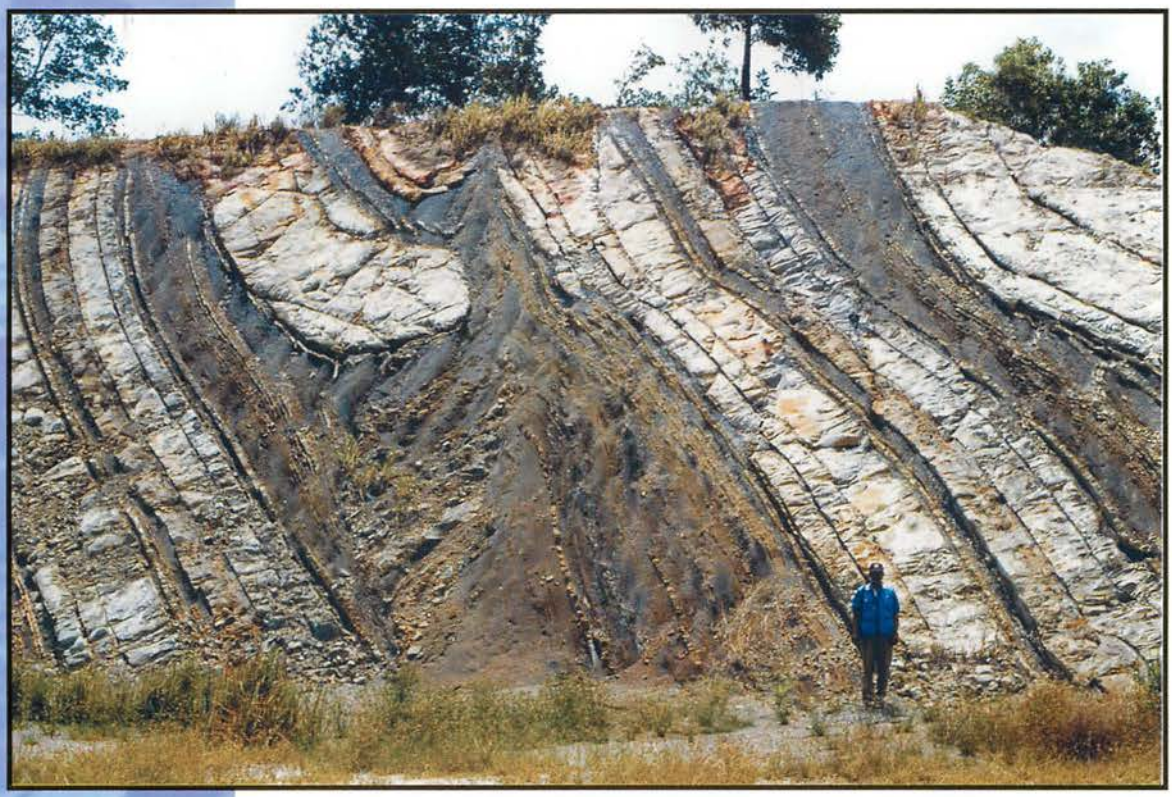
ISSN 0126-5539
PP2509/2/2008

WARTA GEOLOGI

PERSATUAN GEOLOGI MALAYSIA

Newsletter
of the

Geological Society of Malaysia



Title: *Slumping*
Description: *Slumping Structure in the Croker Formation Menggatal Sabah*
By : *Mazlina Bt Sulaiman*
3rd Place in the 2006 GSM Photo Competition

Jilid /Volume 33, No 3. May - June 2007

PERSATUAN GEOLOGI MALAYSIA
(GEOLOGICAL SOCIETY OF MALAYSIA)

MAJLIS (COUNCIL) 2007/08

Printed by:
Art Printing Works Sdn Bhd
29, Jalan Riong, 59100 Kuala Lumpur
Malaysia

The Society was founded in 1967 with the aim of promoting the advancement of earth sciences particularly in Malaysia and the Asian region. The Society has a membership of about 600 earth scientists and is worldwide in distribution.

The Warta Geologi (Newsletter of the Geological Society of Malaysia) is published bimonthly by the Geological Society of Malaysia. The Warta Geologi is available free to members of the Geological Society of Malaysia

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CATATAN GEOLOGI (Geological Notes)

GEOLOGY
A Cousin To All Basic Sciences and More

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ABSTRACT

Biology, Chemistry, Mathematics and Physics are all naturally and undoubtedly deemed as part and parcel of basic SCIENCE since its very inception. Geology, unfortunately, is often mistaken for Geography despite being in existence since the 1st century. Geology encapsulates the study of the beginning of the universe and our solar system and more specifically the past, present and future of planet Earth. The branches of Geology are many and very specialized. Paleontology, Oceanography and Marine Science both utilize and contribute to the knowledge of Biology. Such also is the case with Geophysics, Petroleum Geology and Planetary Geology that contribute to Physics. Similarly, Cosmology, Mineralogy, Petrography, Petrology and Geochemistry are linked to Chemistry while Structural Geology, Engineering Geology, Petroleum Geology and Geophysics are linked to Mathematics. The non-Science subjects such as Geography also benefit from Physical Geology, Geomorphology, Structural Geology, Sedimentology, and Stratigraphy while Anthropology and Archaeology benefit from Palaeontology, Sedimentology and Stratigrahpy. With this mélange of knowledge and areas of specialization, Geology, is undoubtedly, the cousin of all basic sciences and more.

Keywords: Geology/Science/Contribution

1 INTRODUCTION

Geology originates from the Greek words *Ge* or *Gaea* which means *earth* and *logos* which means *principal / thought / logic*. Geology is thus the study of our planet Earth. It encapsulates the beginning of the Earth and the materials it is made of. It analyses, deciphers and understands the past, present and future of Earth and all its processes. It traces back the beginning of life and how it has evolved over time. It too goes beyond the atmosphere that surrounds the Earth.

2 ORIGIN OF GEOLOGY

The origin of geology goes as far back as the 2nd century AD [1] when Shen Kua (1031-1095), a polymath (a person of varied knowledge) in China, observed fossil shells in rock beds (stratas) up in the mountains miles away from the ocean. He formulated a hypothesis that explains the formation of land from the erosion of mountains.

For centuries ancient Greek, Arabic and Roman civilizations pondered the formation of rocks and the presence of fossils in rocks high in the mountains. However, it was only later in the 1st century BC that ideas and theories began to taken form. Many a theory were suggested and orated. Some were accepted unanimously and some were rejected on the basis of what was sensible in that era.

Leonardo da Vinci (1452-1519) of Italy, a pioneer in the application of scientific-sense, had strongly refuted the biblical theory that Noah's flood had lifted the sea creatures up to higher grounds. He had stressed that since the fossils were found not only on the surface but right through the rock mass, logic stands that they were deposited on an ancient seafloor. He, however, could not explain how they had ended up in the mountains. Even when in the 17th century correlations were made between oceanic deposits and stratas exposed on rock formations, the question that had plagued da Vinci's generation remained unexplained due to the limited knowledge of that time in history.

Georg Agricola (1494-1555), a German physician, had written extensively comprehensive accounts on the discovery, occurrence of mineral and its mining. Hence, he is the 'Father of Mineralogy.

Nicolaus Steno (1638-1686), a Danish pioneering in anatomy and geology, had formulated the three main principals that define stratigraphy : superposition, original horizontality and lateral continuity.

In 1700 AD two Frenchmen, Jean-Etienne Guettard and Nicolas Desmarest, had created a geological map of central France. On it they had recorded all their geological observations. Guettard was the first to record observations of volcanic origin in the region.

By the 18th century, the were two distinct schools of thought: the Neptunists (Werner) who believed that all rocks were formed in the sea and the Plutonists (Hutton) who believed that some rocks were formed by volcanic eruptions (Pluto: God of the underworld) [2].

Abraham Gottlob Werner (1749-1817) a German Inspector and Teacher of Mining and Mineralogy had formed a controversial theory of 'Neptunism' in which the oceans as we know now are the remains of receded ancient seas while the Earth's crust is its resulting precipitate.

James Hutton (1768-1815), a retired doctor and a farmer with a hobby of observing rocks in his native Edinburgh, found evidence that rocks were formed through actively ongoing process of volcanic eruptions, erosion and sedimentation. It was on this basis of actively ongoing processes that Hutton laid the basis of scientific Geology in his paper to the Royal Society of Edinburgh in 1785 titled 'Theory of the Earth', A similar contribution was from the 'Father of English Geology' William Smith (1769-1839) who came across beds of rocks exposed during excavation works while surveying some canals and was fascinated by the fossils found in them. He found similar beds in different regions and noticed that they were in the same sequence with each type containing its own range of fossils. His findings published in 1799 were titled 'Order of the Strata and Their Embedded Organic Remains in the Neighbourhood of Bath'. In 1815, Smith had completed a geological map of England, Wales and Scotland.

Naturalist and zoologist Georges Cuvier (1769-1832) of France concluded that rocks and their fossils are nature's record of earth that gave coherent, reliable account of earth and its past.

It was in 1775 that for the first time Geology was taught as a branch of Science at a small mining academy in Freiburg, Germany by Abraham Gottlob Werner.

Soon, Geology became the scientific craze of late 18th century; and has been growing and expanding since.

3 GEOLOGY AND BASIC SCIENCES

Since the beginning of any civilization, mankind has resorted to 'trial and error' and learnt from mistakes and success to survive the harsh living conditions. Over time, this knowledge became a practice,

then commonsense and eventually the very foundation of Science, logic. As civilization progressed and grew, Science began to take prominence.

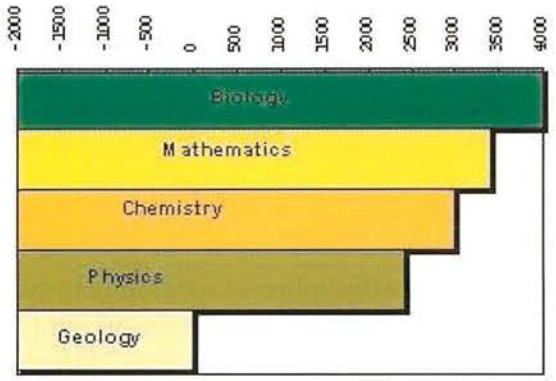

Figure 1 The beginning of Basic Sciences and Geology (years *AD-BC*)

Basic sciences such as Biology, Mathematics, Chemistry and Physics have long been in existence since 2400 BC (Fig. 1). Biology, the understanding of plants and life forms, has been in practice since the prehistoric days of hunting. The knowledge of plants and animals were essential for survival [3]. The use of mathematics, which began with the need to measure time, distance and length, has been practiced since 3500BC. The use of Chemistry began in 3000 BC when the early 'chemists' were women. These women had combined various plant extracts to create perfume. Physics began to take form as early as 2400 BC. The use of Physics was necessary initially for navigational purposes and eventually for astronomy. Geology came into existence only in 1081 AD when Man began to notice the landscape around them and notice their uniqueness and the innumerable historical facts hidden in them.

Though Geology is, by comparison, an extremely 'young' science, it has since grown and expanded very fast since the 19th century. It now has a wide scope of subdisciplines as well as links to all the aforementioned basic sciences and therefore is very much interdisciplinary too. There are many subdisciplines in Geology that both utilise and contribute to all the abovementioned basic sciences. There are seven major subdisciplines in Geology and they are Mineralogy & Petrology, Geochemistry, Geomorphology, Stratigraphy, Palaeontology, Sedimentology and Engineering Geology. Mineralogy & Petrology is the study of rock-forming minerals, their properties and geographical distribution. Geochemistry studies the chemical composition of Earth as well as its chemical processes and corresponding reactions. Geomorphology is the study of Earth's landforms. Stratigraphy studies sedimentary rock units, its formation and geologic distribution. Palaeontology is the study of life forms through fossils while Sedimentology is a comparative study of modern sediments and its processes to ancient deposits. Engineering Geology studies the engineering properties and behaviour of rock and soil as well as their structure.

The other subdiscilpines are Petrography, Physical Geology, Geophysics, Geodesy, Soil Science – Edaphology & Pedology, Hydrology, Oceanography, Marine Geology, Glaciology, and Atmospheric Sciences – Climatology, Meteorology & Aeronomy.

Subdisciplines that utilise and contribute to Biology are Marine Geology, Oceanography and Palaeontology. Atmospheric Sciences, Engineering Geology, Geochemistry, Geodesy, Geophysics, Petroleum Geology and Structural Geology utilise and contribute to Mathematics. Atmospheric Sciences, Mineralogy, Petrography, and Petrology are very much linked to Chemistry. Physics is used extensively in Atmospheric Sciences, Climatologic and Geophysics.

With these many interactions of different disciplines, modern interdisciplinary fields have been founded to accommodate the ever expanding and overlapping of Geology and all other basic sciences. They are Atmospheric Chemistry, Biogeochemistry, Paleo-climatology and Paleo-oceanography to name a few. Medical Geology is another interdisciplinary invention of the late 20th century science that is of essence to the well being of mankind. It studies human health in relation to geology e.g. health complications or diseases that are specific to a population residing over certain bedrock or in the vicinity of certain mineral deposit or mining activities.

4 GEOLOGY AND OTHERS

Geology too contributes to non-science disciplines. Geography in general is the study of the interactions between human and the environment as well as the influence of earth's processes and properties on their survival, growth, and development [4]. Thus, Geomorphology, Mineralogy, Mining Geology, Physical Geology, Sedimentology, Stratigraphy and Structural Geology contribute to the discipline of Geography and its related subjects. Archaeology is the study of ancient human cultures through recovery, documentation and analysis of artefacts, biofacts and landforms. As such Palaeontology, Sedimentology and Stratigraphy contribute to the field of Archaeology.

5 CONCLUSSION

As the human race evolved and grew, so did cognitive ability. The need to understand the nature of surrounding landforms and to question the distinct occurrences and distributions of fossils began to take prominence.

Hypotheses were suggested and orated. Some were accepted but only to be proven wrong by the future generations of the cognitively skilled. Some were deemed nonsense by one generation only to be followed up and proven many generations later. Such were the paths trodden by Geology as all disciplines before and after it.

Though the basic sciences have been in existence since before 2400 BC and Geology only since 2 AD, the science of earth has grown fast and caught up with the rest of the basic sciences. Geology, sometimes said to be neither here nor there, has proven its relevance in Science and has earned its place in Science. Geology too has proven its contribution to intra-science disciplines as well as the non-Sciences (Fig.2) and will continue to do so.

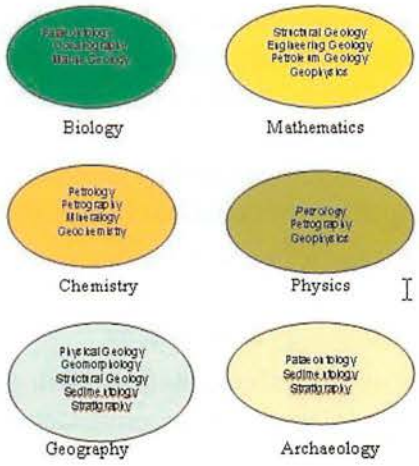

Figure 2 Geology, Basic Sciences and Others

Thus, it suffices to say that Geology is indeed *A Cousin to all Basic Sciences and More*.

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* Manuscripts submitted on 12 February 2007 *

CATATAN GEOLOGI (Geological Notes)

Low Grade, Mesothermal Gold Deposit Characteristics of the Penjom Gold Deposit, Kuala Lipis, Pahang

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Abstract

Penjom gold mine is a lode gold deposit that is much associated with the accretionary prism along the terrain boundary known as the Raub-Bentong Suture. Mineralization took place within a low grade Permo-Triassic island arc system composed of meta-(sedimentary) and volcanic rocks accompanied by extensive deformation (brittle-ductile and shearing zone), metamorphism, and magmatic events that created the favourable environment for source and trap for the gold mineralization. Signs of mineralization such as extensive wall-rock alteration that gave rise to carbonate and alkali metasomatism are evident such as conspicuous occurrence of sericitization, fuchsite, potassic albitization, chloritization as well as sulphidation. Arsenopyrite, pyrite, galena and sphalerite are the common sulphides. Most of the gold-rich samples are proportionally elevated in arsenic. silver, As, Te, Sb, and Bi except Hg are evident in segments associated with sulphide-gold mineralization. Gold has a marked affinity for Te and Bi and less for Sb. Other signatures conspicuously associated with gold included Ba, Mo, Co, Ni, W and Se. The mineralization of gold was believed to be formed at the homogenization temperature higher than 270-280°C hydrothermal fluid which is typical in epizonal mesothermal veins within the metamorphogenic deformational terrain.

Introduction - Gold prospect and mining history in the Central Belt

The Central "Gold" Belt is a 20km wide major N-S trend of gold mining districts that shows the important role of hydrothermal fluids in the development of gold in Peninsula Malaysia, especially in the North Pahang area (Yeap, 1993; Lee et al. 1986; Proctor, 1972; Richardson, 1939). Widespread alluvial gold occurrences have been long recognized in this area and a total in excess of one million ounces of gold has been recovered. Renewed interest in intensive exploration and mining for gold within the Central Belt has come into being since 1985 after the collapse of tin price. Its attraction lies in the good possibilities of finding the existence of a sizeable tonnage of low grade gold deposits, amenable to exploration by low cost, modern techniques of bulk mining (open-pit) with heap leaching and CIP/CIL (Carbon in Pulp/Carbon in Leach) treatments. Many pre-world War II abandoned small scale alluvial and eluvial gold mining spots were worked intermittently and have been targeted for reevaluation since 1990. Pahang and Kelantan were the first to be attractive and favorable economically for attracting foreign investment for systematic gold exploration in the states by the granting of

prospecting licenses of designated concession blocks and consequently mining leases for systematic and modern techniques of gold ventures. Since the closure of the Raub-Australian Gold Mine, the largest underground mine in Malaysia whose gold mining history had produced some 40s ton of gold since 1880. The Penjom Gold Mine is the first, largest and modern open pit gold mine that uses modern extraction methods and processing in Malaysia since its operation in 1996 (3.99 million tonnes, grading 3.78 g/t Au (484100 ounces of gold)) (Flindell, 2003). Currently active evaluation of gold mineralization and development activities at the former Raub Gold mine-Tersang-Tenggelan by Peninsula Gold plc may witness another new modern and bigger scale; open pit gold mine near Raub. Selinsing, Tui, Pulai, Chuah, Buffalo Reef, and Tersang are among old alluvial mining goldfields which are actively being revisited for the existent of low grade bulk-mineable gold deposits.

Geology and gold mineralization setting

Gold mineralization in the Central Gold Belt is generally categorized as a low mesothermal lode gold deposit due to its tectonic and geological setting. Most of the gold mineralization took place within a low-grade meta-sedimentary-volcanic terrain formed during the collision of the Sibumasu block underneath the East Malaya (Indochina) block through the Permian to late Triassic. During this period, subduction zones beneath the East Malaya (Southern extension of Indochina) block constructed an accretionary complex of off scraped oceanic sediments, and mélange, and also East Malaya Volcanic arc and I-type granite, which mainly characterized the Central Belt geology and structure today. The Central Belt comprises mainly of Permo-Triassic low-grade turbiditic metasediments, deep to shallow marine clastic sediments and limestone with abundant intermediate to acid volcanics and volcaniclastics, deposited in a fore arc portion of paleo-arc basin (Metcalfe, 2002; Kamar Shah et al, 2005; Tan, 1984; Leman, 1994; Gobbet and Hutchison, 1973; Richardson, 1939; Proctor, 1972). The Penjom gold deposit (Fig. 1) is one of the promising goldfields currently being mined within the eastern side of the Bentong Suture line of type II of "Central Gold belt" which is located near Kuala Lipis, Pahang as a low grade and bulk-mineable deposit. Type II is a subdivision of the "Central Gold Belt", i.e. gold belt 3 and also known as silver zone (Kamar Shah and Hewson, 2007; Yeap, 1993; Lee et al., 1986). Geologically, mesothermal gold deposits are more important in Peninsula Malaysia although distinctly associated with Tertiary volcanic and hydrothermal activity broadly related to plate boundaries of the Asian region. Magmatism in the Central Belt is markedly less common and consists of an alkali series ranging from gabbro-diorite (157 Ma) monzonite (163 Ma) to quartz syenite (127 Ma), and a later calc-alkali series of granodiorites and granites (Azman, et al., 2006; Hutchison, 1977; Jaafar Ahmad, 1979; Khoo and Tan, 1983; Mohd Rozi and Syed Sheikh Almashoor, 2000; Yong et al., 2004). Geology of the Penjom gold deposit is dominated by widespread occurrences of marine clastic sediments, intermediate to acid volcaniclastics and subordinate rhyolitic lava sequences (Fig. 2). Its belongs to so-called Padang Tengku Formation of the Raub-group and the Pahang Volcanic series. This volcaniclastic and sedimentary association is intruded by a few shallow dipping sheets of tonalite unit as narrow sills and minor dykes of quartz porphyry running almost parallel to the main mineralized shear zone. Tonalite is a major igneous intrusion complex within

the area. The Raub-Bentong Suture has accommodated considerable strikeslip movement. Structural analysis has indicated a regular geometrical pattern of repeated district scale fault trends (Kelau fault) which can be observed within most the goldfields in the Central Belt (Heru Sigit et al., 2000; Tjia & Zaitun, 1985). Mineralization at the Penjom gold deposit is structurally controlled and erratic laterally and vertically. The Penjom thrust is the dominant feature controlling the distribution of ore at Penjom and generally strikes NE (35o) and dips to the southeast (30o- 40o). Considerable shear stresses along the Penjom thrust have remobilized much of the carbon within the shale sequence to form a graphitic "alteration" zone. This, together with sheared and milled rock (fault gouge materials), makes the Penjom thrust an impermeable zone (Kamar Shah and Hewson, 2007; Flindell, 2005; Sonny et al., 2001; Kidd, 1998; Kamar Shah, 1995; Kamar Shah et al., 1995; Hewson and Crips, 1992). Major gold mineralization took place within the footwall of this thrust.

Ore mineralogy and multi-element distribution characteristics

Ores from the Penjom deposit can be broadly divided into four groups, namely vein, dissemination, massive and fragmental. Sulphide minerals mainly arsenopyrite and pyrite are dominant constituents embedded in quartz-carbonate veins. There are widespread occurrences of pyrite, arsenopyrite, sphalerite, galena, chalcopyrite, molybdenite, tetrahedrite and tellurides. The gangue minerals are commonly associated with gold mineralization include quartz, feldspars, carbonates (calcite, ankerite, dolomite, siderite and minrecordite), epidote, manganite, graphite and muscovite (sericite), talc, chlorites, fuchsite, goethite, limonite, fluorite, carbonaceous matter, pyrolusite and kaolinite. They basically coincide with the formation of polymetallic gold-silver ore that is transitional to higher crustal level carbonate-base metal class. Both the veining and massive ores can be subdivided on the basis of their mineral constitution into (1) gold-galena-tetrahedritetellurides (especially altaite) ore, (2) gold-arsenopyrite-pyrite ore, and (3) pyrite. At Penjom, the ore systems display permeability controlled or governed by lithology, structure and breccias and changes in wall rock alteration (quartz, carbonate, sericite, chlorite, fuchsite and clay). Gold mineralization was believed to form at the homogenization temperature higher than 270°C of hydrothermal fluid which is typical for mesothermal vein deposits (Kamar Shah and Hewson, 2007; Wan Fuad and Heru Sigit, 2001, 2003; Kamar Shah, 1995; Herrington, 1992).

Multi-elemental distribution patterns with respect to the depth, litho-geochemistry and structural features of the Penjom gold deposit such as from DDH-3 and DDH-11 (Fig. 2) show that most of the gold-rich samples are proportionally elevated in arsenic. silver, As, Te, Sb, and Bi except Hg as shown in DDH-3 (Table 1 and Fig. 3a) and DDH-11(Fig. 3b) are most elevated in segments associated with sulphide-gold mineralization. Gold has a marked affinity for Te and Bi and less for Sb. Two of the analyzed mineralized samples hosted within tuff of DDH-11, which are characterized by fault gouge materials have shown compelling occurrence of As (80,000 ppm), Au (18 - 47 ppm), Ag (4 - 8 ppm) and Te (8.5 ppm).

Other signatures conspicuously associated with gold include Ba, Mo, Co, Ni, W and Se. These elements in most cases have shown a more sporadic enrichment pattern in proximity to the gold mineralization zone, irrespective of the host rock. Significant presence of Sb up to 130 ppm was detected especially in the segments associated with quartz veining like in DDH-3 and DDH-11. However, Mn, Cr and Ba show generally low concentration in proximity to gold mineralization segments. Elevated values of Cu, Pb, Zn and Fe are often confined to the highly sulphidic mineralization segments, normally characterized by quartz-carbonate veining.

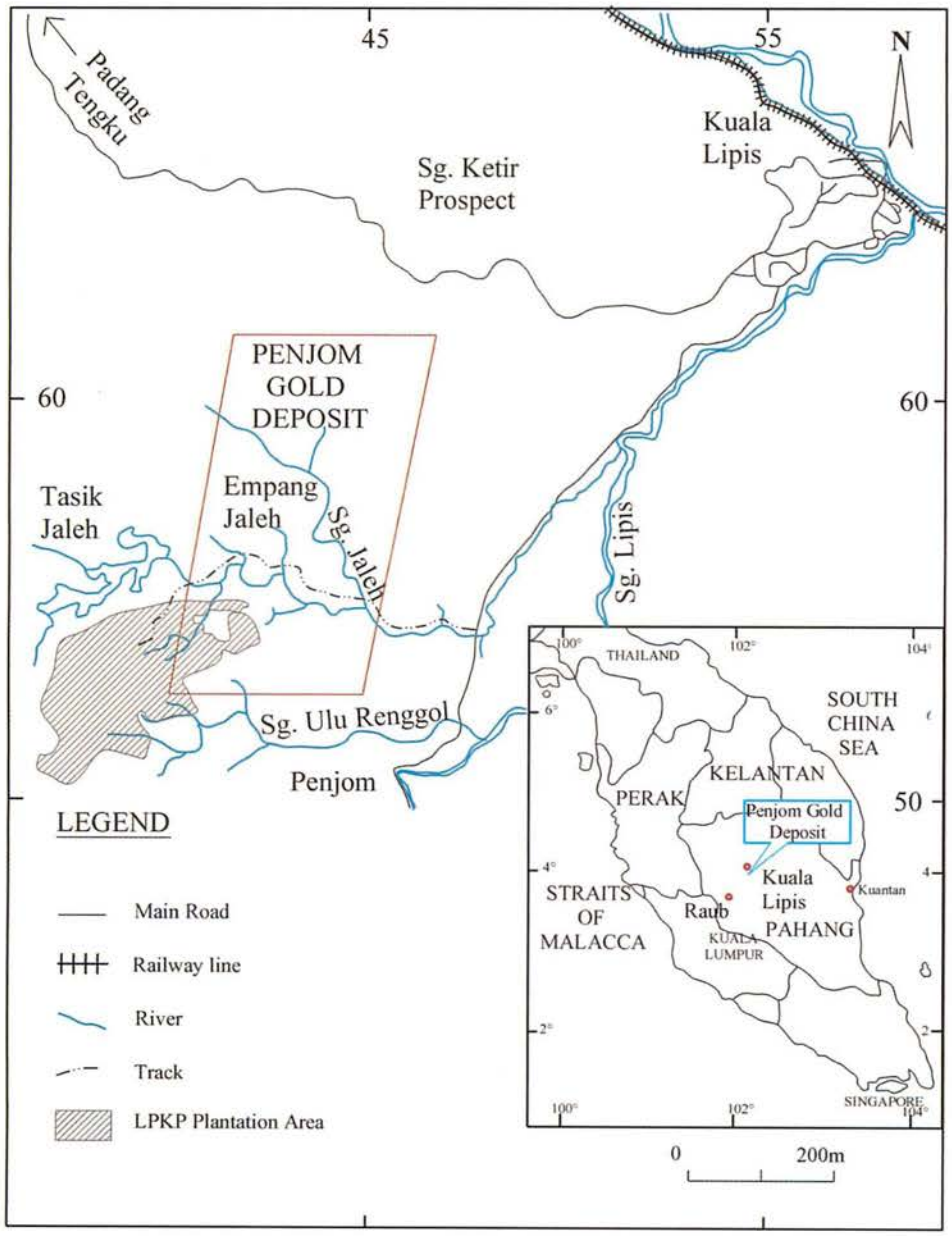

Fig. 1 *Location of Penjom gold deposit within the central Gold Belt*

The Fe, Co, Mo contents appear to be relatively higher within a zone just below the ground surface, which is normally characterized by highly weathered or oxidized subsurface. Gold is associated with varying amount of silver and tellurium as electrum and Au-Ag-Te bearing mineral phases. Pyrite, arsenopyrite, galena and many other sulphide minerals are also important host for submicron gold inclusions. Ratios of Co/Mo, Pb/Zn and Bi/Sb for DDH-11 display a positive trend to the proximity of gold-mineralization zones. Correlation ratio of high Bi/Hg also exhibits a similar positive trend in response to the gold enrichment zone (Kamar Shah, 1995; Kamar Shah and Hewson, 2007).

