6. The Board of Trustees of the GSM Endowment Fund have the discretion to increase the initial principal amount, subject to approval of a majority of members present at an Annual General Meeting of the Society.

7. The GSM Council will appoint the GSM Endowment Fund Chairman for a period of three years, subject to approval of a majority of members present at the AGM. The next appointments are before the AGM of 2017, 2020, 2023, 2026, 2029, 2032 etc. The AGM will appoint three independent Full Members in good standing in 2017, 2020, 2023, 2026, 2029, 2032 etc.

APPENDIX VII

To Council of the Geological Society of Malaysia
An item for discussion and action under OTHER MATTERS at the 50th AGM
Submitted by H.D. Tjia, GSM member since 1968.

Preamble
With reference to the gist of mission statement of the Geological Society of Malaysia that aims to promote advancement of geological knowledge, I have come across factual errors and outdated 'expressions' in publications under expressed control by various generations of GSM Councils, in particular the respective bulletin/Warta Geologi/volume editors/ editors-in-chief.
This 'misinformation' will continue to mislead unsuspecting junior members –and for reasons known to themselves- also some senior practitioners to state and write their version of understanding.
Some examples:

a. In relatively recent printed/digital forms of GSM, the deletions/omissions of true (outcropping) basement rock from Sabah, although the survey's geological maps and publications featured them prominently. FACTUAL ERROR.
b. The uncritical use of 'geosynclines' and 'geanticlines', e.g. in the GSM Stratigraphic Lexicon. THESE EXPRESSIONS BELONG TO THE OUTDATED GEOSYNCLINAL THEORY AND ARE NOT APPLICABLE IN PLATE-TECTONIC CONCEPT.
c. Wrong identification of "stylolites" in the Setul Formation of Langkawi in the new edition of the Geology of Peninsular Malaysia and that first appeared in its intitial 1973 publication. FACTUAL ERROR.
d. Preventing/non-cooperation in dissemination of information on new publication(s) that can be considered to possess general appeal to the geological community. Case in point: book on record of sea level changes in Peninsular Malaysia published NOT by GSM or a staff member of the university where GSM is housed. NOT IN LINE WITH GSM's MISSION.

Question and Action:
WHAT CORRECTIVE ACTION(S) HAVE BEEN CONSIDERED AND EXECUTED BY GSM COUNCIL TO PREVENT PERPETUATION OF SUCH ERRORS AND INCONSISTENCIES?

APPENDIX VIII

ANNOUNCEMENT OF NEW COUNCIL FOR 2016/2017

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 2016/2017:

President	:	Dr. Mazlan Madon (PETRONAS)
Vice-President	:	Mr. Abd Rasid Jaapar (GeoMapping Technology Sdn. Bhd.)
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	:	Prof. Dr. Wan Hasiah Abdullah (UM)
Councillors (1 year) 2016/2017	:	Mr. Tan Boon Kong (Consultant) Dr. Nur Iskandar Taib (UM) Dr. Tanot Unjah (UKM) Dr. Jasmi Hafiz Abdul Aziz (UM)
Councillors (2 years) 2016/2018	:	Dr. Meor Hakif Amir Hassan (UM) Ms. Marelyn Telun Daniel (UM) Mr. Muhammad Ashahadi Dzulkafli (UKM) Dr. Norbert Simon (UKM)

CERAMAH TEKNIK TECHNICAL TALK

Setap and Temburong are separate formations

Tjia H.D. (Universiti Kebangsaan Malaysia)

Date: 2 March 2016

Venue: Bilik Mesyuarat Program Geologi, Bangunan Geologi, FST, Universiti Kebangsaan Malaysia

Abstract: Until today confusion is still perpetuated about the status of the Temburong and Setap formations. Colleagues who are exclusively familiar with northern Sarawak or only with Brunei-southwestern Sabah stratigraphy tend to lump the Setap Formation (mainly of lower Miocene age and deposited as shallow-marine mudstone-dominant sediments) together with deep-marine Temburong Formation (of upper Oligocene) under one Setap Formation label. Those advocating "only Setap" existence have dismissed the older paleontological evidence in their "Setap" as reworked fossils. Liechti et al. (1960) made no mention of a Temburong Formation, which came into existence a few years later by Brondijk (1962) resulting from work in the upper Temburong River area. Sandal (1966) described both Setap and Temburong stratigraphic units, but the latter is absent on the accompanying geological map. As map units, the Setap is recognized by its yellow-brown hues and the Temburong as mainly dark grey shale-dominant sequences. Recent field observation in both mentioned areas and seismic evidence from the Baram Delta elucidate the probable cause of confusion and firmly establish the Setap and Temburong as separate formations.

Strength mobilisation of rock masses in relation to deep seated landslides

Ferdaus Ahmad (Minerals and Geoscience Department Malaysia)

Date: 9 March 2016

Venue: Department of Geology, University of Malaya

Dr. Ferdaus Ahmad is the Chief Deputy Director, Geoscience Planning Division of the Minerals and Geoscience Department Malaysia. Dr. Ferdaus delivered his talk to a small group of geologists at the Geology Lecture Hall of University of Malaya. The interesting and informative talk is part of his PhD research.

Abstract: Almost any form of analysis used in the design of slopes, foundations and underground excavations in rock requires reliable estimation of the strength and deformation characteristics of rock masses. The Hoek-Brown Failure Criterion, which was developed in the late 1970s, suggests that rock mass strength is dependent primarily on lithological type, fracture spacing and intact rock strength relative to the in-situ stress level.

This criterion is applicable to fractured rock masses where the potential for simple kinematical failure along individual discontinuities is not possible. In other words, it should not be applied to the analysis of structurally controlled failures. A fundamental assumption of the Hoek-Brown criterion is that the rock mass to which it is applied is homogeneous and isotropic. Thus, the simple hypothesis to be tested is: *Does the Hoek-Brown (HB) Failure Criterion adequately characterise the strength of slopes in rock masses?*

The rock mass strength of material from failures in rock slopes was examined. Standard rock mass classification, GSI, was employed during fieldwork and intact samples were tested for strength. Back analysis was employed using limit equilibrium and finite element methods to conduct slope stability analyses and determine the likely rock mass strength and the HB characteristics. The research revealed that the HB criterion overestimated the cohesion but is accurate in estimating the friction angle. It was also noted that the GSI value obtained from back analysis is not representative of the rocks' properties in the field. The GSI criterion needs adjustment in order to increase its applicability and to characterise materials with discontinuities that control the strength.

The results of this research will assist engineers and engineering geologists to have a better understanding in selecting reliable estimates of the strength and deformation characteristics of rock masses in the analysis of the design of slopes.