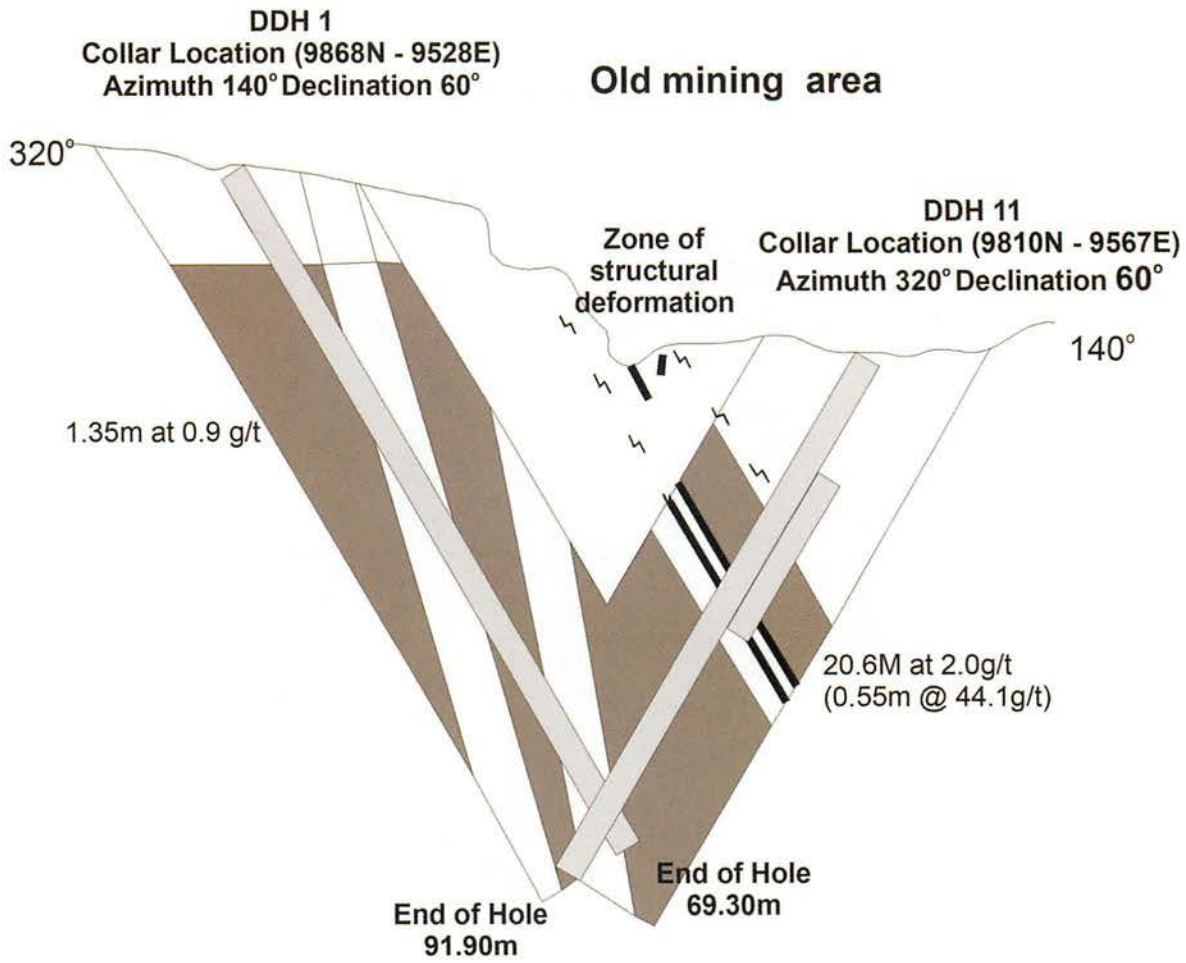

Fig. 2 *An example of explotory drillholes (DDH 1 and DDH 11) that cut the significant mineralization section within the Penjom trust (shear zone).*

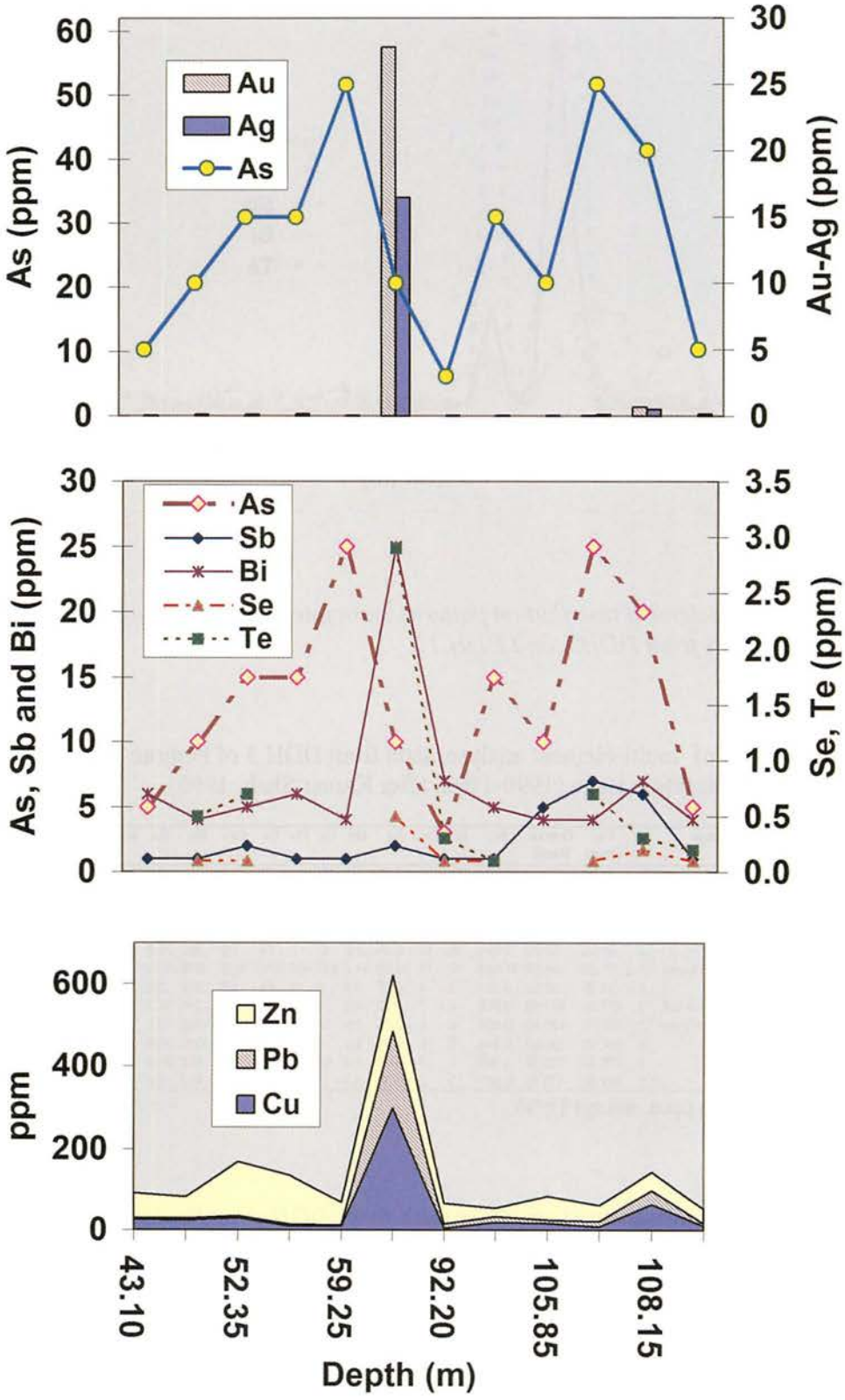
As (ppm)
Au-Ag (ppm)
Au
Ag
As
As, Sb and Bi (ppm)
Se, Te (ppm)
As
Sb
Bi
Se
Te
ppm
Zn
Pb
Cu
43.10
52.35
59.25
92.20
105.85
108.15
Depth (m)

Fig (3a)

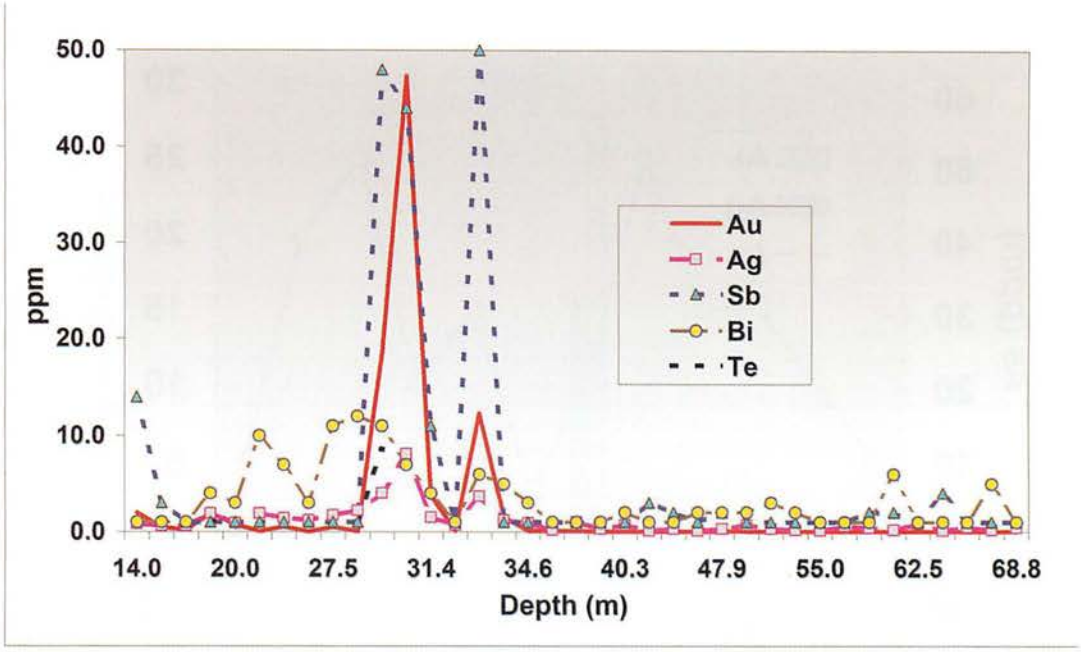

Fig 3(b)

Fig 3(a and b) *Mult-ielement distribution patterns associated with gold mineralization at Penjom gold deposits from DDH3 and DDH 11.*

Table 1 Results of multi-element analyses data from DDH 3 of Penjom gold deposit from the early exploration stage (1990-1992; after Kamar Shah, 1995)

Site No	Field description	BH No	Top Depth	Bottom Depth	Au	Ni	Co	Ag	Mo	Cu	Pb	Zn	Fe	Mn	As	Sn	W	Hg	Sb	Bi	Ba	Cr	Se	Te
1127	tuff	3	43.00	43.10	0.001	14	8	0.10	3.4	27	3	63	3.4	290	5.0	5	2.0	0.02	1	6	101	24		
1128	agglom, siderite alteration	3	45.00	45.30	0.001	11	13	0.20	3.4	24	5	54	3.8	1560	10.0	5	2.0	0.02	1	4	173	24	0.1	0.5
1129	agglom, siderite alteration	3	52.00	52.35	0.001	15	26	0.20	3.2	31	4	134	8.1	5480	15.0	5	2.0	0.02	2	5	352	24	0.1	0.7
1130	agglom, siderite alteration	3	54.40	54.50	0.001	15	21	0.30	2.8	10	5	121	7.9	5040	15.0	5	2.0	0.02	1	6	261	25		
1131	tuff, foliated	3	58.85	59.25	0.001	16	14	0.05	2.0	10	2	58	3.5	362	25.0	5	8.0	0.02	1	4	109	19		
1132	agglom, rubble with q.vein	3	67.00	67.50	57.463	22	31	34.00	14.2	300	185	136	13.0	1910	10.0	5	16.0	0.08	2	25	149	49	0.5	2.9
1121	tuff	3	91.65	92.20	0.001	2	4	0.05	2.9	5	11	51	1.7	584	3.0	5	2.0	0.06	1	7	561	33	0.1	0.3
1122	silic/cherty zone within tuff	3	103.00	103.40	0.008	6	2	0.10	4.8	20	14	21	0.9	361	15.0	5	2.0	0.02	1	5	197	83	0.1	0.1
1123	tuff with 1% euhedral pyrite	3	105.60	105.85	0.007	6	5	0.05	3.9	17	9	59	1.5	1580	10.0	5	2.0	0.02	5	4	668	35		
1124	calc, tuff, banded	3	106.60	106.80	0.048	6	6	0.20	2.9	9	13	40	1.9	1390	25.0	5	24.0	0.02	7	4	358	22	0.1	0.7
1125	tuff, silica	3	108.00	108.15	1.378	7	3	1.00	3.4	64	36	45	1.5	650	20.0	5	2.0	0.02	6	7	182	50	0.2	0.3
1126	tuff, silica	3	109.80	110.10	0.003	2	2	0.30	3.7	11	6	36	1.5	652	5.0	5	2.0	0.02	1	4	97	21	0.1	0.2

(all elements in ppm, except Fe%)

Table 1. *Results of multi-element analyses data from DDH 3 of Penjom gold deposits from the early exploration stage (1990- 1992: after Kamar Shah, 1995)*

Acknowledgements

I would like to express my sincere gratitude to Prof. C.S. Hutchison and Prof. Wan Fuad Wan Hassan, UKM for their valuable comments and suggestions.

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** Manuscripts submitted on 8 June 2007 **

More Glimpses of Engineering Geology in Malaysia*

Tan Boon Kong, Consultant Engineering Geologist, Petaling Jaya.

This short note provides more glimpses of Engineering Geology in Malaysia, following two previous articles in JURUTERA, Tan (2005b, 2006). Some other recent publications on Engineering Geology are listed in the references for those interested in knowing more about the subject.

The various applications or actual case histories of Engineering Geology as it relates to various aspects of civil engineering works are illustrated by photographs as follows. Detailed discussion is contained in the paper by Tan (2007) submitted to the 16th S.E.Asian Geotechnical Conference 2007, K.L.

ENGINEERING GEOLOGY APPLICATIONS AND CASE STUDIES

Foundations in Limestone

F1(a)

F1(b)

Fig. 1a, 1b. Pinnacled limestone bedrock, Sunway.

Limestone Cliff Stability

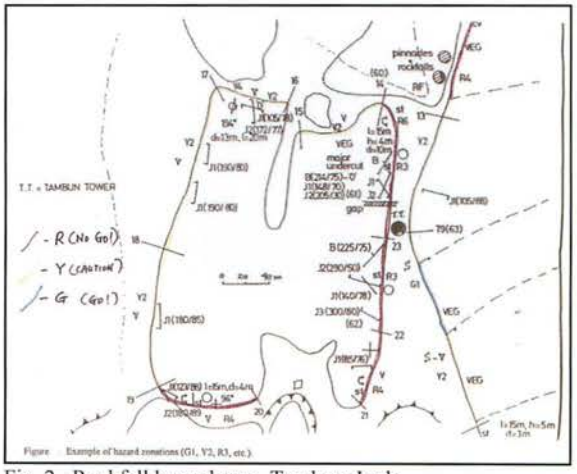


Fig. 2. Rockfall hazard map, Tambun, Ipoh.

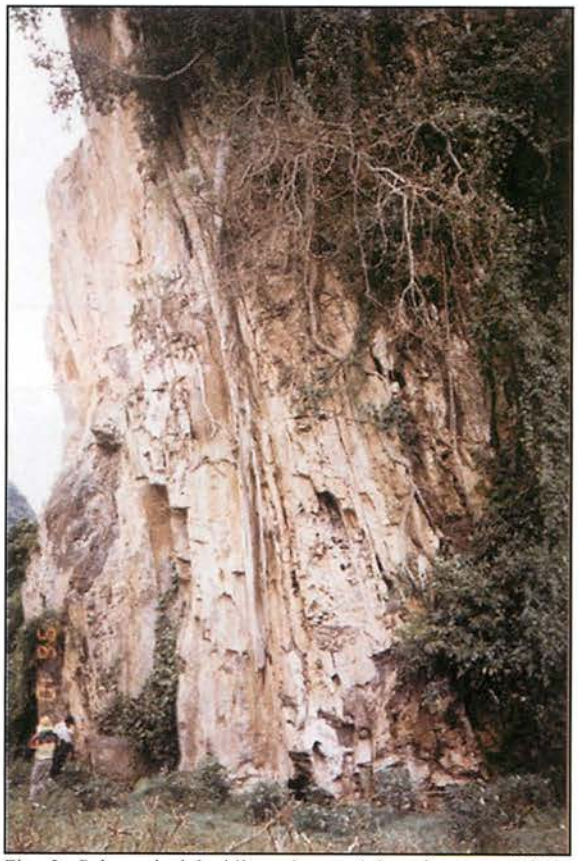


Fig. 3. Sub-vertical bedding planes giving rise to rockfall., Tambun, Ipoh.

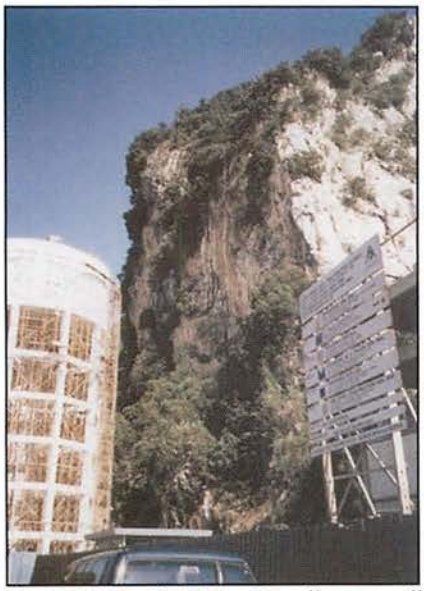


Fig. 4. Water tank at Batu Caves limestone cliff, Kuala Lumpur.

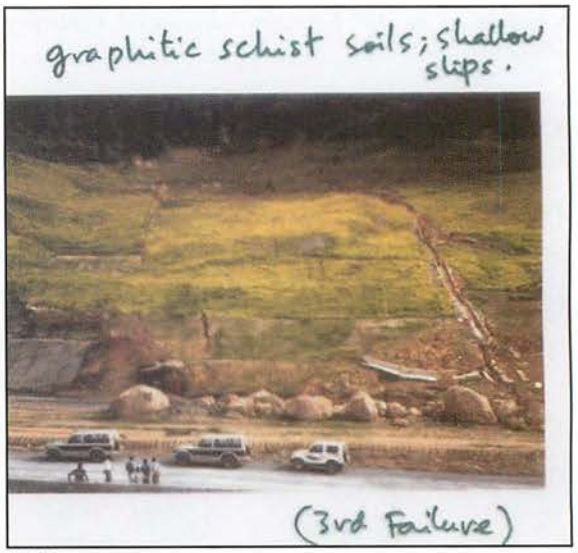
Rock Slope Stability

F5 (a)

F5 (b)

Figs. 5a, 5b: Graphitic schist, Senawang-Ayer Keroh Highway.

Fig. 5c. Secondary minerals on graphitic schist, Senawang-Ayer Keroh Highway.



F6 (a)

F6 (b)

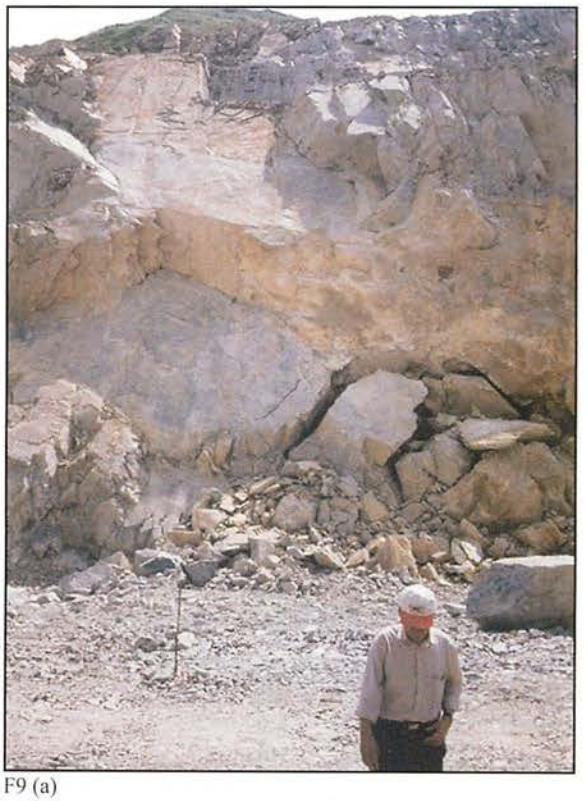
Fig. 6a, 6b. Failures in graphitic schist cut slopes, Lojing Highway.

Fig. 7. "Flattened" cut slope in graphitic schist, N-S Highway near Rawang.

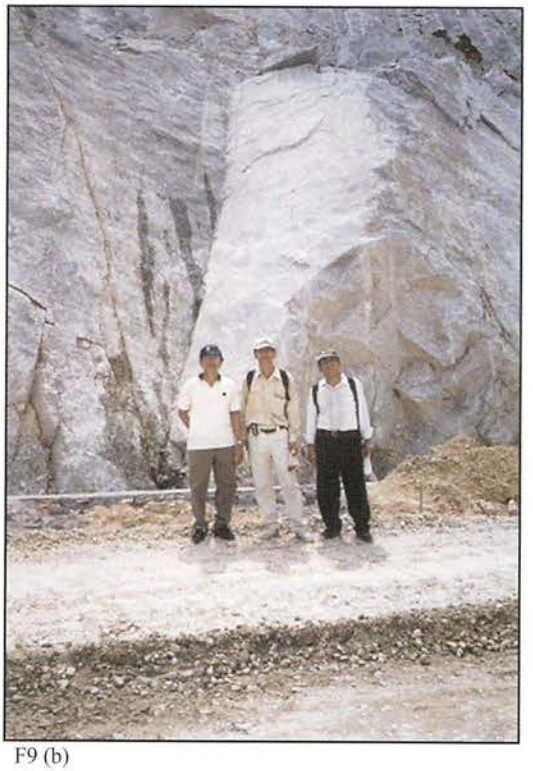
F8(a)

F8 (b)

Fig. 8a-8b. Slope failures controlled by bedding planes and faults, Sarawak rural road.



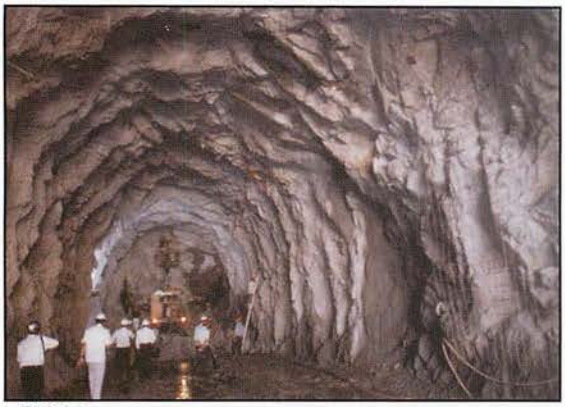
F9 (a)



F9 (b)

Fig. 9a-9b. Classic examples of planar and wedge failures in granite cut slope, SILK highway, Kajang.

Tunnels



F10 (a)

F10 (b)

Fig. 10a-10b. Highly fractured granite and steel sets support, diversion tunnel, Sg. Selangor dam.

Riverbank Instability

Fig. 11. Riverbank instability, Sarawak.

Slope Failure due to Rapid Draw-down

Fig. 12. Rapid draw-down of mining pond triggering slope failure and destroying houses, Kuala Lumpur.

Urban Geology & Hillsite Development

F13 (a)

F13 (b)

F13 (c)

Fig. 13a-13c. Slope failures associated with housing projects in hilly terrains, Kuala Lumpur.

Dam Geology

Fig. 14. Foundation grouting at Batu Dam, K.L.

Fig. 15. Kenyir Dam, a rockfill dam, Kuala Berang, Terengganu. Dolerite dykes (black) in granite.

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* Author's Footnote: This short note was published in the IEM bulletin (Jurutera), May 2007. It is reproduced here in Warta Geologi for the benefit of GSM members in general, and young Engineering Geologists in particular.

Dated: 20th Aug. 2007.

PERTEMUAN PERSATUAN (Meeting of the Society)

PERSIDANGAN GEOSAINS KEBANGSAAN 2007

(National Geoscience Conference 2007)

NGC 2007

"GEOLOGI & TAHUN MELAWAT MALAYSIA 2007"

7 - 9 Jun 2007
Universiti Malaysia Sabah
Kota Kinabalu, Sabah

PROGRAM & ABSTRAK

Seminar Geosains Kebangsaan 2007 (NGC 2007)
Universiti Malaysia Sabah, Kota Kinabalu
7 - 9 Jun 2007

UCAPAN OLEH YB DATUK HJ. MASIDI MANJUN MENTERI PELANCONGAN, KEBUDAYAAN DAN ALAM SEKITAR NEGERI SABAH

YBhg. Prof. Datuk Dr. Mohd Noh Dalimin, Naib Canselor Universiti Malaysia Sabah,
YBerusaha Tuan Haji Yunus Abd Razak, Presiden Persatuan Geologi Malaysia,
(Diwakili oleh Timbalan Presiden: Prof. Mady Dr. Jacqueline Joy Pereira),
Timbalan-Timbalan Naib Canselor Universiti Malaysia Sabah,
Pn. Fatimah Jaafar, Pengarah Unit Sains dan Teknologi, Kerajaan Negeri Sabah,
Prof. Madya Dr. Felix Tongkul dan En. Alexander Yan, Pengerusi dan Pengerusi Bersama Persidangan,
Dekan-Dekan, Ketua Ketua Unit, Ketua Ketua Jabatan

Tuan-tuan dan Puan-Puan

Selamat datang ke PERSIDANGAN GEOSAINS KEBANGSAAN 2007 (National Geoscience Conference 2007). Di kesempatan ini saya ingin mengucapkan ribuan terimakasih kerana menjemput saya hadir untuk merasmikan 'Persidangan Geosains Kebangsaan 2007' seterusnya menghadiri aturcara makan malam bersama semua peserta yang terlibat pada petang berbahagia ini . Saya juga ingin merakamkan ucapan terimakasih dan syabas kepada Persatuan Geologi Malaysia dan AJK Persidangan kerana telah menjadikan negeri Sabah sebagai tempat bagi persidangan Geosains peringkat kebangsaan pada tahun ini. Tahniah saya ucapkan kepada Sekolah Sains dan Teknologi, Universiti Malaysia Sabah yang telah memikul tanggungjawab untuk menjadi tuan rumah dan seterusnya menjadi penganjur bersama persidangan yang penuh bermakna ini. Tahniah juga kepada Jabatan Mineral dan Geosains, Cawangan Kota Kinabalu dan Unit Sains dan Teknologi, Kerajaan Negeri Sabah selaku penganjur bersama. Jalinan kerjasama dalam menjayakan persidangan ini adalah satu contoh baik dalam mewujudkan hubungan baik di kalangan institusi pengajian tinggi, agensi kerajaan negeri, kerajaan pusat dan persatuan akademik. Kehadiran tuan-tuan dan puan-puan sama ada sebagai pembentang, peserta dan jemputan dari dalam negeri Sabah atau dari luar negari Sabah menunjukkan sokongan dan komitmen terhadap program yang telah diatur di negeri Sabah ini.

Tuan/Puan

Tema seminar iaitu 'Geologi dan Tahun Melawat Malaysia 2007' sangat bersesuaian dengan strategi kerajaan negeri dan juga dasar negara pada tahun ini untuk mempromosikan negeri Sabah dan Malaysia sebagai destinasi pelancong dari dalam negara dan juga luar negara. Sektor pelancongan adalah salah satu daripada penyumbang sumber ekonomi terbesar negara. Sebagai contohnya pada tahun 2006 hasil pendapatan negara melalui pelancongan ialah RM36.2 billion iaitu peningkatan sebanyak RM6.2 billion berbanding tahun sebelumnya iaitu RM31.0 billion (2005). Saya yakin dengan program yang dirancang oleh kerajaan dan sokongan semua seperti acara hari ini maka secara tidak langsung akan menjadi sandaran kepada peningkatan para pelancong seterusnya akan meningkatkan pendapatan

negara. Saya ingin mengulangi lagi saranan YAB Perdana Menteri Malaysia Datuk Seri Abdullah Ahmad Badawi dalam perhimpunan perdana Citra Warna Malaysia 2007 pada malam 26 Mei 2007 di Dataran Putrajaya yang dihadiri oleh lebih kurang 70 ribu orang termasuk pelancong dari luar negara. Dalam perhimpunan tersebut Perdana Menteri menggesa semua rakyat memberi kerjasama dan mengambil bahagian dalam semua perancangan yang diadakan oleh kerajaan. Komitmen ini boleh ditonjolkan melalui hubungan mesra dan bersopan santun sesama rakyak lebih-lebih lagi dengan pelancong. Seperti tuan-puan telah maklumi negara Malaysia dan negeri Sabah khususnya terdiri dari pelbagai kaum yang sangat kaya dengan adat resam. Begitu juga dengan pelbagai tempat semulajadi yang menarik yang boleh diketengahkan untuk menarik pelancong datang. Bersesuaian dengan persidangan ini, tempat tarikan semulajadi yang mempunyai nilai geologi yang tinggi seperti landskap pantai, pulau-pulau berhampiran pesisir pantai yang menarik, gunung Kinabalu dan tidak ketinggalan juga kawasan pedalaman seperti lembah Danum, lembah Maliau perlu dihebahkan dan dipromosikan lagi kepada pelancong dalam dan luar negara. Pada hemat saya kunjungan para pelancong sebenarnya masih belum mencukupi sekiranya makluman saintifik tidak diselitkan dan diperjelaskan kepada semua yang mengunjungi kawasan tersebut.

Tuan/Puan

Seperti semua telah maklumi aktiviti perlombongan sama ada petroleum dan gas asli ataupun mineral dan kuari memang sinonim dengan bidang geologi. Sumbangan geosains dalam bidang tersebut memang tidak dapat dinafikan. Dan kalau tuan-tuan masih ingat lagi sehingga tahun 2000 yang sudah sebelum lombong tembaga Mamut ditutup, negeri Sabah merupakan pengeluar tembaga yang terbesar di Malaysia. Ini membuktikan sumbangan bahan tersebut dalam ekonomi negeri Sabah dan Malaysia amnya. Tidak dinafikan juga wujudkanya kesan aktiviti perlombongan ini terhadap alam sekitar; namun saya yakin kerajaan negeri telah menjalankan usaha untuk mengangani masalah ini. Saya juga harap para geosaintis dalam menyumbangkan idea kearah mengurangkan impak atau kesan aktiviti tersebut terhadap alam sekitar. Tidak dapat dinafikan sumbangan besar aktiviti perlombongan tersebut yang telah diberikan kepada negeri Sabah, lebih-lebih lagi penduduk di sekitar Ranau. Saya difahamkan kelmarin iaitu pad 7hb Jun 2007 diadakan satu siri kerja lapangan dikawasan tersebut, untuk melihat landskap atau bentuk muka bumi hasil daripada aktiviti perlombongan itu. Saya harap kunjungan itu akan mencetuskan satu hasil dan idea untuk penambahbaikan kawasan tersebut yang telah lama dibiarkan begitu sahaja. Kerja lapangan ini juga melibatkan kawasan Kundasang. Pemilihan ini berdasarkan kecantikan dan keunikan kawasan tersebut sebagai destinasi pelancongan dengan terdapatnya Gunung Kinabalu iaitu Gunung yang tertinggi di Malaysia. Saya juga dimaklumkan bahawa kawasan Kundasang merupakan kawasan yang 'fragile' atau lemah dan terdedah kepada kejadian pergerakan jisim atau tanah runtuh. Memang tidak dinafikan kawasan ini sering kali mengalami masalah tersebut. Setiap kali saya ke Ranau dan melalui kawasan tersebut ada sahaja aktiviti pembinaan atau penambahbaikan dijalankan. Oleh itu saya sarankan para geosaintis cuba untuk melihat dan seterusnya menjalankan kajian yang terperinci bagi mengurangkan risiko tanah runtuh dan kegagalan tanah dikawasan tersebut.

Tuan/Puan

Saya yakin Persidangan Geosains yang diadakan di negeri Sabah ini dapat memberikan kesan yang bermakna dalam merancakkan perkembangan dan pengetahuan sains dan teknologi sejajar dengan wawasan rancangan Malaysia Ke-9 untuk memperkasakan Sains Teknologi dan Inovasi. Banyak dana

dan prasarana diwujudkan oleh kerajaan untuk membantu meningkatkan kajian Sains dan Teknologi. Saya harap persidangan seumpana ini menjadi medan kearah mencapai rancangan yang talah digariskan oleh Kerajaan . Para geosaintis boleh menjadikan medan persidangan ini untuk berbincang, bertukar pandangan, dan berkongsi pengalaman. Program seperti ini juga dapat mewujudkan jalinan kerjasama sesama geosaintis selaras dengan wawasan negara. Wawasan Negara dalam RM 9 memang sangat jelas untuk mewujudkan negara Malaysia sebagai sebuah negara yang maju dalam bidang sains dan teknologi, serta mengaplikasikan pengetahun ini melalui rekaan dan ciptaan berkualiti yang menyumbang kepada pembangunan dan perkembangan ekonomi negara.

Tuan/Puan

Untuk mengakhiri ucapan ini saya ingin merakamkan ucapan terimakasih sekali lagi kerana menjemput saya merasmikan persidangan ini dan saya harap hasil persidangan ini nanti dapat memberikan manfaat kepada masyarakat dan negara kita dan seterusnya dapat digunapakai oleh kerajaan dalam merangka dasar, bantuan dan dana khususnya berkaitan bidang geosains. Harapan saya usaya persidangn seperti ini dapat diteruskan pada masa-masa akan datang dan saya mohon persidangan ini bukannya yang terakhir diadakan di negeri Sabah, dan saya sangat mengalu-alukan kedatangan para delegasi dari luar Sabah pada masa-masa yang akan datang. Dengan itu maka saya dengan rasminya MERASMIKAN PERSIDANGAN GEOSAINS KEBANGSAAN 2007 (NGC 2007)
di Kota Kinabalu, SABAH.

TERIMAKASIH

YANG BERHORMAT DATUK HJ. MASIDI MANJUN
Menteri Pelancongan, Kebudayaan Dan Alam Sekitar Sabah

Seminar Geosains Kebangsaan 2007 (NGC 2007)
Universiti Malaysia Sabah, Kota Kinabalu
7 - 9 Jun 2007

UCAPAN OLEH YBHG PROF. DATUK DR. MOHD NOH DALIMIN NAIB CANSELOR UNIVERSITI MALAYSIA SABAH

YB. Datuk Hj. Masidi Manjun, Menteri Pelancongan, Kebudayaan dan Alam Sekitar Negeri Sabah
YBerusaha Tuan Haji Yunus Abd Razak, Ketua Pengarah Jabatan Mineral dan Geosains Malayia, Merangkap Presiden Persatuan Geologi Malaysia
Timbalan-Timbalan Naib Canselor Universiti Malaysia Sabah
Prof. Madya Dr. Felix Tongkul dan En. Alexander Yan, Pengerusi dan Pengerusi Bersama Persidangan
Dekan-Dekan, Ketua Ketua Unit, Ketua Ketua Jabatan

Tuan-tuan dan Puan-Puan

Assalamualaikum wbt dan salam sejahtera

Di kesempatan ini saya ingin mengalu-alukan kedatangan para geosaintis daripada seluruh Malaysia dan juga daripada luar negara ke 'Persidangan Geosains Kebangsaan 2007' yang diadakan di Kampus Universiti Malaysia Sabah, Kota Kinabalu. Setinggi-tinggi ucapan terimakasih kepada Menteri Pelancongan, Kebudayaan dan Alam Sekitar Negeri Sabah kerana sudi meluangkan masa merasmikan Persidangan kali ini walaupun saya percaya Yang Berhormat mempunyai jadual yang begitu ketat.

Tuan/Puan

Saya dimaklumkan bahawa Persidangan Tahunan Geologi seperti ini pernah diadakan di Kota Kinabalu pada tahun 1996 dengan kerjasama staf UMS dan Jabatan Mineral dan Geosains. Ini bermakna kitaran kedua persidangan yang diadakan di Sabah dan dianjurkan bersama oleh Universiti Malaysia Sabah dan Jabatan Mineral dan Geosains ini diadakan setelah 11 tahun yang lalu. Sehubungan dengan itu saya sangat berterimakasih kepada Persatuan Geologi Malaysia kerana memilih UMS untuk menjadi tuan rumah pada persidangan kali ini.

Bidang geologi sejak lima tahun terakhir memperlihatkan satu ledakan besar yang positif dalam scenario negara Malaysia khususnya yang berkaitan dengan keperluan pihak industri dan syarikat luar negara yang begitu memerlukan bilangan geosaintis yang ramai untuk berkhidmat. Dalam satu kolokium geosains pertama iaitu Colloquium Geoscience 2007 anjuran PETRONAS bersama syarikat-syarikat berkaitan industri gas dan petroleum yang diadakan di Miri Sarawak pada 11 – 13 Februari 2007 yang di rasmikan oleh Menteri Pengajian Tinggi YB Datuk Mustapa Mohamed, satu perbincangan ilmiah telah di jalankan tentang keperluan mendadak pihak industri terhadap ahli geologi khususnya untuk industri gas dan petroleum. Lanjutan daripada itu juga satu persetujuan telah dicapai diantara IPTA dan IPTS yang menawarkan subjek geologi dan syarikat yang bakal menerima graduan geologi supaya diwujudkan satu penyelarasan korikulum kursus-kursus yang ditawarkan di IPTA mengikut keperluan pihak industri dalam pasaran antarabangsa; dan juga perancangan ambilan para pelajar dalam bidang geologi. Saya yakin UMS sebagai salah satu daripada tiga universiti yang menawarkan program geologi tulin di

Malaysia akan sama-sama menunjukkan komitmen dan memegang amanah untuk meningkatkan mutu modal insan yang bakal dikeluarkan dan nantinya akan memberikan perkhidmatan kepada negara.

Untuk pengetahuan tuan-puan sehingga lima tahun yang terakhir hingga kini UMS masih lagi mengambil pelajar-pelajar geologi pada bilangan purata 60 orang setahun. Jumlah bilangan tersebut adalah memadai dan optimum yang dapat diambil oleh Program Geologi, SST, UMS berdasarkan kapasiti keupayaan bilangan pensyarah dan prasarana yang terdapat di UMS. Saya juga sedar secara umumnya masih lagi berlaku kekurangan pensyarah geologi dalam beberapa bidang pengkhususan. Di UMS senario ini memang dialami oleh kebanyakan bidang sains dan teknologi. Mungkin masalah ini timbul disebabkan masalah logistik UMS yang jauh dari KL menyebabkan ramai yang kurang berminat datang ke Sabah dan juga mungkin hasil daripada persaingan dengan industri – industri luar yang memerlukan khidmat geosains masa ini dan tidak berminat untuk berkhidmat di universiti. Ini juga menunjukan berlakunya persaingan yang sihat dalam menawarkan pekerjaan kepada graduan geosains. Namun saya selaku pihak pengurusan tertinggi universiti prihatin terhadap masalah kekurangan pensyarah di UMS dan Insya Allah akan kita atasi sedikit demi sedikit.

Tuan/Puan

Saya difahamkan soal selidik terhadap graduan geologi UMS pada tahun 3 tahun terakhir ini (2004. 2005 dan 2006) menunjukkan lebih kurang 50% daripada graduan geologi telah diambil bekerja dalam syarikat petroleum dan gas asli, syabas kepada mereka dan terima kasih kepada majikan yang mengambil mereka dan kepercayaan yang diberikan kepada para graduan geologi UMS. Selain daripada itu juga didapati sekitar 30 % bekerja dalam sektor pembinaan. Manakala yang selebihnya mengikuti pelbagai sektor pekerjaan yang lain. Bilangan ini menunjukkan perkembangan yang positif kerana bilangan graduan yang menganggur tidak timbul.

Tuan/Puan

Dalam bidang penyelidikan pula, UMS telah mengambil inisiatif untuk menubuhkan beberapa pusat kecermelangan, dan salah satu daripadanya yang berteraskan pengetahuan geosains adalah Pusat Kajian Bencana Alam. Sejak penubuhan pusat ini tahun lalu, saya difahamkan beberapa penyelidikan berkaitan dengan bencana alam seperti tanah runtuh, banjir dan gempabumi sedang giat dijalankan oleh pusat ini. Saya harap beberapa pusat lain yang berteraskan geosains dapat ditubuhkan pada masa akan datang demi perkembangan sains dan teknologi di negeri Sabah khsusnya dan Malaysia amnya. Sehubungan dengan itu juga saya dimaklumkan bahawa kajian geosains oleh penyelidik dari UMS ataupun juga kajian bersama penyelidik dari luar UMS sedang giat dijalankan di negeri Sabah. Ini membuktikan kehadiran UMS di Sabah begitu relevan dalam merancakkan lagi proses memperkasakan perkembangan sains dan teknologi. Kajian Formasi Formasi Batuan di Sabah, kajian geomorfologi dan proses-proses geologi yang membentuk landskap sangat sinonim dengan geopelancongan yang boleh dijadikan aset penting para pelancong mengunjungi negeri Sabah. Contohnya di Simpang Mengayau Kudat, yang memperlihatkan struktur batuan menarik dan bentuk morfologi tepi pantai. Begitu juga dengan beberapa kawasan volkano Lumpur seperti di Pulau Tiga, di Kuala Penyum di kawasan Tabin, Lahad Datu di kawasan Tingkayu, Tawau.

Satu perkara menarik yang saya ingin kongsi bersama betapa Sabah sangat kaya dengan khazanah dalam bidang geologi ialah dari segi tanah gunung berapi yang subur khususnya di Semenanjung Dent Lahad Datu dan Semenanjung Semporna Tawau. Tidak hairan kalau kawasan tersebut menjadi kawasan pertanian yang menyumbang kepada ekonomi negeri Sabah. Berbanding dengan usia batuan di Semenanjung Malaysia, saya difahamkan bahawa batuan di negeri Sabah khususnya tempat yang saya sebutkan tadi adalah antara batuan yang termuda dari segi usia geologi iaitu dianggarkan antara 27,000 hingga 5 juta tahun. Di negeri Sabah batuan tertua yang terdapat di Lahad Datu dianggarkan berusia 140 juta tahun batuan. Manakala di Sepenanjung Malaysia batuan tertua dianggarkan berusia 540 juta tahun yang tersingkap di Langkawi Kedah. Usia batuan yang relatifnya mudah di negeri Sabah menjadikan kawasan ini unik dan menjadikan peluang kepada geosaintis menjalankan kajian.

Tuan/Puan

Harapan saya semoga Persidangan ini menjadi medan pertemuan kepada para geosaintis di Malaysia khususnya dalam rangka mempertingkatkan taraf ilmu geosains melalui persembahan hasil kajian yang telah dijalankan dalam negara atau luar negara, perbincangan secara saintifik, dan bertukar-tukar fikiran dengan berhemah. Saya yakin melalui persidangan dan pertemuan ini maka bidang geosains semakin berkembang maju di Malaysia sesuai dengan arus perkembangan sains dan teknologi dunia. Ini seiring dengan wawasan negara untuk mewujudkan negara yang bertaraf negara maju yang generasinya berminda sains dan teknologi yang tinggi.

Akhir kata saya sarankan para peserta dari luar UMS agar dapat meluangkan masa melawat suasana kampus yang menarik di UMS. Sesuai dengan temah seminar maka nikmatilah landskap di UMS juga tidak lari dari elemen geologi; kedudukan tepian pantai menunjukan landskap kawasan pantai yang menarik dan dari puncak bukit tuan-puan boleh menyaksikan pemandangan puncak gunung tertinggi di Malaysia disamping menikmati panorama Bandaraya Kota Kinabalu.

Sekian terimakasih

PROF. DATUK DR. MOHD NOH DALIMIN
Naib Canselor Universiti Malaysia Sabah

Seminar Geosains Kebangsaan 2007 (NGC 2007)
Universiti Malaysia Sabah, Kota Kinabalu
7 - 9 Jun 2007

UCAPAN OLEH PROF. MADYA DR. JOY JACQUELINE PEREIRA NAIB PRESIDEN PERSATUAN GEOLOGI MALAYSIA

Tuan Haji Yunus Abdul Razak, Presiden Persatuan Geologi Malaysia tidak dapat menghadirkan diri pada hari ini kerana beliau berada di Filipina, mewakili negara dalam mesyuarat kerajaan. Walaubagaimanapun, beliau memberi amanat beliau kepada saya untuk menyampaikan salam beliau kepada semua dan mengharapkan perjumpaan ini menjadi pertemuan yang produktif. Beliau juga menyampaikan setinggi-tinggi penghargaan kepada pihak penganjur persidangan geosains peringkat kebangsaan 2007, iaitu Universiti Malaysia Sabah dan Jabatan Geosains dan Mineral Sabah, dengan sokongan Unit Sains dan Teknologi Kerajaan Negeri Sabah kerana merealisasikan persidangan ini, dengan harapan kerjasama di antara ketiga-tiga organisasi di Sabah ini akan berterusan selepas persidangan dan menjadi lebih erat di masa hadapan.

Tuan presiden juga mengingatkan tuan-tuan dan puan-puan semua bahawa Persatuan Geologi Malaysia sekarang sudah mencecah usia 40 tahun. Sejak ditubuhkan pada tahun 1967, persatuan telah menjadi penyumbang terbesar kepada perkembangan pengetahuan dalam geosains di malaysia. Persatuan telah menganjurkan lebih dari 80 perjumpaan pada peringkat kebangsaan mahupun peringkat antarabangsa dan juga menerbitkan 53 Buletin serta 40 jilid Warta Geologi. Pada tahun lepas, nama persidangan tahunan telah ditukar kepada Persidangan Geosains Kebangsaan untuk menyerlahkan status kebangsaan Persatuan serta memberi kesan yang lebih mantap dalam memajukan pengetahuan geosains dalam negara. Bagi tujuan ini, tuan presiden juga mengharap untuk melihat lebih banyak penglibatan aktif daripada ahli-ahli persatuan. Beliau juga menggesa semua ahli persatuan menyumbang dalam membantu meningkatkan keahlian dengan menggalakkan rakan-rakan geosains mereka menjadi ahli persatuan ini.

Malaysia sedang meraikan sambutan "United Nations International Year of Planet Earth, 2008". "International Year" menumpukan sumbangan pengetahuan geosains dalam menjadikan masyarakat lebih selamat dan sihat. Golongan sasaran iaitu pembuat dasar, ahli politik dan orang awam adalah orang yang perlu diberikan lebih pendedahan dan maklumat mengenai cara penggunaan pengetahuan geosains dalam menyumbangkan ke arah pembangunan mampan. Begitu juga dengan ahli geosains yang memerlukan bimbingan dalam menggunakan pengetahuan luas mereka agar dapat memberi sumbangan berguna terus kepada masyarakat. Persatuan Geologi Malaysia terlibat secara aktif dalam memberikan sokongan kepada kementerian alam sekitar dan sumber asli dalam usaha ini. Pada peringkat serantau, persatuan akan mengetuai dalam menggiatkan kerjasama antara persatuan geologi Asia Tenggara (GEOSEA) dengan mengadakan mesyuarat serantau pada 2008. Persatuan bercadang untuk menubuhkan sekreteriat GEOSEA di Kuala Lumpur bagi meningkatkan profilnya di rantau ini. Pada peringkat kebangsaan, antara aktiviti yang telah dirancang ialah debat pada peringkat universiti dan sekolah menengah, pengeluaran artikel dalam media massa dan cetak, rencana liputan tentang sumbangan geosains kepada masyarakat serta pameran antara lain.

Persatuan juga sedar tanggungjawab bagi memastikan kualiti dalam perkembangan pengetahuan geosains dalam negara ini. Bagi tujuan ini, kami sedang berusaha untuk menjadikan Buletin Persatuan Geologi suatu jurnal yang mempunyai "impact factor'. Kini pihak kami sedang membuat persediaan dan saya menyeru semua bakal penyumbang supaya menyemak semula keperluan yang dikehendaki dalam Buletin 53 yang diedarkan pada pagi ini sebelum menghantar artikel anda pada masa akan datang.

Bagi pihak Presiden dan Majlis Persatuan saya mengucapkan terima kasih kepada jawatankuasa pertubuhan dalam menganjurkan persidangan ini dan saya mengharapkan anda semua mendapat faedah yang berterusan daripada persidangan ini.

Sekian Terima kasih.