CERAMAH TEKNIK TECHNICAL TALK

Journey to The Most Southern World of Earth: Antarctica

Goh Thian Lai (Universiti Kebangsaan Malaysia)

Date: 23 March 2016

Venue: Bilik Mesyuarat Program Geologi, Bangunan Geologi, FST, Universiti Kebangsaan Malaysia

Abstract: Eight scientists from six local universities successfully conducted their research in the land of Antarctica in a 22-day scientific expedition to study the link between Climate Change and the South Pole. Five of them were biologists, one geologist, one atmospheric expert and one geomagnetic engineer. Two of them were from UniversitiKebangsaan Malaysia (UKM). The expedition team made their first attempt by research yacht to sail across Drake Passage on 18th January 2016. However, they failed to set sail due to bad weather. The second attempt was successful after a 36 hours wait in Port William, Chile.In this expedition, the scientists collected algae, water, small invertebrates in the sea, soils, rocks, pollen and sediments samples. Some of the samples collected were processed on the yacht and at research station in Antarctica and some were brought to the lab in Malaysia for further analysis. The samples and reading were used for scientific studies especially those related to biodiversity, climate changes, greenhouse gas and ozone layer. The researchers were from Universiti Teknologi Mara, Universiti Malaysia Terengganu, Universiti Kebangsaan Malaysia (UKM), Universiti Malaya, Universiti Sains Malaysia and International Medical University. The Malaysian scientists explored eight locations on the Antarctic continent; King George Island, Greenwich Island, Deception Island, Hut, Trinity Island, Enterprise Island of Danco Coast, Paradise Bay, Booth Island, and Darboux Island. The researchers also visited King Sejong Research Station (Korea), Great Wall Research Station (China), Eduardo Frei Research Station (Chile) and Vernasky (Ukraine).

Overview on Hydropower Dam Safety Program with Focus on Geology and Geotechnical Investigation

Jansen Luis (Energy Venture Division, Tenaga Nasional Berhad)

Date: 20 April 2016

Venue: Bilik Mesyuarat Program Geologi, Bangunan Geologi, FST, Universiti Kebangsaan Malaysia

Abstract: Typically the construction of the new dams includes various phase of the project throughout the lifespan of the structures. This includes planning, design, construction and commissioning, operation and maintenance, surveillance and decommissioning. The Malaysian Inter-Departmental Committee on Dam Safety (1989) provides a guideline for the Operation, Maintenance and Surveillance of Dams in Malaysia. Meanwhile, the International Commission on Large Dams (ICOLD) first establish a committee on dam safety guidelines on 1982 and the first publication on "Dam Safety Guidelines" was made in 1987 and the US Bureau of Reclamation Safety of Dams Program which follows the Federal Guidelines for Dam Safety also provides a guidelines with regard to planning, design, construction, operation, maintenance, and examination of dams.

Upon the commissioning of a dam, there is a need to continuously inspect, maintain and check to ensure that any occurrence and development of safety deficiencies and problems are quickly detected, identified, analysed and the required remedial actions are determined and consequently carried out in due time.

An adequate assessment and investigation of the site specific geological and geotechnical conditions is one of the most important aspects of safety evaluation for a hydropower development project which includes the dams, surrounding areas of site, and appurtenant structures.

This presentation is aimed to discuss on the overall dam safety program with focus on geological and geotechnical investigation, safety review and monitoring aspects with regards to geology and special investigation and studies carried out for dams and appurtenant structures such as tunnel, intakes and outlets. Several case studies are discussed with regards to repair and rehabilitation works to ensure the safety, integrity and continued functionality of the structures as well as to provide new ideas and research suggestion for future investigation.

BRITISH COUNCIL MiGHT Malaysian Industry-Government Group for High Technology Newton-Ungku Omar Fund SCIENCE to ACTION

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Workshop on Science for Managing Disaster Risk

9 March 2016, PJ Hilton, Petaling Jaya

The Workshop on Science for Managing Disaster Risk on 9 March 2016, at PJ Hilton, Petaling Jaya. The workshop was convened under the aegis of the National Disaster Management Agency (NADMA) and led by Universiti Kebangsaan Malaysia's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM) and MCSC-University of Cambridge, in conjunction with partners such as Malaysia Industry-Government Group for High Technology (MIGHT), Malaysian Association of Risk and Insurance Management (MARIM), University of Malaya's Department of Geology, the Geological Society of Malaysia and the Institute of Geology Malaysia, among others. The objective was to understand the scientific needs and priorities of financial entities for managing disaster risks and identify barriers that limit the penetration of disaster risk insurance in Malaysia. About 40 scientists, government officials and representatives of financial entities participated in the workshop.

The Workshop commenced with an officially opening by the Director General of NADMA. This was followed by a keynote address from the Science Advisor to the Honourable Prime Minister, YBhg. Professor Tan Sri Zakri Abdul Hamid. The panel session devoted to viewpoints on Science and Market Needs for Disaster Risk Reduction involved presentations by Professor Lord Julian Hunt from University of Cambridge, Professor Johnny Chan from City University of Hong Kong, Dr. Arpah Abu Bakar from Universiti Utara Malaysia as well as a representative from MARIM. The discussion focused on challenges in harnessing science for disaster risk insurance. Participants from the private sector highlighted current practices in the insurance sector and made recommendations to promote science for risk insurance for current and future climate. The workshop findings will be published shortly for wider dissemination to encourage further development of science based products and services.

Universiti Kebangsaan Malaysia – The National University of Malaysia

National Disaster Management Agency, Prime Minister's Department

Majlis Profesor Negara

University of Cambridge – The Cambridge Malaysian Education and Development Trust (CMEDT) in association with the Malaysian Commonwealth Studies Centre, Cambridge (MCSC)

seadpri – southeast asia disaster prevention research initiative

University of Malaya – Kuala Lumpur

University College London

IUGS-GEM – International Union of Geological Sciences, Commission on Geoscience for Environmental Management

Geological Society of Malaysia

Asian Network on Climate Science and Technology (ANCST)

MARIM – Persatuan Pengurusan Risiko dan Insurans Malaysia, Malaysian Association of Risk and Insurance Management

Unit Kajian Pengurusan Risiko, Risk Management Research Unit, School of Economics, Finance & Banking, Universiti Utara Malaysia

Approaches to Communicating Geoscience Information

Jane Poole (Cuesta Consulting Limited, UK)

Date: 23 March 2016
Venue: Geology Department, University of Malaya

The talk is organised under the aegis of the GSM-IGM Flagship on Disaster Risk Reduction (G2A4DRR), which is funded by the Newton-Ungku Omar Fund.

Dr. Jane Poole is a Chartered Geologist with 20 years of consultancy experience in providing specialist geological and geomorphological expertise in relation to a range of development and restoration schemes for the mineral industry, local planning authorities, major developers and others within the UK, and has acted as an expert witness. Jane has also directed many research projects for government departments requiring the delivery of evidence-based, policy-orientated reports and dissemination events. Through her work, Jane has developed a passion for exacting real understanding of the decision-maker's requirements and presenting geological information in a way that can be widely understood and sensibly used. Drawing on her experience, her talk will explore approaches to communicating geoscience information in disaster risk reduction.

Joy J. Pereira

Soil Science and Risks of Climate Related Hazards

S. Paramananthan (Param Agricultural Soil Surveys (M) Sdn. Bhd.)
Date: 29 April 2016
Venue Hotel Hilton, Petaling Jaya, Selangor

Introduction

Dr. S. Paramananthan, Fellow of the Academy of Sciences Malaysia delivered the above-mentioned talk on 29 April 2016, Hilton Petaling Jaya. It was held in conjunction with the Annual General Meeting of the Geological Society of Malaysia under the auspices of the GSM-IGM Flagship on Geoscience to Action for Disaster Risk Reduction (G2A4DRR). The Flagship aims to repackage or develop and market geoscience technology, tools and services for targeted end-users within government, industry and the community. With support from UKM's Southeast Asia Disaster Prevention Research Institute (SEADPRI-UKM), University Malaya's Geology Department and the Newton Ungku Omar Fund, the G2A4DRR serves as the platform to mobilise coordinated measures underpinned by science to address the risks of climate related hazards. Capacity building and professional development will focus on Malaysia initially and Southeast Asia in the long term.