Prof Madya Dr Joy Jacqueline Pereira
Naib President, Persatuan Geologi Malaysia

JABATAN MINERAL DAN GEOSAINS

PERSATUAN GEOLOGI MALAYSIA

UNIVERSITI MALAYSIA SABAH,

UNIT SAINS & TEKNOLOGI, SABAH

PERSIDANGAN GEOSAINS KEBANGSAAN 2007
(National Geoscience Conference 2007)
NGC 2007

Opening ceremony with Datuk Hj. Masidi Manjun

VC UMS Prof. Datuk Mohd Noh Dalimin presenting a memento to Datuk Hj. Masidi Manjun, Minister of Tourism, Culture & Environment of Sabah

ATURCARA SEMINAR GEOSAINS KEBANGSAAN 2007
(PROGRAMME OVERVIEW OF NGC 2007)

	8 JUN 2007 (Jumaat)
07.30 – 08.30	Pendaftaran
08.30 – 09.10	Ucap utama I oleh : - H.D Tjia Pembentangan Kertas Kerja, Sesi 1A dan 1B
09.10 – 10.50	Sesi 1A : Geologi Kejuruteraan Sesi 1B : Geologi Sekitaran
10.50 – 11.30	Sesi Pembentangan Poster I (P1 – P9)
11.30 – 14.00	Makan Tengahari & Solat Jumaat
14.00 – 14.30	Ucap utama II oleh :- Mohd. Shafeea Leman Pembentangan Kertas Kerja, Sesi 2A and 2B
14.30 – 16.30	Sesi 2A : Geologi Kejuruteraan Sesi 2B : Geologi Ekonomi/ Sumber Mineral
16.30 – 17.00	Kudapan & Rehat
20.00 – 22.30	**Majlis Perasmian** *19.30 – Ketibaan para peserta* *20.00 – Ketibaan para jemputan* *– Ketibaan Naib Canselor, UMS* *– Ketibaan Perasmi* *20.30 – Ucapan alu-aluan oleh :-* *En. Alex Yan (PengerusiBersama NGC 07)* *– Ucapan oleh :-* *Tuan Hj. Yunus Abd. Razak (Presiden GSM)* *– Ucapan oleh :-* *YBhg. Prof. Datuk Dr Mohd. Noh Dalimin* *Naib Canselor, UMS* *– Ucapan Perasmian :-* *YB. Datuk Hj. Masidi Manjun* *Menteri Pelancongan, Kebudayaan & Alam Sekitar, Sabah* *– Penyampaian Cendera Kenangan*
22.30	**SELESAI HARI PERTAMA**
	9 JUN 2007 (Sabtu)
08.30 – 09.00	Ucap utama III oleh :- Sanudin Hj. Tahir Pembentangan Kertas Kerja, Sesi 3A and 3B
09.00 – 10.00	Sesi 3A : Gelogi Kejuruteraan Sesi 3B : Petrografi/ Petrologi
10.00 – 10.20	Kudapan
10.20 – 12.40	Pembentangan Kertas Kerja, Sesi 4A and 4B Sesi 4A : Sedimentologi & Stratigrafi Sesi 4B : Teknik & Peralatan Geosains
12.40 – 14.00	Makan Tengahari
14.00 – 15.20	Pembentangan Kertas Kerja Sesi 5° dan 5B Sesi 5A : Hidrogeologi Sesi 5B : Geopelancongan/ Geologi Pemuliharaan
15.20 – 16.00	Sesi Pembentangan Poster II (P10 – P18)
16.00 – 16.30	**Majlis Penutupan** Kudapan

Seminar Geosains Kebangsaan 2007 (NGC 2007)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7-9 Jun 2007

RINGKASAN ATURCARA
(PROGRAMME SUMMARY)

HARI PERTAMA (8 JUN 2007)

07.30 – 08.30	Pendaftaran Peserta
08.30 – 09.10	**UCAP UTAMA I** Prof. Dr. H.D. Tjia *Kundasang (Sabah) at the intersection of regional fault zones of Quaternary age.*

SESI & LOKASI	**SESI 1A** *Geologi Kejuruteraan* (Auditorium I)	**SESI 1B** *Geologi Sekitaran* (Auditorium II)
09.10 – 09.30	P1A-1	P1B-1
09.30 – 09.50	P1A-2	P1B-2
09.50 – 10.10	P1A-3	P1B-3
10.10 – 10.30	P1A-4	P1B-4
10.30 – 10.50	P1A-5	P1B-5
10.50 – 11.50	**SESI PEMBENTANGAN POSTER (PS1 – PS10)**	
11.50 – 14.00	**MAKAN TENGAHARI & SOLAT JUMAAT**	
14.00 – 14.30	**UCAP UTAMA II** Prof. Dr. Mohd. Shafeea Leman *Geopark as an answer to geoheritage conservation efforts in Malaysia – a Langkawi geopark case study* (Auditorium I)	

SESI & LOKASI	**SESI 2A** *Geologi Kejuruteraan* (Auditorium I)	**SESI 2B** *Geologi Ekonomi/ Sumber Mineral* (Auditorium II)
14.30 – 14.50	P2A-1	P2B-1
14.50 – 15.10	P2A-2	P2B-2
15.10 – 15.30	P2A-3	P2B-3
15.30 – 15.50	P2A-4	P2B-4
15.50 – 16.10	P2A-5	P2B-5
16.10 – 16.30	P2A-6	P2B-6
16:30 – 17:00	Kedapan /Rehat	

Seminar Geosains Kebangsaan 2007 (NGC 2007)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7-9 Jun 2007

RINGKASAN ATURCARA
(PROGRAMME SUMMARY)

HARI KEDUA (9 JUN 2007)

08.30 – 09.00	**UCAP UTAMA III** Prof. Dr. Sanudin Hj. Tahir *Overview of Sabah Stratigraphy* (Auditorium I)	
SESI & LOKASI	**SESI 3A** *Geologi Kejuruteraan* (Auditorium I)	**SESI 3B** *Petrologi/ Petrografi* (Auditorium II)
09.00 – 09.20	P3A-1	P3B-1
09.20 – 09.40	P3A-2	P3B-2
09.40 – 10.00	P3A-3	P3B-3
10.00 – 10.20	**KUDAPAN**	
SESI & LOKASI	**SESI 4A** *Sedimentologi/ Stratigrafi* (Auditorium I)	**SESI 4B** *Teknik & Peralatan Geosains* (Auditorium II)
10.20 – 10.40	P4A-1	P4B-1
10.40 – 11.00	P4A-2	P4B-2
11.00 – 11.20	P4A-3	P4B-3
11.20 – 11.40	P4A-4	P4B-4
11.40 – 12.00	P4A-5	P4B-5
12.00 – 12.20	P4A-6	P4B-6
12.20 – 12.40		P4B-7
SESI & LOKASI	**SESI 5A** *Hidrogeologi* (Auditorium I)	**SESI 5B** *Geopelancogan/ Geologi Pemuliharaan* (Auditorium II)
14.00 – 14.20	P5A-1	P5B-1
14.20 – 14.40	P5A-2	
14.40 – 15.00	P5A-3	P5B-2
15.00 – 15.20	P5A-4	
15.20 – 16.00	**SESI PEMBENTANGAN POSTER (PS11 – PS20)**	
16.00 – 16.30	**MAJLIS PENUTUPAN** ***(CLOSING CEREMONY)***	
16:30 – 17:00	**Kedapan (Selesai NGC 2007)**	

Seminar Geosains Kebangsaan 2007 (NGC 2007)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7-9 Jun 2007

HARI PERTAMA (8 JUN 2007)

08.30 – 09.10

UCAP UTAMA I
Prof. Dr. H.D. Tjia
Kundasang (Sabah) at the intersection of regional fault zones of Quaternary age.
(Auditorium I)
Pengerusi Sesi : Prof. Madya Dr. Felix Tongkul

SESI 1A (8 Jun 2007)
Geologi Kejuruteraan
(Auditorium I)
Pengerusi Sesi : Prof. Madya Dr. Felix Tongkul

Masa	Tajuk / Penulis (s)	Kod	M/S
09.10 – 09.30	Verification of post failure behaviour of rock using closed circuit servo-controlled costing maching. *Rini Asnida Abdullah & Mohd. For Mohd. Amin*	P1A-1	4
09.30 – 09.50	Landslide hazards rapid assessment in a mountainous sedimentary rocks terrain - a case study along the railway line between Membakut, Beaufort and Tenom, Sabah. *Tajul Anuar Jamaluddin, Raftah Mahfar & Rusman Rais*	P1A-2	5
09.50 – 10.10	***Kudapan***		
10.10 – 10.30	The effect of moisture content on strength properties of weak rock. *Edy Tonnizam Mohamad, Ibrahim Komoo, Khairul Anuar Kassim, Nurly Gofar & Muhazian Md. Noor*	P1A-3	6
10.30 – 10.50	Flow characteristics of the Tasik Chini's feeder rivers, Pahang, Malaysia. *Muhammad Barzani Gasim, Mohd Ekhwan Hj. Toriman, Zulfahmi Ali Rahman, Mir Sujaul Islam & Tan choon Chek*	P1A-4	7
10.50 – 11.10	Evaluation of slope stability class using slope mass rating system. *Nur Rashidah Muhammad Sukor, Rohayu Che Omar & Ngiam Shih Ming*	P1A-5	8
11.10 – 11.50	***SESI PEMBENTANGAN POSTER I (PS1 – PS9)***		
11.50 – 14.00	***Makan Tenghari/ Solat Jumaat/ Rehat***		

SESI 1B (8 Jun 2007)
Geologi Sekitaran
(Auditorium II)
Pengerusi Sesi : Prof. Dr. Abdul Rahim Samsudin

Masa	Tajuk / Penulis (s)	Kod	M/S
09.10 –09.30	Karst hills in Sungai Perak basin *Ros Fatihah Muhammad*	P1B-1	8
09.30 – 09.50	Tsunami threat to coastal areas of Sabah, East Malaysia. *John Kuna Raj*	P1B-2	9
09.50 – 10.10	***Kudapan***		
10.10 – 10.30	Investigration of pollutant flow pattern in groundwater system at Taiping municipal solid waste (MSW) disposal site, Perak . *Mohd Tadza Abdul Rahman, Kamarudin Samuding, Roslan Zairi Mostapa, Ismail C. Mohamad, Ismail Abustan & Nabsiah Abd. Wahid*	P1B-3	10
10.30 – 10.50	Non-point source pollution (NPS) and expected mean concentrations (EMC) a for determined soil contamination in Sg. Semenyih, Selangor *Rohayu Che Omar, Farha Mohd Jamil & Nurul Eilmy Zainuddin*	P1B-4	11
10.50 – 11.10	Application of isotope hydrology to study the connection between leachate-groundwater-surface and impact leachate to the quality of groundwater at Taiping municipal solid waste (MSW) diposal site *Mohd Tadza Abdul Rahman, Kamarudin Samuding,Roslan Zairi Mostapa, Ismail C. Mohamad, Ismail Abustan & Nabsiah Abd. Wahid*	P1B-5	12
11.10 – 11.50	***SESI PEMBENTANGAN POSTER I (PS1 – PS9)***		
11.50 – 14.00	***Makan Tenghari/ Solat Jumaat/ Rehat***		

14.00 – 14.30	**UCAP UTAMA II** Prof. Dr. Mohd. Shafeea Leman *Geopark as an answer to geoheritage conservation efforts in Malaysia – a Langkawi geopark case study* (Auditorium I) Pengerusi Sesi : Prof. Dr. Hj. Sanudin Tahir

SESI 2A (8 Jun 2007)
Geologi Kejuruteraan
(Auditorium I)
Pengerusi Sesi : Prof. Dr. Hj. Sanudin Tahir

Masa	Tajuk / Penulis (s)	Kod	M/S
14.30 – 14.50	Slope remedial work at tansmission line in Manjung, Perak *Nur Irfah Mohd Pauzi*	P2A-1	13
14.50 – 15.10	Engineering geological investigation on Karambunai-Lok Bunuq landslides, Kota Kinabalu, Sabah. *Rodeano Roslee, Sanudin Tahir, S. Abd. Kadir S. Omang &* *Ismail Abd. Rahim*	P2A-2	14
15.10 – 15.30	Shear strength along foliation planes in meta-rhyolitic tuff from the Dinding Schist, Kuala Lumpur. *J.I. Nkpadobi & J.K. Raj.*	P2A-3	15
15.30 – 15.50	Evaluation of factors affecting the excavation in weathered rock. *Edy Tonnizam Mohamad, Khairul Anuar Kassim, Nurly Gofar & Muhazian Md. Noor*	P2A-4	16
15.50 – 16.10	Characteristics of filled joint under shear loading. *Mohd For Mohd Amin, Ong Heng Yau, Chan Sook Huei & Rini Asnida Abdullah*	P2A-5	17
16.10 – 16.30	Past, present and future coastal changes at the Kuala Kemasin estuary, Kelantan State. *John Kuna Raj, Ismail Yusof & Wan Hasnah Abdullah*	P2A-6	18
16.30 – 17.00	***Kudapan***		

SESI 2B (8 Jun 2007)
Geologi Ekonomi/ Sumber Mineral
(Auditorium II)
Pengerusi Sesi : Prof. Madya Dr. Shariff AK Omang

Masa	Tajuk / Penulis (s)	Kod	M/S
14.30 – 14.50	Minerals security through land use planning – case study of rock aggregates in Eastern Selangor. *Joy Jacqueline Pereira*	P2B-1	19
14.50 – 15.10	Perubahan batuan dinding yang berkaitan dengan permineralan emas di Selinsing gold mine,Pahang. *Wan Fuad Wan Hassan, Mohd. Basril Iswadi Basori & Ibrahim Abdullah*	P2B-2	20
15.10 – 15.30	Charge properties of soils in Malaysia dominated by kaolinite, gibbsite, goethite and hematite. *J. Shamshuddin & Markus Anda*	P2B-3	21
15.30 – 15.50	Kaitan struktur dan canggaan dengan permineralan emas di Selinsing gold mine, Pahang. *Mohd Basril Iswadi Basori, Ibrahim Abdullah & Wan Fuad Wan Hassan*	P2B-4	22
15.50 – 16.10	Applications of geophysical and geochemical methods as exploration tools in identifying extensions of the Penjom gold deposit, Penjom Gold Mine, Kuala Lipis, Pahang *Sharafuddin Mohamed*	P2B-5	23
16.10 – 16.30	Chemical, mineralogical and industrial properties of aplitic rock origin kaolin clay, Sg. Keneras, Gua Musang, Kelantan. *Kamar Shah Ariffin, Ros Fatihah Muhammad & T. Rabeah T. Omar*	P2B-6	24
16.30 – 17.00	***Kudapan***		

HARI KEDUA (9 JUN 2007)

UCAP UTAMA III
Prof. Dr. Sanudin Tahir
08.30 – 09.00 *Overview of Sabah stratigraphy*
(Auditorium I)
Pengerusi Sesi : Prof. Dr. Basir Jasin

SESI 3A (9 Jun 2007)
Sedimentologi & Stratigrafi
(Auditorium I)
Pengerusi Sesi : Prof. Dr. Basir Jasin

Masa	Tajuk / Penulis (s)	Kod	M/S
09.00 – 09.20	Application of Hoek & Brown failure criterions for rock mass characterization: case study of quartzite from Bandar Subang Impian, Shah Alam, Selangor, Malaysia *Uzir Alimat*	P3A-1	25
09.20 – 09.40	The value of slope mass rating (SMR) adjustment factor for CPSB stone quarry, Sabah, Malaysia: a preliminary study *Ismail Abd. Rahim, Sanudin Hj. Tahir, Baba Musta & Rodeano Roslee*	P3A-2	26
09.40 – 10.00	A review of tunnelling activities in Malaysia. *B.K. Tan, W.H. Ting and T.A. Ooi*	P3A-3	27
10.00 – 10.20	***Kudapan***		

SESI 3B (9 Jun 2007)
Petrologi/ Petrografi
(Auditorium II)
Pengerusi Sesi : En. Alex Yan

Masa	Tajuk / Penulis (s)	Kod	M/S
09.00 – 09.20	Potential alkali-silica reaction in aggregate of deformed granite. *Ng Tham Fatt*	P3B-1	28
09.20 – 09.40	New trace, major and rare earth element data for the early Pleistocene alkali olivine basalts and olivine nephelinites from Kuantan, Pahang: plume-related rift volcanics or wrench-related crustal extension? *Azman A. Ghani & Nur Iskandar Taib*	P3B-2	29
09.40 – 10.00	Geochemistry of Spinifex-textured komatiite, Manica area, Northern Mozambique *Yaser, M. Abdel - Aziz & Amadeus, S*	P3B-3	30

SESI 4A (9 Jun 2007)
Sedimentologi & Stratigrafi
(Auditorium I)
Pengerusi Sesi : En. Sahat Sadikun

Masa	Tajuk / Penulis (s)	Kod	M/S
10.20 – 10.40	A review of Stratigraphic simulation techniques and its applications in sequence stratigraphy and basin analysis. *Ku Rafidah Ku Shafie & Mazlan Madon*	P4A-1	31
10.40 – 11.00	Sedimentology and structural geology of Jurassic-Cretaceous Mangking sandstone at Simpang Jengka 8, Kota Gelanggi, Jerantut, Pahang. *Lee Chai Peng & Sharon Khor Suyin.*	P4A-2	32
11.00 – 11.20	The West Crocker Formation (Early Oligocene to Middle Miocene) in the Kota Kinabalu area, Sabah: facies, sedimentary processes and depositional setting *Nizam A. Bakar, Abdul Hadi Abd Rahman & Mazlan Madon*	P4A-3	33
11.20 – 11.40	Comparative analysis of facies and reservoir characteristics of Miri Formation (Miri) and Nyalau Formation (Bintulu), Sarawak *Teoh Ying Jia & Abdul Hadi Abd Rahman*	P4A-4	34
11.40 – 12.00	Penecontemporaneous deformationn in the Nyalau Formation (Oligo-Miocene), central Sarawak. *Mazlan Madon & Abdul Hadi Abd Rahman*	P4A-5	35
12.00 – 12.20	Stratigraphy and sedimentology of the chert unit of the Semanggol Formation. *Basir Jasin & Zaiton Harun*	P4A-6	36
12.20 – 14.00	***Makan Tengahari/ Rehat***		

SESI 4B (9 Jun 2007)
Teknik & Peralatan Geosains
(Auditorium II)
Pengerusi Sesi : Prof. Dr. Lee Chai Peng

Masa	Tajuk / Penulis (s)	Kod	M/S
10.20 – 10.40	Pembangunan pangkalan data tanah runtuh dengan menggunakan kaedah sistem maklumat geografi di sepanjang Lebuhraya Pantai Timur (LPT) Km160-Km190, Pahang. *Norbert Simon, Juhari Mat Akhir, Azlikamil Napiah & Tan Han Kee*	P4B-1	37
10.40 – 11.00	Use of seismic facies characterization for identifying Pliocene-Holocene continental shelf/slope facies, Central Luconia Province, Offshore Sarawak. *Dony Adriansyah, Umar Hamzah & Mohd. Razali Che Kob*	P4B-2	38
11.00 – 11.20	2-D geoelctrical resistivity survey at a proposed new condominium site of Port Dickson Beach Resort, Negeri Sembilan. *Abdul Rahim Samsudin & Umar Hamzah.*	P4B-3	39
11.20 – 11.40	Characterising Interbedded Sedimentary Rock Mass Using Electrical Resistivity Imaging in Puncak Alam, Selangor. *Haryati Awang, Mohamed Z. Mohamed Nordin*	P4B-4	40
11.40 – 12.00	EPMA characterization of struverite from amang of Peninsular M'sia. *Teh Guan Hoe, Cheng Kwong Kiong & Jazmi Hafiz Abd. Aziz*	P4B-5	41
12.00 – 12.20	Pemetaan ramalan potensi tanah runtuh di sepanjang KM160 – 190 Lebuhraya Pantai Timur dengan pendekatan sistem maklumat geografi: Kaedah Statistik *Tan Han Kee, Juhari Mat Akhir, Azlikamil Napiah & Norbet Simon*	P4B-6	42
12.20 – 12.40	Modelling of Lampas Kaolin Occurrence, Km 12, Spg. Pulai-Pos Slim, Ipoh by Shallow Seismic Refractions Imaging *Kamar Shah Arifin*	P4B-7	43
12.40 – 14.00	***Makan Tengahari/ Rehat***		

SESI 5A (9 Jun 2007)
Hidrogeologi
(Auditorium I)
Pengerusi Sesi : Prof. Madya Dr. Baba Musta

Masa	Tajuk / Penulis (s)	Kod	M/S
14.00 – 14.20	Groundwater modeling of Chepstow Block, Wales, UK. *Ismail Yusoff*	P5A-1	44
14.20 – 14.40	Flow path analysis as an additional calibration target to calibrate a groundwater flow model *M. Selvarajah*	P5A-2	45
14.40 – 15.00	Potensi air bawah tanah di Pulau Tenggol, Terengganu berdasarkan teknik pengimejan keberintangan geoelektrik. *Lakam anak Mejus, Rahman Yaccup & Roslanzairi Mostapa*	P5A-3	46
15.00 – 15.20	MIKE SHE modeling of surface water and groundwater interaction. *Bahaa-eldin E.A. Rahim, Ismail Yusuff, Saim Suratman, Azmi M. Jafri & Zainuddin Othman*	P5A-4	47
15.20 – 16.00	***SESI PEMBENTANGAN POSTER II (PS10 – PS18)***		

SESI 5B (9 Jun 2007)
Geopelancongan/ Geologi Pemuliharaan
(Auditorium II)
Pengerusi Sesi : Prof. Madya Dr. Baba Musta

Masa	Tajuk / Penulis (s)	Kod	M/S
14.00 – 14.30	*Geological heritage of Tanjung Simpang Mengayau, Sabah* *Felix Tongkul*	P5B-1	48
14.30 – 15.00	Geoheritage of Pulau Balambangan, Sabah. *Che Aziz Ali, Kamal Roslan Mohamed & Ibrahim Komo*	P5B-2	49
15.00 – 16.00	***SESI PEMBENTANGAN POSTER II (PS10 – PS18)***		

MAJLIS PENUTUPAN
(CLOSING CEREMONY)

16.00 – 16.30

PROF. MADYA DR. FELIX TONGKUL
PENGERUSI SEMINAR GEOSAINS KEBANGSAAN 2007

Seminar Geosains Kebangsaan 2007 (NGC 2007)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7-9 Jun 2007

PEMBENTANGAN POSTER II (PS1 – PS10)
(POSTER PRESENTATION)
(Dataran Auditorium)
(8 Jun 200)

11.10 – 11.50 ***SESI PEMBENTANGAN POSTER I***
PS1 – PS10

No.	Tajuk / Penulis (s)	Kod
PS1	Characterization of leachate plumes at two waste disposal sites, Selangor. *Abdul Rahim Samsudin, Bahaa-eldin Elwali A. Rahim & Wan Zuhairi Wan Yaacob*	GS
PS2	Physico-chemical characteristics and geochemical composition of soil from Pelepah Kanan ex-mine, Kota Tinggi, Johor. *Sahibin Abd. Rahim, Tukimat Lihan, Zulfahmi Ali Rahman, Baba Musta, Adong Laming, Wan Mohd. Barzani Gasim & Siti Rahayu Awang*	GS
PS3	Assessment of excavalibility method of wethered rock by seismic velocity method. *Edy Tonnizam Mohamad, Khairul Anuar Kassim, Nurly Gofar, Muhazian Md. Noor &Zuhar Zahir Tuan Harith*	GK
PS4	Hydrocarbon potential of the coals and shales at the Eucalyptus campsite area, Maliau Basin, Sabah *Zulkifli Salleh, Awang Sapawi Awang Jamil, Kamal Roslan Mohamed & Che Aziz Ali*	GM
PS5	Surface morphology of glass shards from volcanic ash found in Perak – a preliminary study. *Ros Fatihah Muhammad & H. D. Tjia*	GT
PS6	Assessment of shuttle radar topographic mission (SRTM) elevation data of Lojing and Hulu Langat, Peninsular Malaysia. *Ng Tham Fatt*	GT
PS7	The stress-strain behaviour of an artificial weakly bonded soil in undrained conditions. *Zulfahmi Ali Rahman, D.G. Toll & D. Gallipoli*	GK
PS8	Deep-marine sedimentary facies of the Belaga Formation (Cretaceous-Eocene), Sibu and Tatau areas, Sarawak: key features and implications. *Zainol Affendi Abu Bakar, Mazlan Madon & Abdul Jalil Muhamad*	GSS
PS9	Criteria of four soil series of the Tasik Chini, Pahang Malaysia *Muhammad Barzani Gasim, Sahibin Abd. Rahim, Zulfahmi Ali Rahman & Sujaul Islam Mir*	GS
PS10	Gua dalam Batu Kapur Balambangan, Pulau Balambangan, Sabah. *Kamal Roslan Mohamed & Che Aziz Ali*	GP

Seminar Geosains Kebangsaan 2007 (NGC 2007)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7-9 Jun 2007

PEMBENTANGAN POSTER II (PS11 – PS19)
(POSTER PRESENTATION)
(Dataran Auditorium)
9 Jun 200)

15.20 – 16.00 ***SESI PEMBENTANGAN POSTER II (PS11 – PS20)***

No.	Tajuk / Penulis (s)	Kod
PS11	Sedimentology of the Semantan Formation (Middle-Upper Triassic) along the Karak-Kuantan highway, central Pahang. *Hasnol Hady Ismail, Mazlan Madon & Zainol Affendi Abu Bakar*	GSS
PS12	Geochemical characterization of volcanic soils from Tawau, Sabah. *Baba Musta, Hennie Fiftria W. Soehady E. & Sanudin Tahir*	GPP
PS13	Kepekatan Logam Pb, Cu, Zn dan Fe di Sungai Mamut, Ranau Sabah. *Kamsia Budin, Baba Musta, Yahya Jelimin, & Farrah Anis Fazliatul Adnan*	GS
PS14	Geotechnical Properties Of Mining Waste Stabilised With Lime – Gypsum *Baba Musta*	GT
PS15	Kajian fiziko-kimia dan mikro struktur tanah formasi cert-spilite dan formasi kudat di Kudat, Sabah. *Wan Nursaiedah Wan Ismail & Baba Musta*	GK
PS16	Acid Mine Drainage at Mamut Copper Mine and the potential for their treatment using calcareous geomaterials *Marcus Jopony, Aw Li Chuen, Cyril Jinusie, Ho Yen Ling & Lim Kah Ling*	GS
PS17	Understanding Acid Main Drainage (AMD): Causes, impacts, control and the local scenario *Marcus Jopony, Felix Tongkul & Stella Ho Yen Ling*	GS
PS18	Investment Opportunities in the Mineral Sector in the Sudan (With Emphasis) *Mohamed Hamid Moala*	GE
PS19	Farrah Anis Fazliatul Adnan	

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

UCAP UTAMA I

KUNDASANG (SABAH) AT THE INTERSECTION OF REGIONAL FAULT ZONES OF QUATERNARY AGE

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ABSTRACT

The Crocker fault zone (CFZ) is more than 170 km long and several kilometres wide. It contains the Quaternary structural valleys Tenom, Keningau, and Tambunan which are aligned in a northerly to N20°E trend. Its most northern segment, Lobou-Lobou, displaced a tarred road for 15 cm left-laterally. In addition to normal faulting, as the association with valley-fill deposits suggests, tributaries of the Pegalan River that cross the CFZ boundary also display abrupt sinistral course shifts of several hundred metres. The Mensaban fault zone (MFZ) strikes WNW and is traceable over a distance of 110 km from Tuaran toward east into the interior of Sabah. Facetted ridge spurs indicate Quaternary activity of normal faulting with individual downthrows up to 50 m high. Along a Mensaban fault strand in the vicinity of Kundasang, the sudden course change of the Liwagu River suggests recent and sustained sinistral slip. In this area the MFZ is 12 km wide and intersects the CFZ. Continued activity on these two regional faults is one of the root causes of widespread mass movements in the Kundasang area.

UCAP UTAMA II

GEOPARK AS AN ANSWER TO GEOHERITAGE CONSERVATION EFFORTS IN MALAYSIA – A LANGKAWI GEOPARK CASE STUDY

Mohd Shafeea Leman, Ibrahim Komoo, Kamal Roslan Mohamed, Che Aziz Ali & Tanot Unjah
Langkawi Research Centre
LESTARI, Universiti Kebangsaan Malaysia
43600 Bangi, Selangor

ABSTRACT

Langkawi Geopark has paved clearer path for geoheritage conservation agenda, effort that previously seems unreachable. This achievement would not have materialized without serious commitment from various institutions, particularly the Malaysian Geological Heritage Group, Langkawi Development Authority and Forestry Department of Peninsular Malaysia. For the conservation component of geopark, geoheritage sites of

Langkawi are packaged into 3 geoforest parks, 3 geological monuments and several protected geosites. As for geotourism and public awareness, public friendly information panels and brochures are provided. Some highly significant geoheritage sites are

packaged into geopark trails or incorporated into existing nature tour trails. Langkawi Geopark is inspired to be a model for sustainable development on nature resources and to become a catalyst for future development of geopark in this region.

UCAP UTAMA III

OVERVIEW OF SABAH STRATIGRAPHY

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ABSTRACT

This paper discussed the stratigraphy of Sabah according to the latest findings and data from the previous researcher. The oldest rock unit in Sabah is made up of fragmented ophiolites blocks and overlain by clastic sediments. Clastic sediments form the major back bone of mountain ranges of Sabah. Numerous formation names have been established by the Geological Survey of Malaysia to describe the different sedimentary rocks. The outcrops of the sedimentary units are dominated by Paleogene sequence and considered to be the thick apron over the oceanic crust basement. The Paleogene highly deformed deep marine sediments unconformably overlain by less deformed Late Neogene shallow marine units. In a vertical relation, the Paleogene and the Neogene sequences are separated by melanges. A wider distribution of carbonate facies all over Sabah area occurred during the Late Oligocene. The limestone facies are exposed at Kudat Peninsula, Beluran, Sukau and Sapulut. Numerous chaotic assemblages have been classified by the Geological Survey of Malaysia to differentiate the rock associations. In the present study, the chaotic assemblages denote units, which are made of blocks of various nature and origin embedded in a pervasively shared shale matrix. Almost all are classified rock units under these assemblages contain the same rock associations with varying percentage among the units. However, the term melange has been widely used for the rock series. The nature of the rock blocks are very heterogeneous which is consists of ophiolitic blocks, volcanic materials, limestone, clastic from older formations and the size of the blocks reach hundreds of meters with varying ratio of sand to shale matrix. The major matrix component is composed of pervasively seared shale. Some of the shale matrix collected form different locations rich in *Orbulina sp.* The volcanic facies form the prominent feature of the Dent and Semporna peninsular. The facies were formed from series of Tertiary volcanisms which pile up to form stratovolcanic layers. This volcanic rocks association were deposited in a shallow to neritic marine environments in Early to Middle Miocene times. The younger formations formed after the latest tectonics in Sabah during Late Pliocene, estimated to be after the intrusions of Kinabalu batholith.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P1A-1

VERIFICATION OF POST FAILURE BEHAVIOUR OF ROCK USING CLOSED-CIRCUIT SERVO-CONTROLLED TESTING MACHINE.

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ABSTRACT

The analysis of stress-strain curve is a fundamental aspect in the field of rock mechanics. Since the most rocks exhibit not the intact rock, but rocks with discontinuities. So, it is important to study the stress-strain curve beyond the peak failure as to study the stage of rock with a non-intact rock. However, several difficulties arise in obtaining the complete stress-strain curve. Since most rocks exhibit brittle behaviour, they fail violently and uncontrollably when tested on conventional compression machines. In this study, two series of uniaxial compression test were performed on sandstone samples. The first test was conducted using 2000 kN MaTest conventional compression testing machine and then the results were compared with 3000 kN Tinius Olsen servo-controlled testing machine. Based on the results obtained, it is observed that for similar rock type (sandstone), the post-peak failure can be achieved by using the servo-controlled testing machine. The post-failure behaviour of a rock is particularly important in designing an excavation, where the rock materials surrounding the excavation may be fractured or displayed a certain degree of failure. Comparison between the modes of failure observed from the tests on both types of machines clearly shown that violent fracture is not the intrinsic characteristic of rock but due to the rapid release strain energy from the loading machine.

P1A-2

LANDSLIDE HAZARDS ASSESSMENT IN A MOUNTAINOUS SEDIMENTARY ROCKS TERRAIN – PRELIMINARY STUDIES ALONG THE RAILWAY LINE BETWEEEN MEMBAKUT, BEAUFORT AND TENOM, SABAH

Tajul Anuar Jamaluddin[1], Raftah Mahfar[2] & Rusman Rais[2]
[1.] Geology Programme, Faculty of Sciences & Technology, UKM Bangi, Selangor
[2.] SCG Consultants Sdn. Bhd., 16-C, Wisma Keringat 2, Lorong Batu Caves 2, 68100 Batu Caves, Selangor Darul-Ehsan.

ABSTRACT

Geological studies form the vital component in landslide hazards assessments. In practices however, the landslide hazards assessment have long been monopolised by engineers due to lack of geologists involvement in this field. Hence, possibility for the lack of appreciation and underestimation on the vital geological parameters during the

course of assessments could have not been precluded. This paper describes an example of landslide hazards assessment which was carried out on a project of widening and modernisation of the railway track transversing mountainous sedimentary rocks terrain in Sabah. The main objectives of this study are identification of the existing and the potential modes of landslide hazards along the proposed alignment, and to recommend suitable mitigation measures. To achieve these goals, the geological studies were designed in such a way by focussing on the understanding of the characteristics and behaviours of the highly inhomogeneous associated sedimentary rock masses, geomorphology and predominant geomorphic processes, followed by the identification of the forms, types and the potential mode of slope failures. Once these vital information were compiled and analysed, then only the suitable mitigation measures can be proposed to the engineers and project proponent for further actions.

P1A-3

THE EFFECT OF MOISTURE CONTENT ON STRENGTH PROPERTIES OF WEAK ROCK

Edy Tonnizam Bin Mohamad[1] , Ibrahim Komoo[2], Khairul Anuar Kassim[1], Nurly Gofar[1], Muhazian Md Noor[1]
[1]Department of Geotechnic & Transportation, Faculty of Civil Engineering,
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[2]Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor

ABSTRACT

Variation of moisture content is one of the greatest issue in the tropical climate as extreme temperature and heavy downpour can be expected. This study was undertaken as a part of the excavatability studies on weak rock to look at the effect of moisture content on strength properties. Although the changes in the rock strength have been discussed by previous researchers, the effect of moisture content on weathered rock materials are not fully understood. This study was undertaken by using 127 samples of weathered sandstone from various weathering grades collected from four (4) different sites, namely Bukit Indah, Kempas, Desa Tebrau and Mersing, Johor. Standard rock mechanics testing procedures cannot be applied in this study because the samples were easily broken during preparation, hence a modified penetration test was proposed for determining the strength. The result shows that moisture content is an important factor that affects the strength of the weak rock materials.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P1A-4

FLOW CHARACTERISTICS OF THE TASIK CHINI'S FEEDER RIVERS, PAHANG, MALAYSIA

Muhammad Barzani Gasim, Mohd. Ekhwan Hj. Toriman, Zulfahmi Ali Rahman, Mir Sujaul Islam & Tan Choon Chek
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ABSTRACT

The hydrological assessment of the seven Tasik Chini feeder rivers was carried out between October and December 2004, February, March and April 2005 to assess the total stream flows for maintaining the Tasik Chini to its level. A total of nine sampling stations were selected in this study, namely: Datang River, Cenahan River, Hilir Gumum River, Mid Gumum River, Kura-kura River, Melai River, Hilir Kuala Merupuk River, Hulu Kuala Merupuk River, and Jemberau River. The annual rainfall in the study area ranges from 1488 to 3071mm or 124 to 256 mm/month. The stream flow rate during the sampling days varied from 0.033 to 0.9083m^3/sec during wet season and from 0.0042 to 0.2448m^3/sec during dry season or average of 0.1674 m^3/sec. Water analysis based on three water quality parameters such as turbidity, TSS and TDS proved that the water bodies in the upstream area were polluted by physical activities. Results of TDS range from 22.67 to 184 mg/L, TSS (1.17 – 79.11 mg/L) and turbidity (4.67 – 28.67 NTU). Recent activities such as mining, deforestation, agricultural, and residential activities have taken place in the surrounding areas of the lake. These activities were causing environmental degradation such as changing of hydrological characteristics of the Tasik Chini.

P1A-5

EVALUATION OF SLOPE STABILITY CLASS USING SLOPE MASS RATING SYSTEM

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Kajang Selangor

ABSTRACT

Slope Mass Rating (SMR) system has been use to evaluate the metasedimentary cut slope at Putrajaya-Cyberjaya Link. SMR calculation is 23.3, shows that the slope stability class is IV which rock mass description of the particular cut slope is described as bad. The stability is known as unstable. The probability of failure is 0.6 or 60%.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P1B-1

KARST HILL IN SUNGAI PERAK BASIN

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ABSTRACT

The typical tropical tower karst in the Sungai Perak Basin regarded as in its mature stage, consists of many limestone towers spread across the alluvial plain underlain largely by subsurface karst. The karst areas in the Sungai Perak Basin are Lenggong, Padang Rengas and Kinta Valley areas. The limestone towers in these three karstic areas have been identified as cockpit towers, isolated towers and cone towers. Most cockpit towers are scattered in the Kinta Valley, while cone towers are found in the Sungai Siput area. Isolated towers are found in the Padang Rengas and Lenggong with the latter showing tendency of being cone shaped at the tops.

P1B-2

John Kuna Raj
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University of Malaya 50603 Kuala Lumpur.

ABSTRACT

A study of the regional tectonic setting and a review of historical data on earthquakes and tsunami indicate that there is no threat from local tsunami to the coastal areas of west Sabah fronted by the South China Sea. Distant tsunami, generated by earthquakes along a subduction zone marked by the Manila Trench at the northeast end of the South China Sea, also do not pose a threat to the coastal areas of west Sabah in view of the wide continental shelf that will lead to insignificant run-ups (<0.5 m).There is also no threat of local tsunami to the coastal areas of northeast Sabah fronted by the Sulu Sea, though distant tsunami generated by large magnitude (M_S>7.0) earthquakes with shallow foci (<33 km depth) along the subduction zone marked by the Negros Trench at the north end of the Sea may reach these coastal areas. The wide continental shelf fronting the northern and central sectors of northeast Sabah will, however, result in insignificant run-ups (<0.5 m) of these distant tsunami, though the narrower continental shelf off the east Dent Peninsula may result in locally significant run-ups (>0.5 m). Tsunami that have occurred in the Sulu Sea, however, have so far only been of a local significance. There is also no threat of local tsunami to the coastal areas of east Sabah fronted by the Sulawesi Sea, though distant tsunami generated by earthquakes along subduction zones marked by the Cotabato, and North Sulawesi, Trenches along the north and south edges of the Sea, respectively, may reach these coastal areas. The relatively wide continental shelf along most coastal areas of east Sabah will, however, result in insignificant run-ups (<0.5 m) of these distant tsunami, though the narrow continental shelf fronting the coastal areas of the Dent and Semporna Peninsulas may lead to locally significant run-ups (>0.5 m high).

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

Tsunami that have occurred in the Sulawesi Sea, however, have so far only been of a local significance and have been generated by large magnitude (M_s>7.0) earthquakes with shallow foci (<33 km depth) along the subduction zones marked by the Cotobato and North Sulawesi Trenches.

P1B-3

INVESTIGATION OF POLLUTANT FLOW PATTERN IN GROUNDWATER SYSTEM AT TAIPING MUNICIPAL SOLID WASTE (MSW) DISPOSAL SITE, PERAK

Mohd Tadza Abdul Rahman [1], Kamarudin Samuding [1], Roslanzairi Mostapa [1], Ismail C. Mohamad [2], Ismail Abustan [3] & Nabsiah Abdul Wahid [3]

[1] Malaysia Nuclear Agency

[2] Mineral and Geoscience Department, Malaysia

[3] University Science of Malaysia, 11800 Pulau Pinang

ABSTRACT

Investigation of pollutant flow pattern in groundwater system has been performed at Taiping Municipal Solid Waste (MSW) disposal site, Perak. The pollutants under study included selected heavy metals such as chromium (Cr), manganese (Mn), lead (Pb), iron (Fe) and zinc (Zn). The hydrogeochemical technique was used to determine the pollutants accumulation concentration in the groundwater system whilst the colloidal borescope system was used as a supporting data to determine groundwater flow direction and flow velocity. The hydrogeochemical technique involved the sampling of groundwater at several boreholes within the study area. The study showed that the accumulation concentration of pollutants was towards southeast of the study area. The result compliment the data given by the colloidal borescope system where the groundwater flow direction was dominant towards southeast with the velocity range between 1.09-3.86 x 10^{-4} m/sec.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P1B-4

NON-POINT SOURCE POLLUTION (NPS) AND EXPECTED MEAN CONCENTRATIONS (EMC) A FOR DETERMINED SOIL CONTAMINATION IN SG. SEMENYIH, SELANGOR

Rohayu Che Omar, Farha Mohd Jamil and Nurul Eilmy Zainuddin
Universiti Tenaga Nasional, KM 7, Jalan Kajang Puchong,
Kajang Selangor

ABSTRACT

Non-Point Source Pollution (NPS) and Expected Mean Concentrations (EMC) method are use to model Zinc (Zn), Copper (Cu) and Lead (Pb) in soil from year 2003. Modeling result for year 2005 show the concentration Zn value is 2754.4 (kg/year), 399.9 (kg/year) for Cu and 206.5 (kg/year) for Pb. The generated values from NPS modeling for year 2005 are compared with observed values in year 2003. Pollutant loading increment for Zn is 84%, Cu is 54% and Pb is 43% and show higher concentration at the upper stream of Semenyih River.

P1B-5

APPLICATION OF ISOTOPE HYDROLOGY TO STUDY THE INTERCONNECTION BETWEEN LEACHATE-GROUNDWATER-SURFACE AND IMPACT OF LEACHATE TO THE QUALITY OF GROUNDWATER AT TAIPING MUNICIPAL SOLID WASTE (MSW) DISPOSAL SITE

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ABSTRACT

Groundwater is vulnerable to contamination from a wide variety of agriculture, industrial, and human activities. Malaysia's common sources of contamination come from landfill leaching or disposal sites, leaky storage tanks, industrial discharge pipes, septic tanks, urban runoff, liquid wastes oil spills and agricultural activities using fertilisers and pesticides. In addition, saltwater intrusion and line seepage from polluted streams or sewerage lines have great impact on groundwater quality. In a country blessed with an abundant rainfall and water resources, the possibility of contaminants reaching the groundwater is high especially in the regions with a top porous geological formation. At present, the extent of leachate infiltration and its movement in groundwater and its

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

discharge to surface water resources is unknown. Hence, the extent of short and long term contamination of groundwater and surface water resources is unknown. The Malaysia Nuclear Agency in co-operation with Mineral and Geoscience Department (MGD) and University Science of Malaysia (USM) had performed the study involving isotope hydrology technique as well as hydrochemical approaches to determine the cationic concentration of selected heavy metals such as chromium (Cr), manganese (Mn), arsenic (As), lead (Pb), iron (Fe), zinc (Zn) and cadmium (Cd), quality of groundwater and finally identify the interconnection of leachate to groundwater and surface water. The study showed high concentration of heavy metals such as Cr, Mn, As, Pb and Fe which exceeded the maximum permissible limits as specified in the Malaysian Drinking Water Standard of the Drinking Water Quality Act 2001. Whilst, Zn and Cd occur at low concentrations in the groundwater. The interconnection between leachate, groundwater and surface water contamination also can be observed in the study area based on isotope data. However, the distributions of contaminants were localized and confined within the dumping area and not diffused over a wide area. The tritium content in groundwater samples indicated that most probably water of modern groundwater.

P2A-1

SLOPE REMEDIAL WORK AT TRANSMISSION LINE IN MANJUNG, PERAK

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ABSTRACT
Slope failures are very common in Malaysia especially during monsoon season where the intensity of rainfall is very high. Slope failure becomes very dangerous if it occurs along the transmission tower, which is the main grid line. The towers can collapse and possibly cause power disruption the whole Malaysia due to slope failure. Therefore, slope remedial work must be done immediately within the budget limitation before the towers trip into each other. There are many methods that can be used for slope remedial. The most common methods in Malaysia are soil nailing (for soil slope) or rock bolt (for rock slope), hydroseeding, benching or flattening of slopes, guniting, retaining the slope by using gabion wall and vegetation cover by planting shrubs, grass and trees. Before suggesting the remedial work, slope stability analyses were carried out to calculate the factor of safety of the slope. If the factor of safety is less than 1, then the slope is considered as high risk. Thus, slope remedial is suggested at that area. This paper discuss on the slope remedial work at Manjung as a field study area. The reason for the method used in remedial work and suggestion for slope treatment are discussed in detail in this paper.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P2A-2

ENGINEERING GEOLOGICAL INVESTIGATION ON KARAMBUNAI-LOK BUNUQ LANDSLIDES, KOTA KINABALU, SABAH

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ABSTRACT

This paper describes landslide occurrences in debris materials, together with its engineering geological and geotechnical setting. The predictions from conventional geotechnical slope stability analyses, taking into account topography, hydrological, geotechnical and engineering geological effects, are compared with the observed pattern of instability. Physical and mechanical properties of eight (8) soil samples indicated that the failure materials mainly consist of poorly graded materials of sandy clay soils and characterized by low to intermediate plasticity, containing of normal clay (0.42 to 0.95), very high degree of swelling (5.63 to 10.35), variable low to high water content (11.95 % to 19.92 %), specific gravity ranges from 2.60 to 2.68, low permeability (6.68 X 10^{-4} to 1.52 X 10^{-4} cm/s), friction angle (ϕ) ranges from 18.50° to 34.20° and cohesion (C) ranges from 3.36 kN/m^2 to 19.50 kN/m^2 with very soft to soft of undrained shear strength (9.47 kN/m^2 to 32.30 kN/m^2). Geotechnical limit equilibrium stability analyses of entire slopes are rarely able to predict the smaller-scale initiation events leading to landslide occurrences, because these are controlled by local topography, water runoff and groundwater conditions, weathered materials and engineering geological setting. Slope stability analysis shows that the factor of safety value ranges from 0.805 to 0.817 (unstable). It is concluded that the failures was debris flow and resulted from a combination of factors.

P2A-3

SHEAR STRENGTH ALONG FOLIATION PLANES IN META-RHYOLITIC TUFF FROM THE DINDING SCHIST, KUALA LUMPUR

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ABSTRACT

Meta-rhyolitic tuff from the Lower Palaeozoic Dinding Schist shows a distinct foliation with quartz and microcline porphryblasts set in an aligned fine grained matrix of quartz, sericite, muscovite and biotite. Laboratory tests using the saturation and buoyancy method indicates that unweathered meta-rhyolitic tuff has an apparent porosity of 2.5 % with average dry, and saturated, unit weights of 25.82 and 26.08, kN/m^3, and dry, and saturated, densities of 2,636 and 2,661, kg/m^3, respectively. A similar method of test

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

shows slightly weathered meta-rhyolitic tuff to have an apparent porosity of 8.2 % with average dry, and saturated, unit weights of 23.99 and 24.78, kN/m^3 and dry, and saturated, densities of 2,447 and 2,529, kg/m^3, respectively. Tilt tests on diamond sawn surfaces (parallel to foliation) of the unweathered meta-rhyolitic tuff yield a basic friction angle of 31°, whilst similar tests on lightly, and highly, polished, diamond sawn surfaces yield basic friction angles of 26° and 24°, respectively. Tilt tests on diamond sawn surfaces (parallel to foliation) of slightly weathered meta-rhyolitic tuff yield a basic friction angle of 23°. Polishing of diamond sawn surfaces thus mimics effects of weathering with a reduction in the basic friction angle. It is concluded that a basic friction angle of 31° can be used as a estimate of the minimum residual friction angle along foliation planes in unweathered meta-rhyolitic tuff, though a lower value of 23° to 24° would have to be used for slightly weathered tuff.

P2A-4

EVALUATION OF FACTORS AFFECTING THE EXCAVATION IN WEATHERED ROCKS

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ABSTRACT

In tropical region where thick profile of weathered zone is common, ripping is always accepted as the limit of mechanical breaking before blasting works is opted due to economical reason. However, the nature of rock and its weathering profile play a very significant role in evaluating the excavation assessment. Many issues have emerged in ripping work for sedimentary area where the occurrence of bedding, foliation and the inhomogeniety of rock can greatly influence the excavatability of the weathered rocks. This paper aims to highlight some of the problems that arise in weathered sedimentary area as what have been experienced during the surface excavation works.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P2A-5

CHARACTERISTICS OF FILLED JOINT UNDER SHEAR LOADING

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ABSTRACT

Filled joints, particularly those resulting from *in situ* deposition, are among the most critical discontinuities in rock. High deformability and low shear strength are the typical behaviour exhibited by this type of discontinuity. There are certain components or features that contribute to the weaknesses exhibited by filled joint, and these include type and thickness of infilling, and surface roughness of the host joint. Due to the complex behaviour of filled joint, it is therefore essential to understand its typical behaviour under the interactive effects of these controlling components. In an attempt to study the behaviour of filled joint, a series of laboratory shear tests were undertaken on model filled joint. The physical model used in the test consists of granite residual soils as infilling and cast concrete blocks as joint blocks. Experimental variables include normal stress, infill thickness and roughness of joint surface. The shear tests were undertaken on specially fabricated servo-controlled direct shear apparatus. Laboratory test results indicate that shear strength of a joint decreases significantly with the presence of infill material in its aperture. The reduction in strength however, depends on the infill thickness and texture of the joint surface. Comparatively, the effect of infill thickness on shear strength is more significant in rougher joint surface. It is also found that the weakest point in joint filled with granular material is not necessarily within the infill, but may occur at the 'infill-joint interface'.

P2A-6

PAST, PRESENT AND FUTURE COASTAL CHANGES AT THE KUALA KEMASIN ESTUARY, KELANTAN STATE

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ABSTRACT

The Kelantan State coast at Kuala Kemasin is fronted by sandy beaches that extend northwestward, and southeastward, from breakwaters constructed on both sides of the estuary between 1989 and 1991. Aerial photographs flown over the area in 1948, 1949, 1952, 1966, 1974, 1978 and 1983 show that there have been several pre-breakwater (past) coastal changes, mainly involving variations in the size of sand spits on both sides of the then unprotected estuary. These changes are due to the predominantly northwest directed

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

littoral drift here which results from the oblique approach of swell and storm waves from the South China Sea. Satellite imagery between 1990 and 2005 as well as aerial photographs flown in 1995, and field surveys in May 2005 and March 2006 show that the northwest directed littoral drift has continued to impact the area; there being accretion of beach sediments (and shoreline advance) on the south side of the estuary, but erosion (and shoreline retreat) on the north side. Rates of shoreline advance and retreat are relatively low, in the order of a meter or so per year, though erosion already now threatens several wooden houses and agricultural land on the north side of Kuala Kemasin. In view of the continued prevailing northwest directed littoral drift, it is concluded that there will continue to be accretion of beach sediments on the south side of the Kuala Kemasin estuary, but erosion on its north side.

P2B-1

MINERALS SECURITY THROUGH LANDUSE PLANNING – CASE STUDY OF ROCK AGGREGATES IN EASTERN SELANGOR

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ABSTRACT

There is a need to ensure long-term security of supply for rock aggregates in Selangor, in view of the impending implementation of the Selangor Policy on Environmentally Sensitive Areas (ESAs). Preliminary findings from a case study of rock aggregates in Eastern Selangor reveal that six quarries and 66% of new aggregate resources in the state are located in highly sensitive ESAs, which are categorised as "no go areas" for quarrying. At least ten quarries and another 26% of new resources are located in ESAs of medium and low sensitivity, which are areas of "controlled development" requiring special circumstances and very strict conditions for quarrying. Only 8% of the new resources identified are actually available for exploitation in the future. Aggregate landbanks and buffer zones should be delineated and gazetted in local development plans and efforts should be made to thoroughly investigate potential resources outside of the ESAs. This effort should be augmented by the promotion of recycled concrete aggregates to maintain aggregates security and ensure sustainable development.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P2B-2

PERUBAHAN BATUAN DINDING YANG BERKAITAN DENGAN PERMINERALAN EMAS DI SELINSING GOLD MINE, PAHANG

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ABSTRAK

Selinsing Gold Mine yang terletak di baratlaut Pahang, Semenanjung Malaysia merupakan lombong emas yang aktif dilombong hingga sekarang. Litologi kawasan ini terdiri daripada batuan sedimen dan batuan volkanik termetamorf gred rendah sebahagian daripada batuan Formasi Gua Musang berusia Perm Akhir-Trias. Permineralan emas kebanyakannya berlaku dalam telerang kuarza yang memotong batuan induk dan berkaitan dengan jalur-jalur sesar dan zon ricih utama berarah hampir utara-selatan dan timurlaut-baratdaya. Mineralogi yang berasosiasi bersama emas dalam telerang kuarza terdiri daripada mineral pirit, arsenopirit, surihan kalkopirit, tetrahedrit dan sfalerit. Perubahan batuan dinding yang berlaku di Selinsing Gold Mine menunjukkan perkaitan secara langsung wujud antara larutan hidroterma, struktur, pembentukan telerang kuarza dan permineralan emas. Gabungan data cerapan lapangan, mineral ubahan yang hadir dan tren komposisi kimia mengenalpasti perubahan batuan dinding yang berkaitan dengan permineralan emas terdiri daripada pensilisifikasian, pengargilitan dan penserisitan yang terjadi di sekitar zon telerang kuarza dan zon sesar. Perubahan pensilisifikasian ditandai oleh hadirnya mineral kuarza sekunder dan sedikit serisit, menunjukkan pengurangan kandungan K_2O, Al_2O_3, LOI, Fe_2O3 dan peningkatan kandungan SiO_2 bersama Na_2O. Zon pengargilitan ditunjukkan oleh kehadiran mineral lempung seperti kaolinit, muskovit atau serisit dan kuarza. Perubahan kimia pula menunjukkan peningkatan kandungan K_2O, Al_2O_3 , LOI bersama pengurangan SiO_2. Perubahan penserisitan dicirikan oleh pembentukan mineral serisit dominan, mineral lempung, kuarza, klorit, karbon, sulfida dan surihan emas halus. Perubahan ini dicirikan oleh peningkatan kandungan K_2O, Al_2O_3, LOI, Fe_2O_3 dan Mg, pengurangan sedikit kandungan Na_2O dan pengurangan mendadak SiO_2.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P2B-2

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ABSTRAK

Selinsing Gold Mine yang terletak di baratlaut Pahang, Semenanjung Malaysia merupakan lombong emas yang aktif dilombong hingga sekarang. Litologi kawasan ini terdiri daripada batuan sedimen dan batuan volkanik termetamorf gred rendah sebahagian daripada batuan Formasi Gua Musang berusia Perm Akhir-Trias. Permineralan emas kebanyakannya berlaku dalam telerang kuarza yang memotong batuan induk dan berkaitan dengan jalur-jalur sesar dan zon ricih utama berarah hampir utara-selatan dan timurlaut-baratdaya. Mineralogi yang berasosiasi bersama emas dalam telerang kuarza terdiri daripada mineral pirit, arsenopirit, surihan kalkopirit, tetrahedrit dan sfalerit. Perubahan batuan dinding yang berlaku di Selinsing Gold Mine menunjukkan perkaitan secara langsung wujud antara larutan hidroterma, struktur, pembentukan telerang kuarza dan permineralan emas. Gabungan data cerapan lapangan, mineral ubahan yang hadir dan tren komposisi kimia mengenalpasti perubahan batuan dinding yang berkaitan dengan permineralan emas terdiri daripada pensilisifikasian, pengargilitan dan penserisitan yang terjadi di sekitar zon telerang kuarza dan zon sesar. Perubahan pensilisifikasian ditandai oleh hadirnya mineral kuarza sekunder dan sedikit serisit, menunjukkan pengurangan kandungan K_2O, Al_2O_3, LOI, Fe_2O3 dan peningkatan kandungan SiO_2 bersama Na_2O. Zon pengargilitan ditunjukkan oleh kehadiran mineral lempung seperti kaolinit, muskovit atau serisit dan kuarza. Perubahan kimia pula menunjukkan peningkatan kandungan K_2O, Al_2O_3 , LOI bersama pengurangan SiO_2. Perubahan penserisitan dicirikan oleh pembentukan mineral serisit dominan, mineral lempung, kuarza, klorit, karbon, sulfida dan surihan emas halus. Perubahan ini dicirikan oleh peningkatan kandungan K_2O, Al_2O_3, LOI, Fe_2O_3 dan Mg, pengurangan sedikit kandungan Na_2O dan pengurangan mendadak SiO_2.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

selain daripada pembentukan sistem telerang kuarza. Berdasarkan perkaitan yang ditunjukkan oleh struktur-struktur, dua fasa canggaan yang bertindak ditentukan. Canggaan generasi pertama dihasilkan oleh mampatan dari timur-timurlaut membentuk struktur lipatan utama di kawasan kajian. Seterusnya, mampatan ini juga menyebabkan canggaan generasi pertama fasa lewat, menghasilkan sesar songsang dan sesar mendatar kanan arah utara(selatan) dan sistem telerang kuarza yang berkaitan dengan arah ini. Sistem mampatan yang berkaitan dengan canggaan generasi kedua bertindak dari arah hampir timur-barat, menerbitkan sistem zon ricih mendatar, lipatan terlipat semula yang berasosiasi dengan sesar songsang dan telerang kuarza. Pembentukan telerang kuarza berasosiasi terutamanya dengan zon ricih mendatar kanan.