Dr. S. Paramananthan is a Fellow of the Academy of Sciences and is recognised by the World Bank, Asian Development Bank and other international agencies as an expert in tropical soil and peat management. He has led international teams in Malaysia, Indonesia, Papua New Guinea, Thailand, Cambodia, Madagascar, Nigeria, Gabon, Cameroon and Timur Leste to conduct soil survey, feasibility surveys, land evaluation and soil classification. He has also served in the International Committees on Classification of Low Activity Clays (ICOMLAC) and Oxisols (ICOMOX). In this context he has produced two educational posters and three maps showing distribution of specific soil types in Malaysia that have contributed to the global knowledge on tropical soils.

Dr. Paramananthan has also contributed to the discourse on climate change particularly with regard to the GHG emissions from peatland forests. He is an advocate of innovative multidisciplinary approaches using existing knowledge on tropical soils in conjunction with subsurface geology to find new solutions from old science to address floods

and peat fires in tropical terrain. The talk will elaborate on this aspect and its potential for disaster risk reduction in Malaysia and the region.

Highlights

The talk commenced with a brief overview of climate change and its impacts on land, water and the atmosphere. The link between geology, souls and food security was emphasized. There are major differences in temperate and tropical weathering processes that influence the type of soil in such regions leading to different responses to human activities. The focus was on tropical terrain, which has high rainfall that results in flooding, soil erosion, river pollution, higher leaching losses and soil infertility as well as landslides, among others.

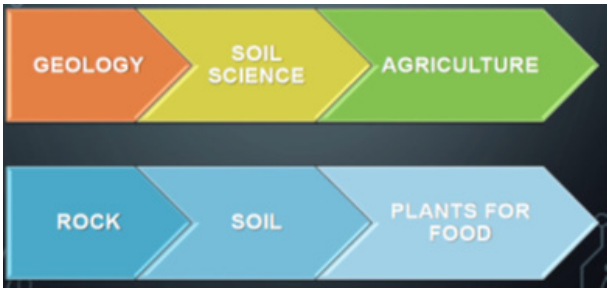
Flooding is a major issue in the country. Factors that determine flooding include the size of catchment areas, amount of rainfall, type of land cover that controls the runoff, erosion and absorption as well as soil type and depth that influence the infiltration rate and water holding capacity. Current practices for flood mitigation, which is based on prediction of rainfall intensity based on historical data, capacity of catchment area to retain water, and capability of river and drainage channels to remove excess water have had limited success. Flood mitigation measures are not static and require constant monitoring of land use change in the catchment area and auditing of existing drains to assess their coping capacity. New approaches are required involving multi-disciplinary inputs. The expertise involved should include among others, climatologists to predict rainfall patterns in a changing climate, hydrologists to review water movement, drainage engineers to designs drains that effectively remove excess water, geomorphological input to identify alluvial floodplains and soil scientists to provide infiltration and water holding capacities.

Oil palm and deforestation is another issue of concern because oil palm is perceived as the key driver of rainforest destruction. However, global data on forest loss does not support this. Deforestation for oil palm plantation was reported to be about 10.7 million hectares from 1990-2002; about seven times lower than deforestation of tropical forests for soya plantation that was about 77.1 million hectares during the same period. Oil palm produces higher oil yields per hectare compared to other oil crops and it also has an energy balance that is more efficient than other oil crops (GHG saving). Although oil palm plantations are not the major contributor to deforestation, there are improvements that can be made to enhance the management of peat soils that sustain much of the plantations in the region.

Tropical peat soils have varying characteristics with depth as well as the presence of both decomposed and undecomposed wood. The drive for economic and social development compounded with the poor understanding of tropical peat soils has resulted in indiscriminate draining and clearing, contributing to widespread seasonal fires, air pollution (haze), greenhouse gas emission and land degradation. Systematic and meticulous mapping can delineate peat areas with undecomposed wood that are unsuitable and not economical for planting oil palm so that they are not developed. Such mapping enables targeted solutions for management and conservation of water and soil, which facilitate the re-establishment of biodiversity. It is also useful for identifying cost effective solutions for preventing widespread fires during land clearing.

Concluding Remarks

There was an enthusiastic discussion after the presentation. It was unanimously agreed that geoscience and soil science have much to contribute to the multi-disciplinary solutions that are required in light of the changing climate. The need for basic field studies to bridge current knowledge gaps as well as for more expertise to be developed in this area was emphasized. Academic institutions were urged to look into this matter seriously, to support the country in addressing the challenges of climate change.



The link between geology, soil science and agriculture.

Joy J. Pereira

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9. Erfa Izhana Othman
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Herman Darman
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Jagakarsa, Jakarta Selatan, Indonesia 12620

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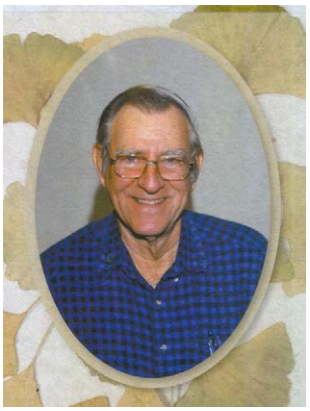

Peter H. Stauffer

1 May 1935 – 10 March 2016

Peter Herman Stauffer was born of Swiss parents in Venezuela in 1935 and grew up in Trinidad until the age of about 6. In 1941, his family moved to Palo Alto, California, where he graduated from Palo Alto High School in 1953. Peter studied geology at Stanford University and earned both Bachelor's and Master's degrees by June of 1959. Shortly thereafter, Peter served in U.S. Army Corps of Engineers from 1958 to 1960. Then he returned to Stanford to pursue his doctorate degree. He completed his Ph.D. dissertation, entitled "Sedimentation of lower Tertiary marine deposits, Santa Ynez Mountains, California," in 1965. Subsequently, he taught sedimentology in the geology department at the University of Malaya in Kuala Lumpur, Malaysia, from August 1965 until May 1983. Tektites were a particular interest and specialty of his.

He was a founding member of the Geological Society of Malaysia and its President form 1972 to 1973. He was elected as the first Editor of the Geological Society of Malaysia. He was instrumental in the publication of the Society's first Bulletin and Newsletter.

Peter thoroughly enjoyed the culture and people of Malaysia. During his teaching career, he met and married his spouse Madeline Entaban, who is an Iban (indigenous person) of Sarawak. Madeline was the first Iban to obtain a college degree. Peter and Madeline raised two daughters, Mari and Heidi.

In 1983, Peter and his family returned to Palo Alto to be near his aging father, and in that same year he began his long and distinguished career with the U.S. Geological Survey. He began work in the publications group as a geologic text editor, a position to which he brought extraordinary talent and quiet humility. During the early 1990s, he served in administration as the Deputy Western Regional Geologist under Bill Normark. Peter initiated and coordinated the first Volunteer Appreciation Day, a celebration for USGS science volunteers and emeriti, and worked extensively on many public outreach projects.

After a partial reorganization of the USGS in 1995, Peter returned to the publications group. His love for technical editing was apparent to all the authors with whom he worked—his subtle but skillful comments on manuscripts and figures made them glow—as well as to his fellow editors, for whom he was a guiding light and resource as a scholar and wise mentor. His contributions were so substantial that he was listed as a coauthor on several large volumes of research papers and other smaller works.

In early 2015, after being diagnosed with aggressive brain cancer, Peter left the publications group to undergo intensive but unsuccessful medical treatment for more than a year. On March 10, 2016, he died peacefully at home, surrounded by his loving family. Peter is survived by his wife Madeline, his daughters Mari and Heidi, and his two brothers Henry and Karl.

TRIBUTES TO P. H. STAUFFER

Prof N.S Haile was leading the University of Malaya team to Tokyo for the Pacific Science Conference, there he met Peter Stauffer's Professor from Berkley. Following that meeting, Prof Haile went to Berkley, met Peter, and was recruited to the Geology Department in UM.

He lived opposite us in KL. We went to a lot of geological outings together. He met Magdalene his wife at MU. She was a student at UM and is from Sarawak. They were married in Kuching, Sarawak. They have two daughters. Heidi the eldest is a geologist, Marie does a lot of art related work. We stayed with them in their home at Palo Alto. Peter family is from Switzerland. His father, his brother, himself and his daughter are all geologists!

We will all miss this gentle, quiet spoken friend and truly geology runs in his family. My family will miss him too.

All good wishes to all,

Maureen Haile

I remember working with Peter during the 1960's when we were both in the Geology Department of the university. He was studying the Kenny Hill Formation around Kuala Lumpur and I accompanied him to exposures in road cuttings. We collaborated in a bibliography of Malaysian geology and he contributed the Cenozoic chapter to the Geology of the Malay Peninsula edited by Charles Hutchison and myself.

He was a very friendly and kind man and it was a pleasure working with him. After I had left Malaya Peter and his wife Madeline visited us in England before he settled in Palo Alto where my son visited him in 1984.

Derek J. Gobbett

I first met Professor Dr Peter Stauffer in 1972 when I was a student pursuing my higher secondary education in Kuala Lumpur. Madeleine, his wife, was my form teacher in Sarawak during my early secondary school days.

It was a privilege to be a friend of Peter whom I found to be a very kind, cordial, generous, helpful,sincere and soft-spoken person. Peter always found time for his students, colleagues, friends and family. He was very passionate about his work and would give his full commitment to whatever he would be doing.

Peter and his team of environmental interest group or activists had made a very important contribution to our country which was the preservation of Batu Caves in Selangor. The natural beauty of the caves which took million of years to form would have been destroyed had it not been for his and the team's timely intervention against the setting up of a commercial cement plant. Peter presented me a sample of the rock from Batu Caves as a memento which I would always treasure.

Peter will be dearly missed by many of his friends, colleagues, scholars and former students. He will always be remembered by those who were fortunate enough to have met and known him. He is a simple and down-to- earth man, full of humility, integrity and honesty. May his Soul rest in Peace!

Justin Kon Khoon Jin

Peter was a very good man, teacher and friend. I first met him in early 1969 wheh he was doing fieldwork in the Bako National Park, and I was his field assistant. This was part of my training with the Geological Survey before going to university. Subsequently I was his student for 3 years. He was always very kind, patient and a great teacher. He always had a soft spot for Sarawak students, for obvious reasons. He remained a friend after I graduated. The last time we met was in 1995 when I and my family visited San Francisco. He will always be remembered fondly.

Denis N.K. Tan

Mengingati H. D. Tjia (1934 – 2016)
Sarjana Ulung dan Bapa Geologi Malaysia

Seluruh warga geologi di Malaysia dan Indonesia dikejutkan dengan kematian Profesor Emeritus Dr H. D. Tjia pada 9 Jun 2016 di kediamannya di Putrajaya. Pemergian sarjana unggul geologi ini merupakan satu kehilangan besar kepada selurh komuniti ilmuan di Asia Tenggara. Pemergian mendiang seperti satu kehilangan, ibarat patah tidah akan tumbuh lagi. Ingatan terhadap sumbangan keilmuan beliau tidak mungkin dapat dilupai oleh kita semua. Jika harimau mati meninggalkan belang, perginya H. D. Tjia meninggalkan nama.

H. D. Tjia atau nama panggilan kami Pak Tjia, dilahirkan pada tahun 1934 dan dibesarkan di Bandung, Indonesia. Beliau meraih Ijazah *Candidaats* (BSc) di Universitas Indonesia (1957), dan *Doctorandus* (MSc) di Institut Teknologi Bandung, Indonesia (1959). Kecintaan beliau terhadap ilmu geologi telah membawa beliau ke Columbia University, USA untuk pengajian pasca-siswazah (1960-61), dan berakhir dengan *Doktor Ilmu Pasti dan Ilmu Alam* (Dr) dari Institut Teknologi Bandung, Indonesia (1966).

Pada tahun 1968 hingga 70, beliau telah diundang menjadi pensyarah di Jabatan Geologi, Universiti Malaya (UM). Di sini permulaan pengabadian kesarjanaan mengembangkan ilmu geologi di Malaysia. Apabila Universiti Kebangsaan Malaysia (UKM) ditubuhkan pada tahun 1970, beliau adalah antara ahli akademik pengasas dan diberikan mandat untuk membangun Jabatan Geologi, Fakulti Sains, UKM. Beliau telah dilantik menjadi Ketua Jabatan Geologi selama hampir 10 tahun (1970-1979), dan penyandang Profesor Geologi pertama di UKM (1973-1990).

Sepanjang hayatnya, beliau telah menjalankan penyelidikan dalam pelbagai persoalan geologi, khususnya yang berkaitan dengan bidang kepakaran iaitu Geologi Struktur, Geomorfologi dan Geologi Kuaterner. Beliau telah menerbitkan beberapa buah buku teks dalam Bahasa Melayu untuk rujukan pelajar, antaranya *Geomorfologi* (terbitan DBP, 1988) dan *Tektonik* (terbitan UKM,1990). Beliau juga telah menerbitkan ratusan makalah ilmiah diterbitkan dalam dan luar negara. Aspek yang beliau pelopori meliputi geologi struktur dan tektonik rantau (Asia Tenggara); geomorfologi (kars, volkano dan sistem saliran); struktur impak meteorit (Malaysia) dan perubahan aras laut (Malaysia dan Asia Tenggara).

Saya tidak kenal apa itu geologi sebelum menjejakkan kaki di UKM. Sebagai pelajar tahun pertama 1972, saya menghadapi masalah untuk memilih bidang pengajian. Selepas bertemu ketua Jabatan Matematik dan Biologi, saya bertemu dengan Pak Tjia selaku ketua Jabatan Geologi ketika itu. Masih terbayang dalam ingatan penjelasan beliau, 'untuk mengambil bidang geologi tidak perlu cemerlang dalam mana-mana subjek sains (fizik, kimia, matematik dan biologi), cukup dengan berkelulusan baik dalam semuanya'. Selanjutnya beliau berkata, 'tetapi awak perlu suka kerja di lapangan, mendaki gunung dan mengharungi sungai'. Sejak pertemuan itu, saya terus jatuh cinta dengan geologi, dan tidak menoleh ke belakang lagi. Sebagai pelajar Geologi (1972-1976), Pak Tjia menjadi guru subjek Geologi Fizikal, Geologi Struktur, Geomorfologi.