P2B-5

APPLICATION OF GEOPHYSICAL AND GEOCHEMICAL METHODS AS EXPLORATION TOOLS IN IDENTIFYING EXTENSIONS OF THE PENJOM GOLD DEPOSIT, PENJOM GOLD MINE, KUALA LIPIS, PAHANG.

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ABSTRACT

The Penjom Thrust is the dominant geological feature controlling the distribution of ore in Penjom Gold Mine. The Penjom Thrust, which strikes NE (035°) and dips to the southeast (30°-40°) is developed by a westward- directed compressional deformation event. Considerable shear stresses along the Penjom Thrust have remobilised much of the carbon within the shale sequence to form a graphitic "alteration" zone. The carbonaceous Penjom Thrust appears to be the main driving force behind the gold mineralisation, acting as both the main fluid conduit into the footwall and as a cap preventing fluid into the hanging wall. The thrust is later intersected by a series of north-south and northwest-southeast structures. Thus, areas of similar deformation along the strike of the Penjom Thrust may be prospective for similar deposits. Rock types are also important, especially in their responses to structural deformation which have developed favourable sites for mineralisation. The most significant unit in the mine area is the tonalite intrusion complex. Dilation zones at the hinges of folded tonalites and tonalite contacts with sedimentary units are the most favourable sites for gold mineralisation. The Penjom exploration team has utilised geophysical (IP dipole-dipole) and geochemical (Partial Leach) methods to identify these targets. The results show that the IP dipole-dipole survey is very useful to map the location of the Penjom Thrust and other key geological

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

features, while the multi-element soil geochemistry survey maps the gold mineralisation hotspots and correlating elements along the thrust and at its footwall.

P2B-6

CHEMICAL, MINERALOGICAL AND INDUSTRIAL PROPERTIES OF APLITIC ROCK ORIGIN KAOLIN CLAY, SG. KENERAS, GUA MUSANG, KELANTAN

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ABSTRACT

This paper discuss the chemical, mineralogical and technological properties of primary, in-situ occurrence of feldspar-rich constituent kaolin clay of Sg. Keneras near KM 279, Gua Musang-Kuala Lipis main road. This occurrence primarily is a product of highly and variably, in-situ hypogene alteration of muscovite-bearing aplite (leucogranite) origin. This is a 2.5 km sq., N-S elongated massive kaolinized-feldspar occurrence/deposit of kaolinitic rich material. This hydrothermally altered and weathered (hydrolysis process) materials are often friable, sugary feel and rich in white clay matrix. The occurrence composed mainly of needle-like halloysite, kaolinite, amorphous clay and significant amount of kaolinized alkali feldspar and plagioclase, free quartz and traces amount of muscovite, and other minute secondary illite/sericite minerals. The presence of significant alkalis (K_2O and Na_2O) and very low iron content indicated the Keneras crude kaolin clay is the mixture of kaolin clay minerals and kaolinized feldspar of in-situ formation with poor segregation characteristic. The distribution and percentage of kaolin mineral is highly variable throughout the deposit, and between 6 to 40%. Atterberg limits and other technology property tests have shown the Keneras clay has very poor cohesion (moulding properties), viscosity and modulus of rapture (MOR) strength for ceramic application. This poor plasticity material, however, has relatively superior brightness, whiteness and oil absorption properties. These characteristics is attributed to the mineralogy, morphology and texture of the derived clay that was strongly influenced by the parental rock, depositional environment and the geological events that accompanied this primary Keneras kaolinitic clay formation.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P3A-1

APPLICATION OF HOEK AND BROWN FAILURE CRITERION FOR ROCK MASS CHARACTERIZATION: CASE STUDY OF QUARTZITE FROM BANDAR SUBANG IMPIAN, SHAH ALAM, SELANGOR DARUL EHSAN, MALAYSIA.

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ABSTRACT

There are numerous schemes of rock mass classification especially for engineering purposes. Rock Mass Rating (RMR_{89}) by Bieniawski (1989), and Hoek and Brown's (2000) Geological Strength Index (GSI), are among the established classifications. A critical rock slope was selected for assessment located at approximately 346500 N and 389833 E, Section U10, Bukit Cherakah, Shah Alam, where a moderately jointed, steep rock slope had been cut. Based on site observations and mapping, estimating the GSI value for rock mass was determined directly using the GSI table as recommended by Hoek and Brown (2000). The effective principal stresses (σ'_1 and σ'_3) were subsequently derived and using the Hoek and Brown failure criterion, the effective cohesion (c') and friction angle (Ø') of the rock mass was estimated using Mohr-Coulomb failure envelope. Using average values obtained from samples that exhibit only materials failure by Uniaxial Compressive Strength (UCS) and Brazil tests, it was estimated that an intact fresh quartzite sample of Kenny Hill Formation is having c' value of 12.5 MPa and Ø' is 52°. The rock mass that comprises predominantly moderately fractured quartzite was estimated to have c' = 300 to 400 kPa and Ø' = 32° which falls under class III of Bieniawski's RMR_{89} classification.

P3A-2

THE VALUE OF SLOPE MASS RATING (SMR) ADJUSTMENT FACTOR FOR CPSB STONE QUARRY, SABAH, MALAYSIA: A PRELIMINARY STUDY

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ABSTRACT

Published SMR geomechanic classification system was applied to rock cut slope of Crocker Formation in CPSB Stone Quarry, Tamparuli in order to assess the value as indicators of rock mass condition. The SMR is obtained from RMR by adding a factorial

adjustment factor depending on the relative orientation of discontinuities and slope (parallelism between discontinuities and slope, discontinuities dip angle in failure modes, relationship between slope and discontinuities dips) and another adjustment factor

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

depending on the method of excavation. Stereonet analysis of the pole plot and Markland test has been used in this study. Pole plot has been performed in determining NE bedding, SSE, WNW and WSW joint sets and Markland test for recognizing potential planar failure and toppling failure. The rating adjustment factor of SMR for the Crocker Formation in the study area are -50.50, -43.70, -28.30 and -50.25 in station BQ1, BQ2, BQ3 and BQ4, respectively. This result shows that the slope in station BQ1 and BQ4 has the lowest SMR rating value which then became a poorest quality of rock mass in the study area.

P3A-3

A REVIEW OF TUNNELLING ACTIVITIES IN MALAYSIA

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ABSTRACT

This paper provides a review of tunnelling activities in Malaysia in the last three decades or so. In the earlier years, most of the tunnels in Malaysia were excavated by the conventional drill-and-blast method, with tunnel supports installed in accordance with the procedure of the New Austrian Tunnelling Method (NATM). Since the introduction of the first Tunnel Boring Machine (TBM) in the diversion tunnel at the Kelinci Dam Water Transfer Tunnel project in Negeri Sembilan in circa 1995, tunnelling activities in Malaysia have witnessed a significant increase in the deployment of the TBM method. A significant advancement is in the use of TBM slurry shield tunnelling method in the treacherous karstic limestone formation as in the case of the SMART tunnel in Kuala Lumpur. Several case histories are discussed, addressing tunnelling problems related to various ground or geologic conditions, tunnel support systems, ground stresses, etc. It must be pointed out that the final selection of tunnelling method using drill-and-blast with NTAM procedure vis-à-vis TBM is based on safety and economy.

P3B-1

POTENTIAL ALKALI-SILICA REACTION IN AGGREGATE OF DEFORMED GRANITE

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ABSTRACT

Granite is the most important source of construction aggregate in Peninsular Malaysia and is widely used in concrete. Granite aggregate is generally considered as not alkali-silica reactive. However, deformation by faulting has generated a diverse variety of deformed granites that may contain deleterious minerals. Petrographic examination and

mortar-bar test were carried out to assess potential alkali-silica reactivity. Strained quartz and microcrystalline quartz are the main potentially deleterious mineral in deformed granites. The mortar-bar test recorded marginally deleterious to deleterious expansions. The expansion values can be related to the total strained and microcrystalline contents. Deformed granites with over 12% of total strained and microcrystalline quartz is expected to cause marginal to deleterious expansion and this should be verified by mortar bar test. The deformed granites generally will not pose serious problems in the production of concrete aggregates as they constitute only a small proportion of the extracted rocks.

P3B-2

NEW TRACE, MAJOR AND RARE EARTH ELEMENT DATA FOR THE EARLY PLEISTOCENE ALKALI BASALTS AND OLIVINE NEPHELINITES FROM KUANTAN, PAHANG: PLUME-RELATED RIFT VOLCANICS OR WRENCH-RELATED CRUSTAL EXTENSION?

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ABSTRACT

The Kuantan Basalts are one of the very few bodies of basic intrusives in Peninsular Malaysia. It was erupted too late to have been caused by the mid-Oligocene extension that formed the sedimentary basins off the Peninsula's East Coast, or by the compression beginning in the mid-Miocene that followed it. This paper presents new trace element data for alkali olivine basalts and olivine nephelinites belonging to the Kuantan Basalt. Both are enriched in incompatible elements and LREE, with signatures comparable to Oceanic Island Basalts and East African Rift basaltoids. They plot in the Intraplate Basalt field on a Zr-Ti-Y discrimination plot. The geochemical evidence, as well as the timing, points to a mantle plume-related genesis, rather than one related to wrench tectonics-induced extension.

P3B-3

GEOCHEMISTRY OF SPINIFEX-TEXTURED KOMATIITE, MANICA AREA, NORTHERN MOZAMBIQUE

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ABSTRACT

Ultramafics volcanics of the komatiite type are widespread in the greenstone belts of Manica area, Northern Mozambique. They are made up of massive and pillow lava flows with massive serpentinites which pass to talcschists and tremolites schists. The komatiite rocks dominated by peridotitic and basaltic komatiite showing olivine spinifex texture

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

where the peridotitic komatiite is volumetrically most prevalent. Based on $Ca/Al_2O_3 \approx 1.0$ and $Al_2O_3/TiO_2 \approx 20$ ratios, these komatiites are classified with the Al – undepleted Munro type kpmatiite. They exhibit a marked depletion in Zr, Nb, Y, Rb and As, and enrichment in Cr and Ni. Replacement textures (lobate and curves boundaries between chromian spinel and magnetite) in addition to the mineral chemistry of chromian spinel indicate that these komatiite underwent regional metamorphism under greenschist amphibolite transition conditions in a temperature about 500° C. the chromain spinel have low Al and Mg values (up to 0.26 and 0.21 respectively), low Mg and high Cr and Fe values. The high Cr [=Cr/Cr+Al] atomic ratio of spinel chemistry exhibits limited compositional range from 0.77 to 0.99 and very low $TiO_2 < 0.2$. This suggests the upper mantle from which the Manica komatiite had been derived was highly refractory. Bulk major element chemistry combined with spinel mineral chemistry indicate that the formation of Manica komatiite may have been linked with some high-Mg magma such as high-Mg tholeiite. The komatiite under consideration may be formed from high degrees of partial melting of reduced, depleted mantle in a mantle wedge or sub-arc mantle environment.

P4A-1

A REVIEW OF STRATIGRAPHIC SIMULATION TECHNIQUES AND ITS APPLICATIONS IN SEQUENCE STRATIGRAPHY AND BASIN ANALYSIS

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ABSTRACT

Stratigraphic simulation is a modeling methodology that can be used for exploration purposes to understand the key factors (sea level changes, subsidence, sediment supply rates) that control the stratigraphic geometries and architectures of a basin. Its application offers many advantages to scientists and researchers in a sense that it provides a globally accessible platform to understand the complexities of sequence stratigraphy. It models stratal patterns in various tectonic settings such as in passive margins, foreland basins, retroarc foreland basin, interarc basin, remnant ocean basin, growth faulting, and salt diapirs. It enhances biostratigraphic interpretation as it provides age constraints for stratal geometries and sequence stratigraphic interpretation. This can lead to a systematic prediction of other geological aspects such as the identification of source rocks, seals, and reservoirs. Furthermore, it may also lead to the identification of new reservoirs within oil and gas fields. One type of stratigraphic simulation that is often used is a "forward stratigraphic simulation". This model is usually applied for prediction of depositional history of an existing basin. In this paper, four simulation techniques (CSM, SEDPAK, DIONISOS, and SEDSIM) and their applications are presented. The models are typically applied to verify and infer the potential for hydrocarbon entrapment and accumulation within a basin. For this reason, it is useful for exploration purposes in oil industry. The models are also used as teaching tools for young geologists.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P4A-2

SEDIMENTOLOGY AND STRUCTURAL GEOLOGY OF JURASSIC-CRETACEOUS MANGKING SANDSTONE AT SIMPANG JENGKA 8, KOTA GELANGGI, JERANTUT, PAHANG

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ABSTRACT

The study area is a housing development at Simpang Jengka 8 Kota Gelanggi, located at 3.881°N and 102.488°E, about 20 km east of Jerantut in the central Pahang, Peninsular

Malaysia. The area is underlain by continental characterised red bed sequences of the Jurassic-Cretaceous Mangking Sandstone of the Tembeling Group. Lithofacies analysis and plant fossils *Sagenopteris* sp. and *Neocalamites* sp. show that the depositional environment was within a meandering river system in an alluvial fan setting. Active volcanism during deposition was suggested by volcaniclastic conglomerates. Abrupt lateral changes in the lithofacies suggest that the study area is composed of two separate blocks: a chaotic slump facies in the west and a stable depositional facies in the east. Extension and tectonic tilting created the basin for sedimentation. Rapid subsidence during sedimentation created syn-sedimentary structures such as penecontemporaneous slumps and syn-sedimentary faults. Rapid lateral changes took place by channel shifting during sedimentation. Younger compressional structures such as thrust faults are prominent implying that the strata were subjected to post depositional compression after the Late Cretaceous sedimentation.

P4A-3

THE WEST CROCKER FORMATION (EARLY OLIGOCENE TO MIDDLE MIOCENE) IN KOTA KINABALU AREA, SABAH: FACIES, SEDIMENTARY PROCESSES AND DEPOSITIONAL SETTING

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ABSTRACT

The West Crocker Formation in Kota Kinabalu area in Sabah is one of the best exposed examples of deepwater sedimentary sequence in Malaysia. This paper describes and documents the detailed facies characteristics and sedimentology of outcrops, and proposes a depositional framework for the West Crocker Formation in the Kota Kinabalu

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

area. Based on lithology, sedimentary structures, geometry, trace fossil assemblages, and paleocurrent data, the sediments are grouped into seven major facies. These are; i) facies A - thick, massive, and structureless sandstone; ii) facies B - thick, and massive sandstone with the presence of post-depositional dewatering structures; iii) facies C - graded sandstone and occasional complete Bouma Sequence; iv) facies D - thin-bedded fine-grained sandstone and siltstone and graded into base-absent Bouma sequences; v) facies E - sandstone and shale interbedding, and frequently marked with lenticular bedding; vi) facies F - slump beds, and vii) facies G - shale. Four deepwater architectural elements had been identified based on the study of vertical successions of facies. These are: i) slopes are made up of turbidite facies F, G, and E; ii) channels are represented by

coarse- and medium-grained massive sandstone with predominantly facies A and B; iii) depositional lobes are formed by medium grained sheet sands, made up of facies C and D, and showing a coarsening- and thickening- upward sequences; iv) heterolithic levee-interchannel facies association, predominantly shale with thin, fine-grained sandstone, and siltstone, made up of turbidite facies D, E, F, and G, and showing a coarsening- and thickening- upward succession.This study has shown that the West Crocker Formation, which previously has been referred to as "turbidites", is not composed of solely turbidity current deposits, but includes debris flow, slumps and other submarine mass-transport deposits.

P4A-4

COMPARATIVE ANALYSIS OF FACIES AND RESERVOIR CHARACTERISTICS OF MIRI FORMATION (MIRI) AND NYALAU FORMATION (BINTULU), SARAWAK

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ABSTRACT

This study on the sedimentological and reservoir petrophysical properties (porosity, permeability, density, sonic velocity) of sandstones were conducted on the sedimentary rocks belonging to the Miri Formation (Middle Miocene) from Miri and Nyalau Formation (Middle Miocene) from Bintulu in Sarawak. The objectives are i) to investigate and determine the facies characteristics, and reservoir properties of the different types of sandstones, and ii) to establish the relationships between the facies characteristics and petrophysical properties. Three lithofacies have been sampled from the outcrops of Nyalau Formation and four lithofacies from the outcrops of Miri Formation, based on lithology, sedimentary structures, fossil traces and bed geometry. These are grouped to four major lithofacies: (i) Hummocky cross-stratified sandstones (HCS); (ii) Trough cross-bedding sandstones (TCB); (iii) Bioturbated sandstones; and (iv) Swaley cross-stratified sandstones (SCS). Hummocky and swaley cross-stratified sandstones, trough cross-bedded sandstones and some bioturbated sandstones of Miri formation recorded the highest poro-perm values, with relatively lower density values (as compared Bintulu samples). The HCS, SCS and TCB sandstones are well sorted

sandstones, with minimal mud content. This has contributed to the high poro-perm values. The bioturbated sandstone (MF1) shows high permeabilities in some samples, and suppressed, low permeabilities in others. This reflects the heterogeneity in facies characteristice and poro-perm distributions of bioturbated samples. Bioturbated HCS, the HCS and TCB sandstones of Bintulu show moderate poro-perm values. The Nyalau Formation rocks are older, and thus are expected to have undergone more compacted than the younger Miri Formation. This is also reflected in the higher density values recorded for all the Bintulu samples.

P4A-5

PENECONTEMPORANEOUS DEFORMATION IN THE NYALAU FORMATION (OLIGO-MIOCENE), CENTRAL SARAWAK

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ABSTRACT

Abstract—Penecontemporaneous deformation of sediments is an indication of active tectonic deformation during sedimentation in a convergent margin, such as in a foreland basin. In the Nyalau Formation (Late Oligocene to Early Miocene in age) exposed near Tg. Similajau and Bintulu areas, structural features indicative of penecotemporaneous deformation are common. These features include (1) "disharmonic" thrusts and associated folding within shaly intervals, (2) detached normal and reverse faults within mud-dominated intervals, (3) subtle stratal termination and onlap patterns associated with faulting, folding and (probably subaquaeous) erosion of the sedimentary layers, (4) slump and load structures within lower shoreface to offshore-transition successions. These features may be a common feature in deforming foreland basins, and indicates the importance of tectonic over eustatic controls on sedimentation and sequence development in the Tertiary NW Borneo basins.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P4A-6

STRATIGRAPHY AND SEDIMENTOLOGY OF THE CHERT UNIT OF THE SEMANGGOL FORMATION

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ABSTRACT

Excavation of rocks in the Semanggol Formation exposed more rock succession, which is now feasible to study in detail the stratigraphical distribution of the rocks, their age and relationship among the units in the formation. Five Permian and four Triassic radiolarian biozones were recognized. Discovery of Permo-Triassic radiolarian faunas indicates the

chart unit is partly equivalent in age to the rhythmite and conglomerate units. The chert unit is divided into eight sedimentary facies, which were deposited in an open-deep marine environment under the influence of different transport mechanisms. It is evident that there were widespread volcanogenic sediments prior to the deposition of the chert in the Semanggol Formation. Abstrak: Pengorekan batuan di Formasi Semanggol telah mendedahkan lebih banyak jujukan batuan yang membolehkan kajian terperinci sebaran stratigrafi, usia, dan hubungan unit-unit dalam formasi ini. Lima biozon Perm dan empat biozon Trias radiolaria telah dikenal pasti. Penemuan radiolaria Perm dan Trias menunjukkan unit rijang ini sebahagiannya setara dengan unit berirama dan konglomerat. Unit rijang boleh dibahagikan kepada lapan fasies endapan yang diendapkan dalam sekitaran samudera laut dalam di bawah pengaruh mekanisme pengankutan yang berbeza. Bukti juga menunjukkan kewujudan endapan volkanogen yang meluas sebelum berlakunya pengendapan rijang Formasi Semanggol.

P4B-1

PEMBANGUNAN PANGKALAN DATA TANAH RUNTUH DENGAN MENGGUNAKAN KAEDAH SISTEM MAKLUMAT GEOGRAFI DI SEPANJANG LEBUHRAYA PANTAI TIMUR (LPT) , KM160-KM190, PAHANG

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ABSTRAK

Sistem Maklumat Geografi telah digunakan secara meluas dalam kajian tanah runtuh. Dalam kajian ini, kaedah GIS telah digunakan untuk menghasilkan peta ramalan potensi

tanah runtuh dan juga digunakan sepenuhnya untuk menghasilkan pangkalan data yang berfungsi untuk menyimpan hasil kajian. Keluasan kawasan kajian adalah lebih kurang 600 km^2 di sepanjang Km 160 ke Km 190 Lebuhraya Pantai Timur (LPT) yang terletak di antara dua daerah, iaitu Maran dan Kuantan, Pahang. Peta ramalan potensi tanah runtuh kawasan kajian dikelaskan kepada empat zon potensi iaitu kawasan berpotensi rendah, sederhana, tinggi dan sangat tinggi. Pangkalan Data Tanah Runtuh yang dibangunkan dengan perisian komersial (DBMS) bukan sahaja berguna untuk ahli geologi tetapi juga untuk ahli kejuruteraan awam, perancang pembangunan dan kontraktor yang ingin mengetahui potensi bencana tanah runtuh di kawasan kajian. Data yang disimpan di dalam pangkalan data bukan sahaja terhad untuk kajian tanah runtuh tetapi boleh juga digunakan untuk bidang kajian lain seperti hidrogeologi, perancangan guna tanah, hakisan tanah dan tapak pelupusan sampah.

P4B-2

USE OF SEISMIC FACIES CHARACTERIZATION FOR IDENTIFYING PLIOCENE-HOLOCENE CONTINENTAL SHELF/SLOPE FACIES, CENTRAL LUCONIA PROVINCE, OFFSHORE SARAWAK

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ABSTRACT

The Central Luconia Province, offshore Sarawak, is one of the geological provinces in Malaysia which is being explored extensively. The main target of hydrocarbon exploration in this area, so far, is Miocene carbonate sequences. The Central Luconia Province comprises also Pliocene-Holocene clastic sequences, which is not well-studied yet. Hence, this study is focused on the characterization of these clastic sequences based on seismic and supported by well data. In this research, seismic facies characterization is carried out on regional two-dimensional (2-D) seismic sections to understand the seismic facies characteristics, depositional environments, and the facies interpretation. This study is carried out by, first, establishing seismic stratigraphic framework to identify seismic sequences, and second, characterizing individual and group of reflections within each sequence. Several seismic facies units were defined based on parameters as follows: reflection amplitudes, frequencies, continuities, geometries, and configurations. The Pliocene-Holocene clastic supersequence is divisible into six, three-order sequences that separated by six sequence boundaries, which reflect fluctuations of sea level during Pliocene to Holocene. Six seismic facies units were also identified within these clastic sequences. There are middle-lower bathyal deposits, shelf/neritic shale deposits, prograding shelf deposits, onlap-fill deposits, slump/debris flow deposits, and basinal hemipelagic shale deposits. Some facies units are estimated potential for hydrocarbon accumulation. In general, seismic facies characterization can be used as a tool in determining the facies in the study area. More data and further detailed analyses, like core description, log correlations, are required to determine the presence of source, reservoir and seal rocks in order to find hydrocarbon accumulation.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P4B-3

2-D GEOELECTRICAL RESISTIVITY SURVEY AT A PROPOSED NEW CONDOMINIUM SITE OF PORT DICKSON BEACH RESORT, NEGERI SEMBILAN

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ABSTRACT

2-D resistivity imaging survey was conducted on a proposed site of a new condominium block at Port Dickson Beach Resort, Negeri Sembilan. The purpose of the survey was to determine the resistivity distribution of the soil underneath the proposed site and to investigate the cause of failures on piling test failures of many driven piles in the site. More than half portion of the site represents new coastal reclamation land. The resistivity survey has successfully determined the boundary between an original ground surface and the filled soil material. The undulating surface of the original ground generally shows gentle slope towards the sea. The original ground material is relatively higher in resistivity value compared with the lateritic filled material of the study area. Data from bore hole clearly show the distinct boundary of lateritic filled material and the original ground soil underneath the study site. A zone of extremely low resistivity value (<5ohm-m) observed on the western part of the site is believed to be associated with the movement of water below surface which is a contributing factor for the failure of the piling tests.

P4B-4

CHARACTERISING INTERBEDDED SEDIMENTARY ROCK MASS USING ELECTRICAL RESISTIVITY IMAGING IN PUNCAK ALAM, SELANGOR

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ABSTRACT

This paper illustrates the result of rock mass investigation and electrical resistivity survey on a selected site at Puncak Alam, Selangor. The purpose of this study is to characterize the rock mass of interbeded sedimentary with regards to the rock type and weathering classification. To achieve the objectives direct rock mass investigation including engineering geological mapping and physical index test on the rock surface followed by field electrical resistivity measurement was carried out at a cut slope ofa rock mass. Results are presented in qualitative and quantitative form. Analysis on the correlated

resistivity image and actual profile of the subsurface shows a relationship between resistivity and rock types and also between resistivity and weathering classification. Preliminary resistivity index of this rock mass with respect to weathering grade are also proposed.

P4B-5

MODELING OF LAMPAS KAOLIN OCCURRENCE, KM 12, SPG. PULAI-POS SLIM, IPOH BY SHALLOW SEISMIC REFRACTIONS IMAGING

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ABSTRACT

This paper describes a case study of shallow seismic refraction imaging in delineating a known kaolinitic occurrence overburden (pallid zone) near the Bukit Lampas, km 12, Spg Pulai-Pos Slim road, Ipoh This kaolinite rich pallid zone is embodied in the Slim granite of Main range granite intrusion with poor layered velocity structure. Lampas kaolin is a product of both hydrothermal and in-situ weathering of sugary aplite, leucogranite, pegmatites and medium to coarse-grained, porphyritic granites of the area. Numerous occurrences of quartz-feldspar veins stockworks, silicification and illite alteration (argillic zone) were evident and characteristic of the hydrothermal fluid influx system of the area. Features such as geometrical shape, thickness, lateral extension which related to geological features and weathering profile of the area was analyzed in an attempt to model the clay occurrence appearance. Seismic velocity model elucidated that the kaolinitic clay formation at the targeted area was confined in a narrow zone or channel, and at least within a depth of 5 to 15m ($Vp < 300ms^{-1}$) and 130 meter wide. The thickest segment was found near the lower part of hill slope. This occurrence was also lithological, geomorphological and structurally control.