Beliau taksub menjalankan penelitian geologi di lapangan. Hampir setiap singkapan batuan dan potongan jalan telah beliau kunjungi, teliti dan membuat lakaran serta catatan mengenai gaya struktur yang direkodkan dalam batuan. Kegigihan mentafsir sejarah tektonik Malaysia berdasarkan bukti pada singkapan batuan menjadi ikon kekuatan ilmu geologi Pak Tjia.

Saya kembali dari Strathclyde University, Glasgow pada tahun 1979 dan terus dilantik oleh beliau menjadi ahli akademik Jabatan Geologi. Sejak itu, Pak Tjia adalah rakan akademik dan mentor yang disegani. Perawakan yang lembut, berbudi-bahasa dan beretika akademik tinggi menjadi ikutan kami semua. Dalam lembut, beliau menunjukkan ketegasan dalam mempertahankan kualiti akademik dan penerbitan ilmiah. Sebagai Ketua Pengarang Pengasas *Sains Malaysiana*, beliau telah mempertahankan kualiti penerbitan, kini satu-satunya jurnal dwibahasa (Bahasa Malaysia dan Inggeris) yang berindeks ISI di Malaysia.

Ketika membuat kerja lapangan bersama beliau, saya masih teringat setiap waktu subuh, beliau telah bangun dan dengan mengunakan lampu suluh memperbaiki catatan lapangan, daripada tulisan pensil kepada dakwat kekal. Beliau menyimpan 'buku nota lapangan' secara teratur dan boleh dirujuk semula walaupun telah puluhan tahun catatannya. Sebagai ahli geologi, beginilah cara beliau mengabadikan cerapan, tafsiran dan pemikiran yang elok dicontohi oleh setiap ahli geologi kini dan akan datang.

Sebagai pemimpin akademik di UKM, amanah membangunkan bahasa Malaysia sebagai bahasa ilmu tinggi sentiasa dihormati. Pada tahun 1971, beliau telah menerbitkan Buku *Istilah Geologi (Inggeris - Melaysia dan Malaysia - Inggeris)*. Ini adalah buku istilah pertama diterbitkan oleh UKM. Semua kuliah juga beliau sampaikan dalam Bahasa Malaysia. Begitupun, aspek kecemerlangan dan pembangunan sains geologi yang bersifat universal (global) terus dipertahankan.

Ramai para Profesor, pensyarah dan ahli geologi tempatan adalah bekas pelajar Pak Tjia. Saya dan beberapa rakan lain, dipilih oleh beliau untuk melanjutkan pelajaran pasca-siswazah ke luar negara. Sekembalinya kami menjadi pensyarah di UKM. Ada juga pensyarah seperti Prof Ibrahim Abdullah, Dr Zaiton Harun dan Dr Anizan Isahak ialah bekas pelajar PhD beliau. Dalam kata lain, Pak Tjia ialah sarjana unggul yang bertanggungjawab membangun bidang Geologi di Malaysia, daripada wawasan penyelidikan, pembangunan kurikulum hinggalah kepada membangun bakat akademik.

Beliau bersara daripada jawatan profesor di UKM pada tahun 1990. Begitupun, sebagai ilmuan, beliau tidak pernah bersara daripada dunia akademik. Pak Tjia meneruskan kerja akademiknya sebagai Profesor Pelawat di USM (1990-1993). Seterusnya, sebagai Penasihat Teknikal di *PETRONAS Research and Scientific Services* (PRSS) (1993-2002), dan pakar Geologi Struktur di PETRONAS Carigali (2002-2004). Sebagai seorang sarjana tulen, beliau masih terus menyelidik, mendidik dan menerbit penelitian ilmiah sehingga di saat akhir hayatnya.

Walaupun Pak Tjia seorang warga negara Indonesia, kecintaan untuk membangun ilmu geologi di Malaysia terus membara dijiwanya. Pada awal tahun 1990an, beliau membuat keputusan untuk menjadi Penduduk Tetap Malaysia, dan mencurahkan bakti di bumi Malaysia. Bagi mengenang jasa dan sumbangan kesarjanaan unggul, UKM telah menganugerahkan *Ijazah Kehormat Doktor Sains* pada tahun 2001, dan *Profesor Emeritus* pada tahun 2004. Persatuan Geologi Malaysia (GSM) juga menghargai sumbangan besar beliau dengan perlantikan sebagai *Ahli Kehormat*.

Mendiang Prof Emeritus Dr H. D. Tjia ialah seorang sarjana geologi luar biasa. Walaupun berusia lampau 80, beliau masih menerbitkan tulisan ilmiah dan menyampaikan syarahan undangan. Ketika berziarah mayatnya, Ibu Tjia sempat menyatakan, 'saya hanya kedua, pertama bagi Pak Tjia ialah geologinya'. Begitulah perjalanan seorang sarjana geologi terkenal, yang telah meninggalkan kita dan tidak mungkin dapat di cari ganti. Berihatlah dengan aman, jasa mu tetap di kenang.

Ibrahim Komoo, Prof Emeritus Dato Dr
Bekas pelajar Mendiang H. D. Tjia; dan
Felo Utama, Institut Alam Sekitar dan Pembangunan (LESTARI), UKM.
20 Julai 2016

TRIBUTE TO H. D. TJIA

Tjia Hong Djin, or affectionately 'Pak Tjia' to his students and colleagues, was born in Bandung on 19 February 1934. Upon completing a PhD in geology at the Institute Teknologi Bandung (ITB) in 1966, he lectured there briefly before moving to Kuala Lumpur in 1968 to lecture at the Universiti Malaya geology department. In 1970 Tjia was invited to join the newly formed Universiti Kebangsaan Malaysia (UKM) to develop a geology curriculum in Bahasa Malaysia (Malay language) as part of a wider aim to raise the standard of Malay as the national language for higher education. One of his early efforts was to publish, in 1971, the first English-Malay glossary of geology, "*Kamus Istilah Geologi Inggeris-Melayu*". As the first head of the department (a position he held for 10 years from 1970 to 1980), Tjia developed the geology teaching curriculum and geological research programmes at UKM. His excellent leadership in teaching and research was soon rewarded by UKM when he was appointed full professor in 1973, only three years after setting up the department. Perhaps, one of his most enduring legacy would be to leave behind not only a very well established and reputable geology department, but several generations of geologists who were trained in the national language. They include some outstanding individuals in key positions in government, academia and industry. Upon mandatory retirement from UKM in 1990, Tjia joined the Physics Faculty, Universiti Sains Malaysia (USM), as visiting professor until 1993. At USM he undertook further collaborations in archaeological research with Professor Zuraina Majid.

My first meeting with Pak Tjia was at the UKM geology department in 1985 when, as a young Malaysian geologist, I had to purchase a copy of *Istilah Geologi*. We discussed Quaternary sea levels, among other things, and I was given some reprints of his papers on sea levels and structural geology of Peninsular Malaysia. Since then I always saw him as a 'regular' at the society's Annual Conference (now the National Geoscience Conference) and the Petroleum Geology Conference and Exhibition (PGCE) where he often had a paper to present.