P4B-6

PEMETAAN RAMALAN POTENSI TANAH RUNTUH DI SEPANJANG KM160-190 LEBUHRAYA PANTAI TIMUR DENGAN PENDEKATAN SISTEM MAKLUMAT GEOGRAFI: KAEDAH STATISTIK

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ABSTRAK

Kajian pemetaan ramalan potensi tanah runtuh merupakan komponen asas untuk pengurusan risiko bencana alam dan ia bertujuan untuk mengurangkan risiko kejadian tanah runtuh. Kertas ini membincangkan mengenai hasil kajian secara komprehensif

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

mengenai pengezonan ramalan potensi tanah runtuh di sepanjang KM 160 hingga ke 190 Lebuhraya Pantai Timur, Pahang dengan menggunakan pendekatan Sistem Maklumat Geografi. Objektif utama kajian ini adalah untuk menentukan sumbangan atau nilai pemberat pada setiap kelas dalam faktor dan antara faktor-faktor itu sendiri dengan kaedah statistik. Adalah penting untuk mengenalpasti faktor-faktor penyumbang kepada tanah runtuh dan faktor-faktor tersebut perlu digunakan sebagai parameter input untuk membangunkan peta ramalan potensi tanah runtuh. Parameter-parameter tersebut terdiri daripada darjah kecerunan, ketumpatan saliran, ketumpatan lineamen, zon penimbal sesar, jenis litologi, taburan hujan tahunan, jenis tanah, jenis guna tanah dan jalanraya. Kajian ini menggunakan kaedah statistik, iaitu kaedah nilai maklumat yang mana kaedah ini merupakan suatu kaedah pengelasan potensi tanah runtuh berdasarkan taburan tanah runtuh yang pernah berlaku dengan pengiraan secara matematik. Peta ramalan potensi tanah runtuh dihasilkan berdasarkan kepada kaedah Nilai Maklumat dan diklasifikasikan kepada lima zon potensi tanah runtuh, iaitu sangat rendah, rendah, sederhana, tinggi dan sangat tinggi. Peta ramalan yang dihasilkan kemudiannya dibandingkan secara kualitatif dan kuantitatif dengan data lokasi sejarah tanah runtuh. Kaedah nilai maklumat ini adalah berdasarkan ketumpatan tanah runtuh sebenar yang pernah berlaku dan menunjukkan keputusan yang boleh dipercayai dengan pengiraan "Correlation Coefficient" *(CC)* bernilai 0.87.

P4B-7

EPMA CHARACTERIZATION OF STRUVERITE FROM AMANG OF PENINSULAR MALAYSIA

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ABSTRACT

The heavy minerals from tin tailings or *amang* comprises a wealth of minerals which contain some the most sort after metals in industry, that includes tantalium and niobium, which are widely used in the computer and cellular phone industry because of their high reliability , high melting points and corrosion resistance characteristics. An extended investigation was carried out on the EPMA into the complex nature of strüverite, the source of tantalium (Ta) and niobium (Nb) in *amang*, in particular its complex mineralogy, chemistry and associated phases/minerals. EPMA data of strüverite show that it is a complex intergrowth of rutile (TiO_2), tantalite (Ta_2O_5) and columbite (Nb_2O_5) with only very few grains devoid of any inclusions or exsolved phases. EPMA analysis of three "pure" strüverite grains, devoid of intergrowths, gave consistent ratios of Ti (19.5773–29.0757 wt%), Nb (5.4450–7.9935 wt%), Ta (25.4301–33.4607 wt%) and Fe (6.8890–8.1144 wt%). They also contain significant amounts of Sn (0.7905–2.6210 wt%) and Th (3.2493–6.0318 wt%) but very low W (0.1056–0.4673 wt%) and Mn (0.0052–0.1229 wt%) and no Y. Other strüverite grains which have inclusions or exsolved phases or intergrowths, all show very variable contents of Ti, Nb, Ta, Fe, W, Mn, Th and Y. BSE images on the EPMA also picked up zoned strüverite crystals where great variations in compositions are clearly discernible in X-ray maps of these zoned

crystals. EPMA analysis of fusion discs of strüverite concentrates from *amang* also show quite variable contents for Ti (12.6090–54.3837 wt%), Nb (1.7099–13.1203 wt%), Ta (2.8768–7.4003 wt%), Fe (1.4287–15.6514 wt%), W (0–3.4844 wt%), Mn (0.0472–1.5066 wt%) and Th (0–29.7631 wt%). The presence of Th with or without Y in some strüverite grains could be a useful criteria for determining their source area. Knowledge of the complexity of strüverite is useful in configuring the correct recovery processes for Ta and Nb.

P5A-1

GROUNDWATER MODELLING OF THE CHEPSTOW BLOCK, SOUTH WALES, UK

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ABSTRACT

In this groundwater modelling study, a simplified conceptual model of the Chepstow Block hydrogeological unit was calibrated using the Aquifer Simulation Model (ASM) program under a steady state condition. One of the objectives of the study is to determine the catchment area for the Great Spring. The initial aquifer boundaries of the model and its changing conditions were investigated. The model was found to be insensitive to changes in the boundary conditions. It was also found that the Nadern Fault within the block plays an important role in drawing water from the north to the Great Spring. During the calibration process, it was difficult and impossible to calibrate the model without incorporating a low permeable boundary parallel to the Nadern Fault.

P5A-2

FLOW PATH ANALYSIS AS AN ADDITIONAL CALIBRATION TARGET TO CALIBRATE A GROUNDWATER FLOW MODEL

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ABSTRACT

A groundwater flow model using the finite element numerical code (FEFLOW) was developed for a coastal wetlands system (Lake Warden Wetlands system) to assess the interaction between the groundwater and surface water. The system to be modeled is complex. As a first step the flow model was calibrated to observed groundwater levels measured since 2001 for both steady state and 19 transient stresses. Particle tracking analysis was conducted using the calibrated steady state model to test the source areas of water discharging to the lakes within the wetlands system. The analysis was able to delineate the connectivity between the lakes in the wetland and the flow path analysis provides an additional means to verify the flow model.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P5A-3

POTENSI AIR BAWAH TANAH DI PULAU TENGGOL, TERENGGANU BERDASARKAN TEKNIK PENGIMEJAN KEBERINTANGAN GEOELKTRIK

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ABSTRAK

Keperluan bekalan sumber air bersih di Pulau Tenggol amat terhad memandangkan sumber air bersih sukar diperolehi. Selain daripada chalet dan rumah peranginan yang menggunakan banyak bekalan air, ianya juga menjadi destinasi persinggahan kapal-kapal nelayan untuk berlabuh, berteduh dan memperolehi bekalan air bersih sebelum meneruskan aktiviti mereka. Semasa kajian dijalankan, sumber air bersih hanya diperolehi daripada air hujan dan perigi cetek yang beroperasi pada masa-masa tertentu. Oleh itu atas inisiatif Jabatan Mineral dan Geosains Terengganu dan Kerajaan Negeri bersama dengan Agensi Nuklear Malaysia, satu kajian penjelajahan sumber air tanah menggunakan teknik pengimejan keberintangan geoelektrik telah dilaksanakan. Sebanyak dua garisan survei menggunakan konfigurasi Schlumberger telah dijalankan sepanjang pesisir pantai berdekatan dengan kawasan chalet di pulau berkenaan. Kertas kerja ini akan membincangkan hasil kajian tersebut yang mana ianya menjadi salah satu maklumat yang penting dalam projek pembangunan sumber air tanah di pulau berkenaan.

P5A-4

MIKE SHE MODELING OF SURFACE WATER AND GROUNDWATER INTERACTION

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ABSTRACT

Paya Indah wetland (PIW) is a designated wetland sanctuary covering a gross area of 260 km^2. The sustainability of peat swamp forest is very dependent on the presence of a shallow groundwater table and thus any impact on the groundwater regime is a potential threat to the peat swamp. The area has undergone some dry-up recently caused by the

surrounding swamp forest to burn periodically. Past peat forest fires occurred in the area clearly show the relationship between dry peat and fires, which in turn may highlight the possibility of dramatically lowering of the regional shallow groundwater level. To help quantify existing and future water quantity and quality conditions associated with development and other land-use change, attempt is made by employing the use of distributed, integrated surface water and groundwater hydrologic models. As an on-going wetland modeling project, further required data preparation and collection are in progress to support the numerical model. However, integrated surface-water and groundwater models were constructed using a detailed channel network and a fully-distributed approach to simulate groundwater flow. The model will, then, be calibrated to measured discharges and water level to the extent permitted by the available data to simulate two different scenarios including the impact of development of Cyberjaya city Flagship zone phase II and fully development of Cyberjaya and E-Village north-west and west to the PIW respectively.

P5B-1

GEOLOGICAL HERITAGE OF TANJUNG SIMPANG MENGAYAU, SABAH

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ABSTRACT

Tanjung Simpang Mengayau, dubbed the "The Tip of Borneo" is one of Sabah's popular tourism sites. The strategic geographical location of this headland is the main attraction for tourist to visit this site. Apart from its beautiful white beach sand the rocky headland provides an excellent exposure of the lower sandy unit of the Early Miocene Kudat Formation. The sedimentary formation, comprising of a thick sequence of sandstone exhibits primary depositional structures such as lamination, graded bedding and load structures. The thick sandstone beds dipping moderately to the north are cut through by a series of NE-SW trending normal faults and N-S trending joints, clearly visible during low tide. The headland also posses coastal landform such as caves, holes and tafoni. These geological features which provide a useful insight into the geological history of the region may be utilized for educational purpose, as in geological tourism, to add value to the existing attraction of this site.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

P5B-2

GUA DALAM BATU KAPUR BALAMBANGAN, PULAU BALAMBANGAN, SABAH

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ABSTRAK

Island of Balambangan, offshore Sabah offers great and outstanding scientific, aesthetic and cultural values that make the island very important in term of geoheritage conservation. Despite its small size, the island has beautiful landscapes and other geological elements that bear high ecotourism potentials. The island has a wide spectrum of rock types and paleoenvironments. It's rock type comprises basaltic igneous that has been deposited together with deep sea sediment and clastic as well as carbonate sediments that have been deposited in shallow marine environments. The age of these rocks range from Cretaceous to Pliestocene. Since its emergence, t island have been carved by weathering and erosion into beautiful landscape and morphology. The clastic sediment at the southern tip of the island have been carved by wave into various shapes some of which resemble certain living creatures. Weathering and erosion on the Balambangan limestone member, on the other hand had produced unique karst morphology and landscape.The Balambangan Limestone hosts more than 20 caves with beautiful cave formations. The youngest Timohing formation provides a good example of the recent products of geological processes and can be of high scientific value. In summary, the island has a good very good package for geoturism, edutourism and conservation.

POSTER 1 (PS1)

CHARACTERIZATION OF LEACHATE PLUMES AT TWO WASTE DISPOSAL SITES, SELANGOR

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ABSTRACT

This paper discusses the results of two-dimensional (2D) direct current resistivity imaging surveys, which were conducted to identify and delineate the extent of contaminated land and leachate plumes as well as to assess the capability of the 2D resistivity as a pre-characterization tool for tracing the properties of disposed waste and

its severity underneath a capped landfill sites. These studies were confined to two different municipal waste disposal sites, namely Ampar Tenang open-tipping site and Bukit Kemuning capped landfill. A total of eleven 2D- resistivity survey lines were carried out. Depending on site specification, these lines were distributed as 2 and 9 lines among Bukit Kemuning and Ampar Tenang sites respectively. In this study, the 2D resistivity imaging was carried out using SAS1000 & SAS4000 resistivity meters and ABEM LUND automatic electrode selector system. The objectives of the study were successfully achieved in delineating the locations of the contaminated subsoil and groundwater in terms of leachate plumes. Generally the results of measured resistivity values obtained from the two sites, define the contaminated leachate plumes as electrically conductive anomalies of relatively low resistivity value of less than 10 ohm-m. In addition, the observed resistivity values of 2D image profile, which were measured at the top of an excavated part of Bukit Kemuning landfill, were found to be in a good coincidence with the actual profile as regards to characteristics, degree of decomposition, depth and thickness of the disposed wastes, as well as thicknesses of both cap, and liner of the landfill, besides some other information about the past landfill operations on the site. This in turn, can proof the efficiency of using 2D direct current resistivity technique in waste disposal site investigations.

POSTER 2 (PS2)

PHYSICO-CHEMICAL CHARACTERISTICS AND GEOCHEMICAL COMPOSITION OF SOIL FROM PELEPAH KANAN EX-MINE, KOTA TINGGI, JOHOR

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ABSTRACT

A study on physico-chemical characteristics and geochemical composition of soil from ex-mines in Lombong Pelepah Kanan, Kota Tinggi Johor was carried out. The ex-mine is known to produce tin and iron until the end 2001 when their operation ceased. A number of 15 topsoil (0 - 20 cm) samples were collected east way direction using 'Dutch Auger'. Sampling area represented five different kinds of land use that were forest area (S1), open area (S2), Pond edge (S3), sand tailing (S4) and river sediment (S5). Three soil samples were collected to represent every type of land use. The soil samples were determined for their physico-chemical characteristics and geochemical compositions. Major element compositions of soils were dominated by SiO_2 followed by Fe_2O_3, and Al_2O_3. TiO_2 and MnO content were less than 4.11% whereas K_2 O and P_2O_5 content were less than 1%. The average concentration for heavy metal were 45-288 µg/g for Ba, 105-1066 µg/g for Zr , 0.3-17.7 µg/g for Sr, 0-143.3 µg/g for Rb, 31.3-107.3 µg/g for Pb, 149.3-723 µg/g for As, 23.3-319.3 µg/g for Zn, 15-586.3 µg/g for Cu, 5-15.3 µg/g for Ni, 7-143.7 µg/g for

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

Co, 24.7-66 µg/g for Cr and 52.7-113 µg/g for V. The organic matter content ranged from 1.63 to 2.41%. True density of some soil sample was high, indicating the presence of high density mineral. The pH of the study area ranged from 3.81 to 5.20, thus acidic with cation exchange capacity ranged from low to high concentration. The electrical conductivity value ranged from 2.19 to 2.38 mS/cm.

POSTER 3 (PS3)

ASSESMENT OF EXCAVATABILITY OF WEATHERED ROCK BY SEISMIC VELOCITY METHOD

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ABSTRACT

Seismic refraction method is one of the most popular methods in assessing surface excavation. The ripper manufacturers keep updating the guidelines of their machineries performance based on the seismic velocity. The main objective of the seismic data acquisition is to delineate the subsurface into velocity profiles as different velocity can be correlated to identify different materials. The physical principal used for the determination of rippability is that seismic waves travel faster through denser material as compared to less consolidated material. In general, a lower velocity indicates material more rippable and a higher velocity indicates more difficult to be ripped. However, a few researchers have noted that seismic velocity method alone does not correlate well with the excavatability of the material. In this study, a seismic velocity method was used in Bukit Indah, Johor to assess the accuracy of this seismic velocity method with excavatability of this weathered sedimentary rock mass. A direct ripping run by monitoring the actual production of ripping has been employed at later stage and compared to the manufacturer's recommendation. This paper presents the research findings of the seismic velocity tests in weathered sedimentary area. The reliability of using this method with the actual rippability trials is also presented.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

POSTER 4 (PS4)

HYDROCARBON POTENTIAL OF THE COALS AND SHALES AT THE EUCALYPTUS CAMPSITE AREA, MALIAU BASIN, SABAH

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ABSTRACT

Six shales and four coals of the Kapilit Formation from the adjacent area of Eucalyptus campsite, Maliau Basin, Sabah were analysed using organic petrological and organic geochemical methods to determine their hydrocarbon generating potential, maturity and depositional environment. The organic richness of the shale samples is generally good to very good, whilst for the coals, as usual, show very good organic carbon richness. The shale samples also show good to very good hydrocarbon generating potential (S2 values from 5.0 to 37.3 mg HC/g rock), except for two samples which possess poor hydrocarbon generating potential (S2 <1.0 mg HC/g rock). Hydrogen Index (HI) for the shale samples are less than 200, except for sample S25 (HI = 228), and this suggests that the shales contain mainly gas prone, Type III organic matter. The hydrocarbon generating potential for the coals are very good (S2 values from 126.8 to 228.4 mg HC/g rock) and their hydrogen indices are also quite high (197 to 327), indicating that the coals have some potential for liquid hydrocarbon generation, in addition to gas. Evaluation on thermal maturity shows that the samples are in the early to main stage of oil generation as indicated by VRo values of between 0.57% and 0.80%. Visual organic matter typing show that both shales and coals contain mainly terrigenous derived organic matter. In the shale samples, vitrinite and inertinite are the dominant macerals and constitute more than 70% of the total kerogen, while fluorescing organic matter content which basically consist of liptinite and fluorescing amorphous, ranges from 10 to 20%. In the coal samples, vitrinite is the most dominant maceral (~70%), while liptinite content range from 20% to 30%. Inertinite content is low (10% or less). Some hydrocarbon generative features, such as oil smears or hydrocarbon haze and vesicles can be observed in the coal samples, suggesting that some hydrocarbons have been generated from the coals. The biomarker characteristics also suggest that the rocks analysed contain high abundance of land plant organic matter as shown by the high pristane/phytane (Pr/Ph >5.0) ratio, odd-over-even *n*-alkane distributions, presence of oleananes and dominance of C_{29} sterane homologs. Tricyclic terpanes and C_{30} steranes which are derived mainly from algae organic matter are present in very low relative abundance or are virtually absent. The depositional environment for the shales and coals is probably in a coastal plain or deltaic setting under oxic condition.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

POSTER 5 (PS5)

SURFACE MORPHOLOGY OF GLASS SHARDS FROM VOLCANIC ASH FOUND IN PERAK – A PRELIMINARY STUDY

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ABSTRACT

Young volcanic ash that has been found scattered in Perak has been observed under a Scanning Electron Microscope. All of them show distinct characteristics of pyroclastic material from magmatic origin. They consist of glass shards of cuspate and flat-type shapes and also fragments of pumice. Early observation indicates that some of the ash might have gone through some reworking and (or) weathering.

POSTER 6 (PS6)

ASSESSMENT OF SHUTTLE RADAR TOPOGRAPHIC (SRTM) ELEVATION DATA OF LOJING AND HULU LANGAT, PENINSULAR MALAYSIA

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ABSTRACT

The availability of digital elevation model (DEM) is limited in many developing countries including Malaysia. This has changed when the Shuttle Radar Topographic Mission (SRTM) released data with near global (80% of the landmass) coverage that can be freely downloaded over the internet in 2003. The SRTM data has since been used globally in a wide range of research, including geoscience studies. In this paper, the quality and vertical accuracy of 3 arc-second SRTM data (~90 m resolution) has been evaluated against reference digital 1:50,000 topographic maps for 2 areas in Peninsular Malaysia. The results shows that the contour lines and topographic profiles derived from the SRTM data appear to be comparable to those from the topographic maps. There is an average bias of 15.0 m in the hilly and densely forested area of Lojing and 8.1 m for the undulating low hills covered by rubber plantation, forest and developed area of Hulu Langat. The accuracy of the SRTM data is better in less rugged terrains and terrains with slope gradient less than 10° compared to hilly terrains and terrains with slope gradient greater than 10°. The derived SRTM slope gradients show average bias of -1.9° for Lojing and -1.1° for Hulu Langat. The drainage network derived from the SRTM data is comparable to that in the topographic maps but most first and second order streams are not delineated.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

POSTER 7 (PS7)

THE STRESS-STRAIN BEHAVIOUR OF ARTIFICIALLY WEAKLY BONDED SOILS IN UNDRAINED CONDITIONS

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ABSTRACT

Many natural soils are in a structured or bonded state. This structured/bonded state normally refers to the combination of fabric and bonding. In particularly, residual soils are one of the structured soils which developed through prolong weathering physically and/or chemically from their parent rock. Residual soils can exist in saturated or partially saturated states. The effect of bonding is important on the shear strength of the soil. Therefore, the effect of bond has been examined for an artificial weakly-bonded specimen in order to simulate some characteristics of residual soils (void ratio and bond strength). A series of consolidated isotropically undrained tests (CIU) has been performed using conventional triaxial test. The artificial specimens were prepared in the laboratory using a mixture of sand and kaolin which then fired at 500°C for 5 hours in the furnace. Firing the kaolin at this temperature creates a weak permanent bond between sand particles. All the artificial soil samples were produced in a relatively similar void ratio of 0.6 (dense). The stress-strain, pore water pressure-strain and stress path have been examined to identify the influence of bond on sandy soils. The results of the tests from the bonded specimens are also compared to the tests on destructured specimens which were prepared in the same manner. Apparently, the results show the contribution of bonding on shear strength of the residual soils.

POSTER 8 (PS8)

DEEP-MARINE SEDIMENTARY FACIES OF THE BELAGA FORMATION (CRETACEOUS-EOCENE), SIBU AND TATAU AREAS, SARAWAK: KEY FEATURES AND IMPLICATIONS

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ABSTRACT

Abstract—Deep-marine rocks of the Belaga Formation (Cretaceous-Eocene) in the Sibu-Tatau area, Sarawak, show a variety of facies types, which are characterized by grain fabric, bed thickness, and sedimentary structures. The main facies types are (A) thick-

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

bedded sandstone, (B) thinly-bedded heterolithic sandstone-mudstone interbeds, and (C) mudstone facies. These facies may be interpreted in relation to a hypothetical submarine fan model, in which facies A represents a proximal position (near to source area) while facies B and C represent deposition in the middle to distal parts of the system, respectively. Within this general fan model, a detailed characterization of the facies can be made to understand the depositional processes operating in the deep-marine environment. Facies A, for instance, comprises massive and graded sand beds that appear to be linked genetically; the massive bed, often with floating mudclasts at the top, probably represent a debris flow deposit laid down over a pre-cursor turbidity flow deposit, which is commonly preserved as a thin graded bed at the base of the sandbody. Such linked debrite-turbidite facies association seems to be a common feature in the Belaga Formation, similar to many other deep-marine depositional systems, including the West Crocker in Sabah.

POSTER 9 (PS9)

CRITERIA OF FOUR SOIL SERIES OF THE TASIK CHINI, PAHANG, MALAYSIA

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ABSTRACT

A total of 20 samples (0-20 cm) from topsoil and 36 samples from horizon basis were collected from four soil series namely Malacca, Rasau, Bungor and Gondang Soils.

Physico-chemical properties such as particle size distribution, texture, organic matter content (OM), density, porosity, pH, cation exchange capacity (CEC), electrical conductivity (EC), available nutrients and selected heavy metals were analyzed. The analysis showed that profile and topsoil of Rasau Soil Series were dominated by sandy loam, whereas Bungor, Malacca and Gondang Soil Series were dominated by clay in texture. The organic matter content (OM) of Rasau Soil Series was very low range from 1.1 to 3.16%, Malacca and Bungor was low range from 5.63 to 8.05% and 5.1 to 10.09% respectively. Gondang Soil Series contained comparatively high range from 1.12 to 16.7%. Bulk density and true density ranged from 1.0 to 1.33 gm/cm^3 and 2.33 to 2.74 gm/cm^3 respectively. Porosity was range from 51.35 to 62.59%. The pH of soils was less than 3.97 and was considered as strong acidic to extremely acidic. Electrical conductivity (EC) was very low range from 1.93 to 2.55 mS/cm. Cation exchange capacity of Bungor, Malacca, Rasau and Gondang Soil Series were 1.08 to 2.98 meq/100g soil, 1.96 to 4.01 meq/100g soil, 2.54 to 4.26 meq/100g soil and 5.79 to 13.52 meq/100g soil respectively. Cation exchange capacity of Bungor, Malacca and Rasau was very low at values less than 4.26 meq/100g soil. Gondang Soil series was comparatively high range 5.79 to 13.52 meq/100g soil. The range of available phosphorus, potassium and magnesium of Rasau series were 4.66 to 7.96µg/g, 21.05 to 56.20µg/g and 3.49 to 29.68µg/g, Malacca Series

were 3.7 to 6.96μg/g, 18.16 to 48.94μg/g, and 11.18 to 32.43μg/g, Bungor Series were 3.92 to 7.0μg/g, 10.63 to 51.88μg/g, and 3.45 to 35.76μg/g and Gondang Series were 6.04 to 9.88μg/g, 20.35 to 70.08μg/g and 12.28 to 47.13μg/g respectively. Results indicated that some heavy metals such as Pb, Zn, Cu, Co, Ni, Cr and Cd concentrations in all the soil series were low and still below the critical level.

POSTER 10 (PS10)

GUA DALAM BATU KAPUR BALAMBANGAN, PULAU BALAMBANGAN, SABAH

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ABSTRAK

Geologi Pulau Balambagan boleh dibahagikan kepada alluvium pantai dan sungai, tiga formasi batuan sedimen dan juga batuan igneus ultrabasik. Formasi batuan sedimen terdiri daripada Formasi Chert-Spilit, Formasi Bongaya dan Formasi Timohing. Pada zaman Miosen (sekitar 10 juta tahun dahulu) pasir dan terumbu karang telah terbentuk di sekitaran laut cetek. Kumpulan endapan sedimen inilah yang membentuk Formasi Bongaya. Terumbu karang tersebut sekarang ini dipanggil Batu Kapur Balambangan yang tersingkap di bahagian selatan pulau. Batu kapur ini mempunyai banyak hidupan karang dahulu yang masih berkedudukan sepertimana ia hidup, serta pecahan dan

serpihan karang lain. Gua batu kapur adalah satu fitur penting yang ditemui dalam Batu Kapur Balambangan. Mengikut masyarakat tempatan, dalam Batu Kapur Balambangan ini terdapat lebih daripada dua puluh (20) buah gua dan empat (4) daripada gua-gua ini telah kami petakan dengan terperinci. Kebanyakan gua-gua lain masih belum diteroka dan didokumenkan. Semua gua-gua ini sangat istimewa kerana ia mempunyai formasi gua yang cantik dan unik seperti stalaktit, stalagmit, batu alir, straw dan banyak lagi. Selain itu, gua-gua ini juga mempunyai nilai saintifik yang tinggi. Jika dimusnahkan, kita semua tidak lagi boleh mewarisi warisan yang tidak ternilai ini kepada generasi yang akan datang. Walaupun banyak lagi gua-gua lain yang terdapat di Sabah, gua di Pulau Balambangan sangat istimewa kerana keindahan fitur guanya (sama ada bersaiz besar atau kecil) dan sebahagian fitur ini masih atau sedang membesar. Jadi gua-gua ini mempunyai kepentingan saintifik dan perlu dipelihara.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

POSTER 11 (PS11)

SEDIMENTOLOGY OF THE SEMANTAN FORMATION (MIDDLE-UPPER TRIASSIC) ALONG THE KARAK-KUANTAN HIGHWAY, CENTRAL PAHANG

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ABSTRACT

Outcrops Of The Semantan Formation (Middle To Upper Triassic) Along The Karak-Kuantan Highway At Km. 114.7, Km. 115, Km. 140 And Km. 149.3 Were Studied. Some Beds Were Found To Contain Bivalves (*Posidonea* Sp., *Daonella* Sp.) And Gastropods, Which Support The Middle To Upper Triassic Age For The Semantan Formation. Sedimentary Facies And Facies Associations Were Examined To Gain A Better Understanding Of Deep-Marine Sedimentation Processes In Relation To Submarine Fan Models. The Main Facies Recognized In The Field Include Conglomerate, Pebbly Sandstone, Thick-Bedded Sandstone, Interbedded Sandstone-Shale, Contorted Sandstone-Shale, And Shale-Dominated Heterolithics. The Facies Associations Include Fining- And Coarsening-Upward Fan-Lobe Parasequences, Slump Deposits, And Outer Fan/Basin Plain Shales. The Sediments Therefore Represent A Range Of Subenvironments From Slope To Outer Fan. Both Debris Flow And Turbidity Current Deposits Are Recognized As The Main Depositional Processes In Semantan Formation. Features, Such As Disorganized Clasts In Conglomerate, "Floating" Mudclasts, And Scour-And-Fill Structures Indicates Debris Flow Processes Whereas Normal Graded Bedding (Fining Upward) And Thin Waning-Flow Sandy Layers In Shale Indicates Turbidity Current Processes.