Our professional paths crossed again in 1992 when Petronas Research & Scientific Services (PRSS) at Hulu Kelang was hiring university academics to manage its research programmes. Ibrahim Komoo, our senior manager from 1990 to 1993 and a former student of Tjia's at UKM, saw an opportunity to hire his former mentor as technical advisor for upstream research. So, just before leaving for Oxford in January 1993 to pursue my PhD, I prepared the necessary paper work to hire Tjia as advisor to a regional project on the Malay and Penyu basins, which was to be led by Liew Kit Kong (also a UKM alumnus who had later served as editor of GSM). I recall travelling to London in December 1994 to meet with Tjia and

Pak Tjia in his element, among the rock outcrops, here in Pulau Redang in September 2012 during a field trip to look at fractured granite. *Photo courtesy of Ngadni Temon of Energy Quest.*

Liew who came to present papers at the Geological Society of London (GSL) conference on the tectonic evolution of SE Asia. Our joint paper which we co-authored with Khalid Ngah on the pre-Tertiary basement structures offshore Malaya, regrettably the only paper Tjia and I ever worked together, appeared in the special publication of the GSL in 1996. While at PRSS, Tjia also contributed two chapters to the Petronas book, *Petroleum geology and resources of Malaysia* (1999), one on the geological setting of Peninsular Malaysia and the other on the pre-Tertiary hydrocarbon potential.

The transition from academia to industry seemed natural for Tjia, not only because of his scientific credentials as the top 'home-based' structural geologist (Petronas still lacks a local structural geologist to this day) but many Petronas employees he worked with were his former students at UKM. Tjia served Petronas for a total of eleven years; at PRSS (1993-2002) and at Carigali (2002-2004).

Tjia was a prolific writer, very meticulous and his drawings had a distinctive style that one could easily recognise his figures. According to his colleagues, he published more than 300 papers and 6 original geology text books, which have become the standard reference text in Malay. Although he was most well known as a structural geologist he had interests in many other fields, including paleontology, stratigraphy, sedimentology, volcanology, geotectonics, geophysics, geomorphology, structural geology, petroleum geology, and Quaternary geology. He had even written articles on meteorite impact craters.

Tjia was appointed as Senior Associate Fellow at the UKM Institut Alam Sekitar dan Pembangunan (LESTARI) from 2000 to 2003, and had been Honorary Fellow since 2004. At LESTARI he was involved in other fields of geology such as geoarcheology, environmental geology and conservation geology. In 2001, he received an honorary doctorate in science from UKM for his services to the university and geology. In 2004 he was conferred the title of Professor Emeritus in earth sciences from UKM for his contributions to the development of geosciences in the region.

Tjia was indeed a 'true geologist'. While in his 70s, he continued working actively as a consultant in the petroleum industry, since 2006 via the oil/gas firm Orogenic Resources and since 2012 via the Orogenic's offshoot Energy Quest Sdn Bhd. He was involved with various projects including field-based work in onshore Sabah and Sarawak until late 2015. He was an active member of the GSM and the Institute of Geology Malaysia and was awarded honorary membership of the GSM in 1986. He worked tirelessly until his untimely passing at his home in Putrajaya on 9 June 2016 at the age of 82.

Pak Tjia is survived by his wife, Tineke, and son, daughter, and two grandsons. I shall remember him as a sincere, humble and kind-hearted person and a dedicated geologist who was very generous with his knowledge. He will be dearly missed by his peers, students and colleagues.

Mazlan Madon
28 June 2016

In the field in April 2013 near Sg. Kerait on the way to Sri Aman, Sarawak, with (from left) Mr Bang and Pak Yoga from PCPP and Shafiq Firdaus from Energy Quest. *Photo courtesy of Ngadni Temon of Energy Quest.*

Taking a reading on his compass in a sandstone quarry near Kuching, Sarawak, in 2013. *Photo courtesy of Ngadni Temon of Energy Quest.*

PERSATUAN GEOLOGI MALAYSIA
GEOLOGICAL SOCIETY OF MALAYSIA

NATIONAL GEOSCIENCE CONFERENCE 2016

The Geological Society of Malaysia is pleased to announce that the National Geoscience Conference 2016 (NGC2016), 29th of the annual conferences, will be held at the M.S. Garden Hotel, Kuantan from 14th to 15th November 2016. The Conference is a premier geoscientific event in Malaysia, which is well attended by geoscientists from academia as well as the public and private sectors. NGC2016 is co-organised with the Minerals & Geoscience Department Malaysia (JMG) Pahang and Universiti Malaysia Pahang.

Theme: Geoscience and Environmental Technology for a Better Future

As we move forward through the modern era, the practice of science and technology is omnipresent. Knowledge of the earth's systems and processes, together with the application of technology has improved our quality of life through the utilisation and management of the earth's natural resources such as rocks, minerals, petroleum, natural gas and groundwater. The use of technology in geosciences can generate creative and innovative solutions to address current environmental issues. Practical application through these approaches may create new horizon and opportunities that can be adopted for a better future.

Programme

The technical program of NGC2016 consists of oral and poster presentations on all aspects of Geoscience, Environments and Technology related to the theme. Presentations will be delivered by keynote speakers on topics of relevance to the theme and interest to the nation. There will be a one-day Pre-NGC2016 Fieldtrip to bauxite mining areas in Kuantan.

Call for papers

Once again, we seek your support to ensure the success of NGC2016. Participants are invited to present papers on original research either in English or Bahasa Malaysia for the Technical Sessions. Contributors may submit more than one paper, however the Organising Committee has the right to select only one paper by any first author for oral presentations, while the rest will be for poster presentations. Please come and share your experiences, ideas and expertise for the benefit of our country and future generations.

Those who would like to present papers are required to submit an extended abstract. The extended abstract should be between 500 to 750 words long, can have up to 3 figures and/or tables and must have at least 3 references. Abstracts of accepted papers will be distributed to all participants of NGC2016. Full paper will be reviewed and published in either the International Journal of Engineering Technology & Science (IJETS) or the Bulletin of the Geological Society of Malaysia. Manuscript requirements for full paper can be downloaded from http://www.gsm.org.my/content.php?id=92&lang=1

Pre-Conference Fieldtrip

A pre-conference fieldtrip to bauxite mining areas in Kuantan is planned. Details will be announced in the next circular.

Deadlines

Submission of Full abstract: 31st August 2016
Acceptance Notification: 5th October 2016
Early Registration: 1th September 2016
Normal Registration: 15th October 2016

REGISTRATION FORM

PERSATUAN GEOLOGI MALAYSIA
GEOLOGICAL SOCIETY OF MALAYSIA

NATIONAL GEOSCIENCE CONFERENCE 2016

M.S. Garden Hotel,
Kuantan
14-15 November 2016

Geoscience and Environmental Technology for a Better Future

Please complete and return the registration form to:

National Geoscience Conference 2016
Geological Society of Malaysia
c/o Department of Geology
University of Malaya
50603 Kuala Lumpur, Malaysia
Tel: (603) 7957 7036 Fax: (603) 7956 3900
Email: geologicalsociety@gmail.com

PERSATUAN GEOLOGI MALAYSIA
GEOLOGICAL SOCIETY OF MALAYSIA

NATIONAL GEOSCIENCE CONFERENCE 2016

Name: _____

Profession: _____

Organisation: _____

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Address: _____

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Membership Type: _____

Tel: _____ **Fax:** _____

Email: _____

Name & age (for children) of accompanying person(s)

_____

_____

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☐ **I would like to attend NGC2016**
☐ **I would like to join the Pre-ConferenceFieldtrip**
☐ **I would like to present the following paper(s)**

1. _____

_____

_____

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2. _____

_____

_____

Please email the abstract(s) to geologicalsociety@gmail.com

_____ _____
Signature **Date**

Registration

All intending participants are advised to register early to facilitate the planning of the Conference. Registration fees will cover conference material, lunch and refreshment. Payment by crossed cheque or bank draft is acceptable and should be made payable to the "Geological Society of Malaysia". Payment can also be made by banking directly to the Geological Society of Malaysia, Standard Chartered Bank, current account no. 794 1054 02263. Please fax or email the bank-in-advise slip to the Society for verification.

Membership	Early Payment before 1st Sept 2016	Payment after 1st Sept 2016
Presenters	RM 150	RM 150
Full/associate/life members	RM 150	RM 200
Non-members	RM 200	RM 250
Spouse/family of members	RM 100	RM 100
Student members	RM 50	RM 80
Student non-members	RM 80	RM 100

Accommodation

Accommodation is at the participant's own expense. Participants are advised to make early room reservations. For reservation, please contact the hotel:

M.S. Garden Hotel Kuantan
Lot 5 & 10, LorongGambut,
Off JalanBeserah,
25300 Kuantan, Pahang DarulMakmur
Tel: +609-5118888
Fax: +609-5177016
Email: enquiry@msgarden.com.my
Website: http://msgarden.com.my/

Other hotels in Kuantan :
Vistana Hotel, Kuantan :Tel: +60 9 517 8000
Grand Continental Hotel, Kuantan :+60 9-515 8888

FIRST CIRCULAR

PERSATUAN GEOLOGI MALAYSIA
GEOLOGICAL SOCIETY OF MALAYSIA

NATIONAL GEOSCIENCE CONFERENCE 2016

M.S. Garden Hotel, Kuantan
14-15 November 2016

Geoscience and Environmental Technology for a Better Future

Co-organisers
Universiti Malaysia Pahang
Jabatan Mineral & Geosains Malaysia

CALL FOR PAPERS

"UNCONVENTIONAL EXPLORATION: What We Need To Know about Shale Oil & Gas"

23 APRIL 2016, DEPARTMENT OF GEOLOGY, UNIVERSITY OF MALAYA

AAPG Student Chapter University Malaya had organized a short course at Department of Geology, University of Malaya on 23th April 2016 from 8:00 am to 3:00 pm, which was focused on the technical skills required as a geologist to understand the basic of unconventional oil and gas exploration in shale. The speaker invited was Mr Syed Tariq Hasany from Petronas. The short course was composed of two parts: a lecture and a workshop. Total participants in this event were 35 to 40 students and 2 faculty members.

The first half of the course was focused on the lecture, which enhanced the student´s oil and gas knowledge, by introducing and exposing one of the geological technique that has been used in the exploration and production field: Shale Fracturing. The lecture was composed by an introduction to the physical and chemical characteristics of the crude oil, followed by the method of exploration: data collection, interpretation and production of the crude oil by using "Shale Fracturing" technique.

The workshop was performed in the second half of the short course, which give the participants an opportunity to experience the work culture as a geologist in the industry, by interpreting the best location of the oil and gas reservoir in a specific area. Therefore, 9 maps with different data were provided together with a well logs and specifications of the area to the students.

At the end, all the members were pleased and satisfied with Mr. Syed Tariq Hasany teaching section in the short course. AAPG, participants and lectures involved deeply appreciate his generosity by sharing his knowledge and helping the new geology generation to improve theirs understanding towards the methods and techniques used in the oil and gas industry.

UPCOMING EVENTS

August 1-3, 2016: Unconventional Resources Technology Conference fueled by SPE-AAPG-SEG, Texas, USA. Contact: email: urtec@urtec.org

August 11-12, 2016: Oil Spill India 2016: 4th International Conference & Exhibition, Mumbai, India. Contact: Tel: +91 1143013474; Fax: +91 1142171483; email: secretariat@itenmedia.in; website: www.itenmedia.in

August 15-17, 2016: International Conference on Intergrated Petroleum Engineering & Geosciences 2016 (ICIPEG 2016), Kuala Lumpur, Malaysia. Tel: +605 3687304/7107; Fax: +605 3655670; email: icipeg2016@petronas.com.my; web: www.utp.edu.my/icipeg2016

August 29 - 31, 2016: EUROCK 2016 - The 2016 ISRM International Symposium - Rock Mechanics & Rock Engineering: From Past to the Future, Ürgüp-Nevşehir, Turkey. Website: http://eurock2016.org/

August 27 to September 5 2016: The 35th International Geological Congress: Cape Town, South Africa. Danie Barnado, Secretary-General: 35th IGC. barnardo@geoscience.org.za; http://www.35igc.org

September 4-8, 2016: The Near Surface Geoscience Conference consists of the 22nd European Meeting of Environmental & Engineering Geophysics; the 2nd Applied Shallow Marine Geophysics Conference and the 1st Conference on Geophysics for Mineral Exploration and Mining, Barcelona, Spain. Contact: registration@eage.org

September 5, 2016: 5th International Conference on Geotechnical and Geophysical Site Characterisation. Gold Coast, QLD, Australia. http://www.isc5.com.au/

September 5-9, 2016: The World Multidisciplinary Earth Sciences Symposium – WMESS, Prague, Czech Republic. Contact: Giulio Iovine, email: giulio.iovine@irpi.cnr.it

September 6-9, 2016: AAPG-SEG International Conference & Exhibition 2016, Cancun, Mexico. Tel: +1 918 560 2617; email: convene@aapg.org

September 11-15, 2016: 2nd European Mineralogical Conference, Remini, Italy. http://emc2016.socminpet.it/index.php.

September 13-14, 2016: Groundwater: Managing our hidden asset, University of Birmingham, UK. Contact: Michael Rivett, email: m.o.rivett@bham.ac.uk

September 22-23, 2016: 2nd Virtual Geoscience Conference, Bergen, Norway. http://virtualoutcrop.com/vgc2016; email: vgc2016@virtualoutcrop.com

September 25-29, 2016: 4th International 'Serpentine Days' workshop, Sete, France. email : serpentinedays@gm.univ-montp2.fr

September 27-29, 2016: Rain, Rivers & Reservoirs, Edinburgh Conference Centre, UK. Contact: Georgina Worrall, email: georgina.worrall@geolsoc.org.uk

September 27-30, 2016: 7th International Conference on UNESCO Global Geoparks, Torquay, UK. website: www.ggn2016.com

September 28-30, 2016: The 3rd Malaysia Oil & Gas Services Exhibition & Conference – MOGSEC2016, Kuala Lumpur, Malaysia. email: mogsec@xmr3.com; website: www.mogsec.com.my

October 1, 2016: ARMS 9 - the 9th Asian Rock Mechanics Symposium - ISRM Regional Symposium, Bali, Indonesia. Website: http://www.isrm.net/conferencias/detalhes.php?id=3268&show=conf

October 6 - 7, 2016: 2nd Internaitonal Specialized Conference on Soft Rocks. Cartagena, Colombia. Contact: sociedadcolombianadegeotecnia@scg.org.co

October 9 - 13, 2016: World Water Congress & Exhibition. Brisbane, Australia. http://www.iwa-network.org/event/world-water-congress-exhibition-2016/

October 10 - 13, 2016. GEOSEA XIV and 45th IAGI Annual Convention 2016, Bandung Indonesia. see page 60.

October 16 - 18, 2016: Recent Advances in Rock Engineering - RARE 2016 - an ISRM Specialised Conference, Bangalore, India. Website: http://www.isrm.net/conferencias/detalhes.php?id=3312&show=conf

October 16 - 19, 2016: SEPM-AAPG Mudstone Diagenesis Research Conference - Implications for Exploration and Development of Unconventional Reservoirs. Santa Fe, New Mexico, USA. http://www.sepm.org/pages.aspx?pageid=410

October 16 - 21, 2016: Water Rock Interaction 15. Evora, Portugal. http://wri15portugal.org/

October 18 - 20, 2016: ARMS 9 - 9th Asian Rock Mechanics Symposium - ISRM Regional Symposium. Bali, Indonesia. http://arms9.com/

October 25 – 2 November, 2016: The fifth International Symposium of the International Geoscience Programme Project (IGCP) 589: Development of the Asian Tethyan Realm: Genesis, Process and Outcomes. Yangon, Myanmar. Contact: igcp5892016@gmail.com

October 30 - 5 November 2016: 52nd CCOP Annual Session and 67th Steering Committee Meeting. Bangkok, Thailand. http://www.ccop.or.th/news

November 2 - 7, 2016: Oceanic Anoxic Events. Austin, Texas, USA. https://www.sepm.org/OAE-Conference

November 7 - 11, 2016: International Mining and Resources Conference - IMARC 2016. Melbourne, Australia. https://events.ausimm.com.au/getdemo.ei?id=299&s=_1R80XVBLY

November 14-16, 2016: International Petroleum Technology Conference (IPTC), Bangkok, Thailand. Contact: iptc@iptcnet.org or +603 2182 3000.

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November 24-25, 2016: Bryan Lovell Meeting 2016: Water Risk & Hazards: Managing Uncertainty in a Changing World, London, UK. website: www.geolsoc.org.uk/Lovell16

November 29-December 2, 2016: Subsea Asia 2016: 6th Asian Subsea Conference & Exhibition, Singapore. Contact: Alex Pout, email: apout@oesallworld.com

February 22-24, 2017: Exciting Evolution: Myanmar's Petroleum Systems, Plays & Field Developments, Yangon, Myanmar. email: apereira@aapg.org

March 12 - 15, 2017: Geotechnical Frontiers 2017. Orlando, Florida, USA. http://geosyntheticsconference.com/

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May 7-9, 2017: 19th Asia Oil & Gas Conference (AOGC2017), Kuala Lumpur, Malaysia. email: aogc@icep.com.my; website: www.aogc.com.my

July 15 - 19, 2017: GeoMEast 2017 International Conference "Sustainable Civil Infrastructure (SCI): Innovative Infrastructure Geotechnology". Sharm El-Sheikh, Egypt. http://www.geomeast2017.org/

August 4 - 9, 2017: Magmatism of the Earth and related strategic metal deposits. Contact: alkaline.conference@gmail.com

September 13-14, 2017: Hidden potential in mature basins: Play analogs and best practices, Bandung, Indonesia. email: apereira@aapg.org

September 17 - 22, 2017:19th International Conference on Soil Mechanics and Geotechnical Engineering (ICSMGE 2017). Seoul, Korea. http://www.icsmge2017.org/

"Invitation to Attend the GeoSEA XIV and 45th IAGI Annual Convention 2016"

The Organizing Committee is pleased to invite you to the "GeoSEA XIV and 45th IAGI Annual Convention 2016, ASEAN Earth Resources and Geoscientist Role in AEC Era, October 10—13, 2016, in Bandung, Indonesia. The convention is a collaboration of Regional Congress on Geology, Mineral Resources and Energy in Southeast Asia (GeoSEA) with the annual scientific meeting of the Indonesian Association of Geologists (IAGI - Ikatan Ahli Geologi Indonesia).

Message from GIC 2016 Chairman

Dear Colleagues and Friends,

Welcome to the GeoSEA XIV and 45th IAGI Annual Convention 2016, or "GIC 2016" where the Regional Congress on Geology, Mineral Resources and Energy in SE Asia collaborates with the annual scientific meeting of the Indonesian Association of Geologists (IAGI – Ikatan Ahli Geologi Indonesia). This convention aims to bring an excellent opportunity to exchange scientific, technical information and to advance geoscience in multidisciplinary fields including oil, gas, mining industries as well as other related fields.

2016 marks a significant milestone for the ASEAN countries with the AEC era (ASEAN Economic Community). It is also a perfect time for us to highlight the important geological issue of *"ASEAN Earth Resources and Geoscientist Role in AEC Era"* as the main theme of the convention. We hope this main theme will encourage the government in ASEAN countries to focus more on exploration, production and development of resources as well as inventory. If applied successfully, the result will be a comprehensive transfer of information from upstream to downstream that can be valuable for executives, employees, lecturers, and students. Knowledge, ideas, and experiences will be shared during the technical and non-technical sessions. This Convention will also serve as a great opportunity for you to expose your visions and core technologies.

GIC Bandung 2016 will be held from the 10th to the 13th of October 2016 in Bandung, West Java – just 150 kms southeast of Jakarta. As one of the major cities in Indonesia, Bandung has undergone a long history involving the Indonesian Association of Geologists which was established in 1960. Bandung is also well known as the home of major Indonesian geological experts that have contributed significantly to the development of geoscience and research in Indonesia.

On behalf of the committees GIC 2016, it is my pleasure to invite you to participate as delegates, presenters, exhibitors and sponsors. We look forward to welcoming you to GIC 2016, and hope that you can extend your visit to enjoy some of the best that Bandung and the rest of Indonesia has to offer – our geology, food, museums, and beautiful landscapes.

Selamat datang.

Iryanto Rompo (IAGI #4078)
Chairman of GIC Bandung 2016

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Approximately more than 200 non-invited speaker plus 30 poster slots available

"ASEAN Earth Resources and Geoscientist Role in AEC Era"

The theme is ASEAN Earth Resources and Geoscientist Role in AEC Era will cover the issues in oil and gas, minerals and coal, engineering as well as related fields. This convention will include panel discussion and invited speakers from leaders in research, industry and government. The 48 sessions of technical presentation in 2 days will feature distinguished speakers plus 30 posters and pre– and post-convention events and field trips complementing the convention theme.

Keynote Presentation and Panel Discussion

Invited keynote and panel discussion session include two separate and coordinate talks on the earth resources in ASEAN countries and development of the ASEAN geoscientists. These comprehensive talks will include the resources industries (oil-gas, coal and minerals), infrastructure development, disaster management and environmental conservation as well as the research development of basic geological sciences.

Technical Session

Approximately more than 200 non-invited speakers and 30 posters will be presented in 2 days of technical session from October 12 - 13, 2016. The technical session presentation will cover 12 main topics including General Tectonic of SE Asia; Renewable Resources; Mineral, Petroleum and Energy; Resources Management; Energy Scenario and Policy; G & G Methods, Technology and Application; Sedimentology and Stratigraphy; Environmental Issue and Hydrogeology; Geo-hazard and Mitigation; Volcanology and Geothermal; Engineering Geology; Culture and Geo-tourism.

For online abstract submission, please visit:

http://geosea2016.iagi.or.id

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