POSTER 12 (PS12)

GEOCHEMICAL CHARACTERIZATION OF VOLCANIC SOILS FROM TAWAU, SABAH

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ABSTRACT

This paper discussed the geochemical characterization of volcanic soils from Tawau, Sabah. The concentration of major elements and trace elements were determined using XRF analysis whereas mineralogical study was determined using XRD and SEM techniques. The result of the analysis showed that SiO_2 and Al_2O_3 were abundant constituents in volcanic soils with their concentrations between 43.06% -

67.96% and 12.55% - 29.92% respectively. The concentration of Fe_2O_3 was next in abundance with the concentration between 6.82% and 11.29%. The concentration CaO, K_2O, MgO, Na_2O, P_2O_5, and TiO_2 is less than 5%. The high concentrations of SiO_2 and Al_2O_3 are due to the high abundances of kaolinite and quartz as detected from XRD, while the high concentration of Fe_2O_3 is due to the appearance of geothite. The average concentrations for Ba, V, Zr and Zn in volcanic soils are 341 ppm, 314 ppm, 239 ppm, and 124 ppm respectively. The strong correlation between Zn - Al_2O_3, Zn - Fe_2O_3 and Zn - SiO_2, indicates that Zn is been adsorb by secondary minerals especially kaolinite and goethite.

POSTER 13 (PS13)

KAJIAN KEPEKATAN PB, CU, ZN DAN FE DI SUNGAI MAMUT, RANAU SABAH

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Sekolah Sains & Teknologi,
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Kajian ini dijalankan bertujuan menentukan kepekatan logam Plumbum (Pb), Kuprum (Cu), Zink (Zn) dan Ferum (Fe) di dalam air Sungai Mamut, Ranau Sabah. Sebanyak empat lokasi persampelan telah dipilih di sepanjang Sungai Mamut iaitu dengan jarak pada 7km, 10km, 12 km dan 14 km daripada kawasan bekas Lombong Tembaga Mamut. Kesemua sample dianalisis dengan kaedah spectrometer serapan atom (AAS). Hasil

analisis menunjukkan nilai kepekatan bagi logam-logam tersebut adalah 0.16 – 0.25mg/l, 0.05 – 0.64 mg/l, 0.03 – 0.36mg/l dan 0.01 – 0.06 mg/l masing-masing. Logam Pb dan Cu di semua lokasi persampelan adalah melebihi had yang telah ditetapkan di dalam Piawaian Kualiti Air Kebangsaan Interim (INWQS) Malaysia untuk air sungai bagi Kelas IIA/IIB iaitu 0.05mg/l dan 0.02 mg/l manakala logam Zn dan Fe adalah rendah di sepanjang sungai Mamut. Ini menunjukkan bahawa Sungai Mamut adalah kurang sesuai dijadikan sebagai sumber air minuman dan kegunaan seharian bagi penduduk setempat di sepanjang sungai tersebut. Kepekatan logam Pb dan Cu ini dikhuatiri boleh menyebabkan masalah kesihatan walaupun aktiviti perlombongan di Lombong Tembaga Mamut telah berhenti beroperasi.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

POSTER 14 (PS14)

GEOTECHNICAL PROPERTIES OF MINING WASTE STABILISED WITH LIME – GYPSUM

Baba Musta

Geology Program
School of Science & Technology
Universiti Malaysia Sabah 88999, Kota Kinabalu SABAH

ABSTRACT

This paper presents a study on the stabilisation of mining waste from Sabah, Malaysia using admixture of lime gypsum and soil. The physico-chemical properties studied consists of pH, particle size distribution, compaction, unconfined compressive strength and permeability. The mineral identification were examined using X-ray diffraction (XRD) and Scanning electron microscopic (SEM). In this study, different percentages of lime, gypsum and fine material were added into the mining waste. For the stabilisation purposes, 20% of clayey materials from weathered shale were added into mining waste to act as a pozzolana before adding stabilising agent i.e lime and gypsum. The samples were cured for 1 day, 14 days, 28 days, 45 days and 100 days at room temperature before unconfined compressive test were performed. The surface micromorphology of samples was analysed using SEM. The results of unconfined compression test for the unstabilised samples show the strength is between 11 kPa to 15 kPa. The absence or very low chemical cementation between minerals particles in mining waste resulted in the low strength. In contrast, stabilised samples shows immediate increased of strength with the increase percentages of lime and gypsum added into mining waste. This is due to the formation of cement minerals as detected from the SEM. Mining waste stabilised with 6% lime show the maximum strength after curing for 7 days, 14 days, 28 days, 45 days and 100 days. Whereas, mining waste stabilised with 8% gypsum has the maximum strength. The results of compressive strength also show the maximum strength is achieved with a mixture of 3% lime and 3% gypsum. From this study, it is concluded that the intensive pozzolanic reactions with the addition of lime, gypsum, and lime-gypsum mixture into mining waste produce cement minerals, creating bridge-like structures, cementing the original minerals and creating high inter-particle contact orientations; hence the increase in strength.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

POSTER 15 (PS15)

KAJIAN SIFAT FIZIKO-KIMIA DAN MIKROSTRUKTUR TANAH FORMASI CHERT-SPILIT DAN FORMASI KUDAT DI KUDAT, SABAH

Wan Nursaiedah Wan Ismail & Baba Musta
Sekolah Sains & Teknologi,
Universiti Malaysia Sabah, 88999 Kota Kinabalu, Sabah

Sampel tanah daripada luluhawa batuan Formasi Chert-spilit dan Formasi Kudat telah diambil untuk kajian sifat fiziko-kimia dan mikrostruktur. Kajian fiziko-kimia terdiri daripada kandungan kelembapan, kandungan organik, pH, graviti tentu, analisis taburan saiz butiran, ujian pemadatan, kebolehtelapan dan kekuatan ricih. Kajian mikrostruktur dijalankan dengan menggunakan peralatan Mikroskop Elektron Pengimbas (SEM). Hasil kajian menunjukan kelembapan tanah berjulat diantara 13.45% hingga 30.56% dan nilai yang tertinggi ialah tanah cert spilit. Nilai kandungan bahan organik bagi kesemua sampel adalah kurang daripada 2.10% dan pH adalah di antara 5.57 hingga 6.71. Nilai spesifik graviti adalah diantara 2.61 hingga 2.88. Analisis saiz butiran menunjukkan tanah daripada Formasi Kudat dikelaskan sebagai tanah berpasir manakala tanah daripada Chert Spilit adalah lempung berlodak dan lempung. Nilai kebolehtelapan bagi kesemua sampel Formasi Kudat adalah lebih tinggi (1X 10^{-5} m/s) berbanding dengan sampel Cert Spilit (1 x 10^{-6} m/s). Kekuatan ricih menunjukkan sampel Formasi kudat mempunyai nilai di antara 36.5 – 125 kN/m^3 dan Cert Spilit sekitar 22.0 kN/ m^3. Kajian mikrostruktur menukjukkan kehadiran mineral kuarza yang dominan dalam Formasi Kudat manakala mineral lapisan minerallempung jelas ditunjukkan dalam tanah Cert Spilit.

POSTER 16 (PS16)

UNDERSTANDING ACID MINE DRAINAGE (AMD): CAUSES, IMPACTS, CONTROL AND THE LOCAL SCENARIO

Marcus Jopony, Felix Tongkul & Stella Ho Yen Ling
School of Science and Technology, Universiti Malaysia Sabah,
Locked Bag No. 2073, 88999 Kota Kinabalu, Sabah
*marcj@ums.edu.my

ABSTRACT

Acid Mine Drainage (AMD) is a well documented worldwide environmental problem associated with mining activities, including coal and base metal mining. Nevertheless, it is a relatively new environmental issue in Malaysia and consequently scientific understanding and experiences on AMD causes, impacts and control is still low. This paper presents a brief overview on the science (chemistry, geology and biology) of AMD formation, its environmental impacts and methods of control, with specific references to the ex-copper mine in Ranau, Sabah.

Seminar Geosains Kebangsaan 2007 (NGC 07)
Universiti Malaysia Sabah, Kota Kinabalu, Sabah
7 – 9 June 2007

POSTER 17 (PS17)

INVEST OPPURTUNITIES IN THE MINERAL SECTOR IN THE SUDAN (WITH EMPHASIS ON GOLD)

Mohamed Hamid Moala
Geological Research Authority of the Sudan
Khartoum-Sudan

ABSTRACT

Due to the diversity of geology in the Sudan, many minerals deposits are known to occur in the Sudan. These include copper, lead, zinc, mica, manganese, chromite, gypsum, marble, white silica, iron and gold etc. Gold mining in the Sudan is known since the Pharaonic times, about 3000 years ago, in the area between the Nile and the Red Sea as well as in the Blue Nile area and in southern Sudan. No precise exploration for gold was made till early 1900 when a number of British companies carried out some work in the Red Sea Hills. Between 1929-1939 a small group of companies performed exploration work which led to the development of small gold mines in the Red Sea and Blue Niles areas. Between 1980-1985 the work done by British and French Organization in the Red Sea Hills resulted in new discoveries of gold at Gebeit and Wadi Ariab areas. All the exploration prior to 1980 was based on the traditional methods of prospecting quartz veins, and all mines developed were small vein type underground mines. During the last twenty years, the gold mining industry has developed a substantial amount of knowledge due o the recently developed technology which has resulted in the discovery of many new types of gold deposits which could not be detected by the traditional prospecting

techniques. This modern gold exploration technology gave significant results including the discovery of several major base metal-gold deposits associated with silica barite gossans in the Ariab area. Ariab Mining Company, a joint venture company, between Sudan Government and a group of French companies, is now producing about four tons of gold per year. Contracts were signed with local and foreign companies to explore and exploit gold in different parts of the country. The targeted areas are divided into blocks. These are 26 blocks in northern Sudan, ten of them were granted and the rest are still free. In addition to other areas in the Blue Nile and Kordofan. In this Poster Presentation, I will show all the geological and mineralogical maps and other documents pertaining to the subject.

PERSIDANGAN GEOSAINS KEBANGSAAN 2007
(National Geoscience Conference 2007)
NGC 2007

Registration in Library Auditorium, UNS

Participants in the Main Auditorium

Speech by Vice Chancellor of UMS Prof Datuk Dr. Mohd Noh Dalimin

Welcome address by Vice President , GSM, Dr Joy Pereira

Prof Sanudin Hj. Tahir - Plenary paper No III

Prof Wan Fuad Wan Hassan - Gold mineralization at Selingsing, Pahang

PERSIDANGAN GEOSAINS KEBANGSAAN 2007
(National Geoscience Conference 2007)
NGC 2007

Prof Shafea Leman - Plenary Paper No II

Backdrop of the NGC 2007

Deputy VC Assoc Prof Dr Amran Ahmed with Dr Joy Pereira and Mr Webster

Diners at the NGC 2007 dinner

Welcome address by Mr Alexander Yan - Co-chairman NGC 2007

Vice Chancellor presenting a memento to Dr Baba Session Chairperson

PERSIDANGAN GEOSAINS KEBANGSAAN 2007
(National Geoscience Conference 2007)
NGC 2007

VC presenting a memento to Prof Basir Jasin Session Chairperson

VC presenting a memento to Mr Alexander Yan Session Chairperson

VC presenting a memento to Prof Dr Lee Chai Peng Session Chairperson

VC presenting a memento to Dr Baba Musta Session Chairperson

VC presenting a memento to Dr Joy Pereira Session Chairperson

USM Logo at the Universiti Malaysia Sabah, Kota Kinabalu

PERTEMUAN PERSATUAN (Meeting of the Society)

Ceramah Teknik (Technical Talk)

Status of Beach Placer Mineral Exploration and Exploitation: Global Scenario

22 June 2007
Geology Lecture Hall, University of Malaya

(in collaboration with Department of Geology, University of Malaya)

Prof. N. Chandrasekar
Centre for Geotechnology, Manonmanium Sundaranar University, Tirunelveli, Tamilnadu, India.

Report

A small audience was present in the Geology Lecture Hall to listen to the technical talk by Prof. Chandrasekar at 5.30 pm on Friday, 22 June 2007. The unusually small crowd was because all our students were away on term break. Nevertheless it was an interesting session with active participation from those present in the discussion following the talk. The abstract of his talk is given below.

Report by Prof Dr Lee Chai Peng

Abstract

The mineral deposits of the land will be exhausted one day due to industrial growth and continuous exploitation by man. It is essential to search for an alternative source. Nearly 7000 km of Indian coast and the shallower portion of the seas is the obvious choice for detail exploration and exploitation. The most important minerals in these areas are the heavy mineral placer deposits, which are high specific gravity resistant minerals usually accumulated in the beaches. Beaches are an interesting area from a mineral resource point of view. Exploration and exploitation of these deposits are comparatively cheaper. Bulk of the material forming the beaches are washed products transported down to the seacoast by rivers and streams derived from continental rocks by weathering processes. The most important heavy minerals present in the beach sands are ilmenite, sillimanite, leucoxene, rutile, zircon, garnet and monozite. The provenance of these heavy minerals is the crystalline rocks of the hineterland. However, the immediate source of these heavy minerals is believed to be the back shore sediments and continental shelf sediments deposited on the palaeo beaches during low stands in the area. The transgressing shoreline concentrated and deposited these heavy minerals by the action of waves on the present day beaches and backshore. These placer deposits are mined from the beach and backshore.

Even mineral concentrations of gold, diamond and platinum also occur in the beach sector as well as in the submerged extension of stream channels, generally within several kilometers of the primary source.

Offshore placers of potential economic importance are likely to be restricted to shelf areas in water depths less than about 150 m adjacent to the primary source rock on land or rocks cropping out on the seafloor. Some of the well known offshore placers are tin deposits off the coast of Indonesia, Malaysia, Thailand and UK.

The diamond deposits of southern Africa off the Orange River mouth in Atlantic is well known. Large scale production by De Beers Marine commenced in 1989 in Nambian waters and lot of developments has taken place recently. Remotely controlled sea bed mounted excavation systems have assumed a major role. They permit highly selected extraction and enhanced the recovery of diamondiferous gravels from 200 m water depth. In India occurrence of beach placers are well known from a number of localities along the long coastal stretch. Detailed explorations of these placers are in progress.

Considering the fact that there is growing need and application of placer minerals in various mineral based industries, a new thrust should be given to placer mineral exploration. These deposits are readily exploitable, marketable and can easily capture the international market. Full attention should be given to take stock of the present status of exploration and exploitation and attempts should be made to search for these minerals in the unexplored areas at the earliest. It is also suggested that multi disciplinary studies should be done to understand the environmental impact and to access the correct picture of exploitation status.

Status of Beach Placer Mineral Exploration and Exploitation: Global Scenario

Prof N Chandrasekar delivering his talk

From Left: EV Gangadaram, N. Chandrasekar, Charles Hutchison, Zainudin Ariffin, CP Lee and Nur Iskandar

Tea break before the talk

Part of the audience at the talk by Prof N Chandrasekar

Immediate Past President Prof Dr CP Lee introducing the guest speaker

Immediate Past GSM President Dr Lee CP presenting a token of appreciation to Prof N Chandrasekar

BERITA-BERITA PERSATUAN (News of the Society)

COUNCIL MEMBERS WANTED

Our Council is looking for suitable candidates to head the following Groups as Chairman:

1. **Working Group on Structural Geology & Tectonic**
2. **Working Group on Petroleum Geology**
3. **Working Group on Sedimentology, Stratigraphy & Paleontology**

Interested candidate please write to GSM or call the Editor, Mr Lau YinLeong at 012-2093098.

Current Address Wanted

1. Mohd. Kasim Kinchu
2. Zainey Konjing
3. Marahizal Malihan
4. Heinrich R. Siregar
5. Hla Mine Pye
6. Anyi Ngau

Pertukaran Alamat (Change of Address)

1. Tong Pow Mun, 2-6, Sutramas, 3, Jalan Dutamas Melati, 51200 Kuala Lumpur
2. Lim Eng Hwa, No. 8, Jalan Damai Kasih 11, Alam Damai, Cheras, 56000 Kuala Lumpur
3. Lee Chong Yan, 19, Jalan Pantai Jerjak 15, 11900 Bayan Lepas, Pulau Pinang

BERITA-BERITA LAIN (Other News)

Pertambahan Baharu Perpustakaan (New Library Additions)

1. Earth Science Frontiers, vol. 14, nos. 1 & 2, 2007
2. Journal of Shijiazhuang University of Economics, vol. 29, no. 6, 2006
3. Acta Geoscientica Sinica, vol. 27: no. 6, 2006 & vol. 28: nos. 1 & 2, 2007
4. Natural History Research, Special issue no. 8, 2005 & no. 9, 2006
5. Journal of the Natural History Museum & Institute, Chiba, vol. 9, no. 2, 2007
6. Natural History Research, vol. 9, no. 2, 2007
7. Journal of the Natural History Museum & Institute, Chiba, Special issue no. 8, 2007
8. The University of Kansas, Paleontological contributions, no. 15, 2007
9. Bulletin of the National Science Museum, vol. 32, 2006
10. Bulletin of the Geological Survey of Japan, vol. 57, nos. 7/8 & 9/10, 2006
11. Episodes, vol. 30, no. 2, 2007
12. Geological Survey of New South Wales, Quarterly Notes, no. 124, 2007

Proceedings for Sale

1. Forum on groundwater, 1994 (3 copies)
2. Forum on environmental geology & geotechnics, 1995 (4 copies)
3. Dynamic stratigraphy & tectonics of Peninsular Malaysia, 3rd seminar – The Mesozoic of Peninsular Malaysia (2 copies)
4. GSM-IEM forum: the roles of engineering geology and geotechnical engineering in construction works: proceedings (10 copies)

BERITA-BERITA LAIN (Other News)

Department of Geology, Universiti Malaya Celebrates 50th Anniversary

Prof Dr Wan Hasiah, Head of Geology Dept, Universiti Malaya

The Department of Geology, Universiti Malaya recently celebrated its 50th Anniversary. To mark this significant occasion, a dinner was held on 23rd June 2007 at the Armada Hotel, Petaling Jaya. The dinner was attended by a near capacity crowd of 120, comprising invited guests, graduates, staff and retired staff of the Department. Some of them were accompanied by their friends and family. The dinner was organised by a committee chaired by Dr. Ahmad Tajuddin Ibrahim and Puan Che Noorliza Lat served as Master of Ceremony for the evening.

The Guest of Honour, Deputy Vice Chancellor (Research & Innovation) Professor Dr. Muhamad Rasat Muhamad representing the Vice Chancellor was accompanied by his wife Professor Dr. Saadah Abdul Rahman. The Head of Department Professor Dr. Wan Hasiah Abdullah also hosted the following guests: Director General, Minerals and Geoscience Department Tuan Haji Yunus Abdul Razak, Dean Faculty of Science Professor Dr. Amru Nasrulhaq Boyce, Professor Emeritus Dr. Charles S. Hutchison and Professor Emeritus E.V. Gangadharam.

The evening began at about 8.15 pm with the reading of congratutary greetings from friends and former lecturers living abroad including Dr. Peter H. Stauffer, Dr. Ian Metcalfe, Dr. Robert Hall, Mrs. D.J. Gobbett and Dr. T.T. Khoo, by Professor Dr. Lee Chai Peng. It was followed by a multimedia presentation on the history of the Geology Department. After the presentation, everyone was treated to a sumptuous Chinese dinner.

Professor Dr. Wan Hasiah Abdullah delivered the welcoming speech in which she thanked all those present for attending the dinner. She also expresses her gratitude to the sponsoring companies and their management. She was delighted to see former lecturers and retired support staff, some of them who have served the Department for more than 30 years. She noted that some of the participants may no longer have a direct link with the Department, while others are still dedicating their time and to effort fulfil Universiti Malaya's mission and vision. She hoped that links can be rebuilt and strengthened by establishing the Alumni (see sidebar/footnote) and get together dinners such as this.

Professor Dr. Wan Hasiah also described some of the current initiatives of the Department. These include the writing of two books, on the history of the Department and the geology of Peninsular Malaysia, respectively. According to Professor Dr. Wan Hasiah, the Department is presently doing a curriculum review and preparing new MSc programmes. The Department, according to Professor Dr. Wan Hasiah is doing its best to support the need of the industry.

BERITA-BERITA LAIN (Other News)

Professor Dr. Wan Hasiah said that "life long learning and teaching" should be adopted by all, especially those who are approaching retirement age or have already retired. She encouraged them to become involved with the Department or the Alumni, to help to enhance the soft skills of the geology undergraduates. To achieve this, she suggested that the Alumni should work closely with the UM Geology Student's Club (KAGUM).

Professor Dr. Wan Hasiah concluded her address by thanking all her staff, the management of Universiti Malaya, the Alumni, individuals and companies for their support. She also expressed her sincere and heartfelt thanks to the organising committee and all those that have contributed and participated in the dinner.

In his brief speech, Professor Dr. Amru Nasrulhaq Boyce congratulated the Department on its 50th Anniversary. In his years in Universiti Malaya, he has noted and is very pleased with the progress made by the Department. He also noted that geosciences are now one of the most sought after profession by the industry.

The programme was followed by an address by Professor Dr. Muhamad Rasat Muhamad who represented the Vice Chancellor. Professor Dr. Muhamad Rasat Muhamad first thanked the Department for the invitation to the 50th Anniversary Dinner. He noted that since its establishment in 1956 in Singapore, the Department has progressed in terms of human resources, research facilities and student intake to become one of the leading geology departments in the region. He concluded his address by congratulating the Department on its 50th Anniversary and on the establishment of the Alumni.

The evening was followed by a presentation of souvenirs to the main sponsors of the 50th Anniversary Dinner by Professor Dr. Muhamad Rasat Muhamad. The main sponsors were Petronas Carigali, ExxonMobil Exploration & Production (M) Inc., Murphy Oil Corp, Core Laboratories (M) Sdn. Bhd., Talisman Malaysia Ltd and Histocenter (M) Sdn. Bhd.

Professor Emeritus Dr. Charles S. Hutchison was presented with a special souvenir by Professor Dr. Amru Nasrulhaq Boyce, to acknowledge his contribution to the advancement of geoscience in Malaysia and Southeast Asia. This was followed by presentation of souvenirs to the special guests, Professor Dr. Muhamad Rasat Muhamad, Tuan Haji Yunus Abdul Razak and Professor Dr. Amru Nasrulhaq Boyce by Professor Dr. Wan Hasiah.

Professor Emeritus Dr. Charles S. Hutchison, Dr. Koh Tuck Wai, Mr. P. Loganathan, Mr. S. Sandrasagaram, Mr. Sia Hock Kian, Professor Emeritus E.V. Gangadharam and Encik Uzaymee Mohd. Yusof then took turns to entertain the crowd with stories about their past experiences in the Department. The dinner ended at 11 pm and everyone left with renewed ties of friendship.

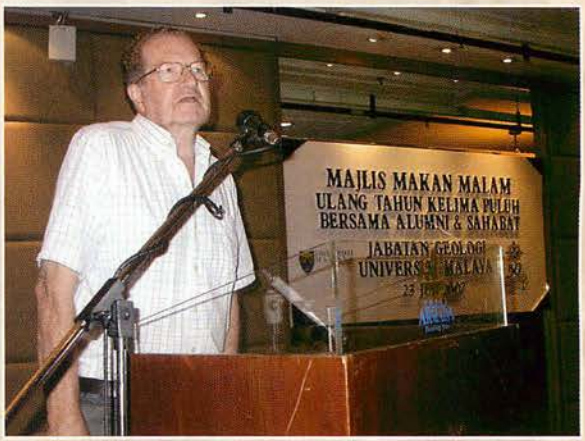
Report by Dr Ng Tham Fatt

Department of Geology
Universiti Malaya Celebrates 50th Anniversary

Dr Mark Koh Tuck Wai regaling the diners

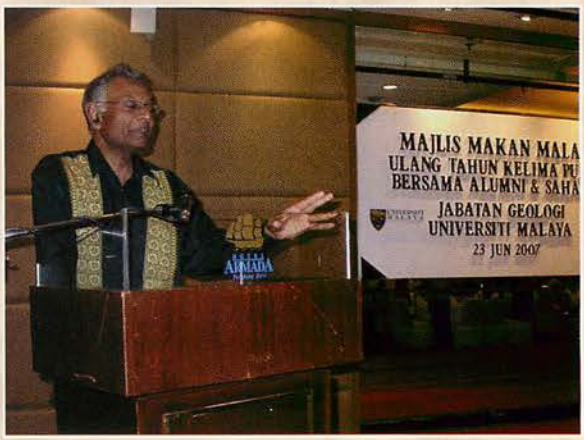
Prof Dr Lee Chai Peng

Prof Emeritus Dr. E.V. Gangadharam



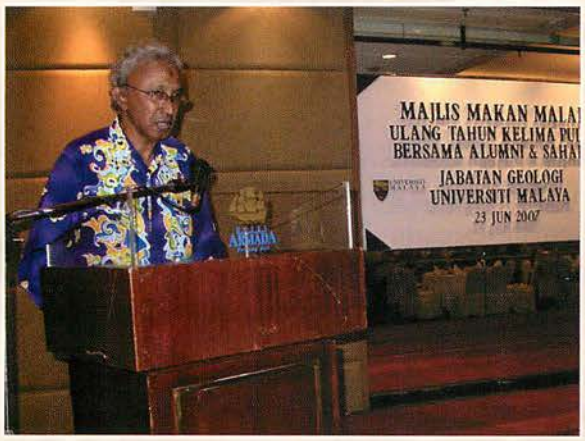
Prof Emeritus Dr Charles Hutchison

Encik Uzaymee Mohd. Yusof



Mr P.Loganathan

Department of Geology
Universiti Malaya Celebrates 50th Anniversary



Mr S. Sandrasagaram

Mr Sia Hock Kian

Diners at the UM Geology Dinner

Diners at the UM Geology Dinner

Part of the diners at the UM Geology Dinner

Prof Dr Wan Hasiah presenting a token of appreciation to Prof E Dr Charles Hutchison

BERITA-BERITA LAIN (Other News)

Formation of the Universiti Malaya Geology Alumni Society Protem Committee

A meeting was held at 6.30 pm on 23rd July 2007 at the Armada Hotel, Petaling Jaya to form the Protem Committee for the Universiti Malaya Geology Alumni Society. The meeting chaired by Assoc. Professor Dr. Samsudin Hj. Taib was attended by 21 graduates from the Department of Geology, Universiti Malaya. The meeting unanimously agreed to form a Universiti Malaya Geology Alumni Society to be registered with the Registrar of Societies. The meeting also voted to establish a Protem Committee comprising the following:

President:	Low Keng Lok
Vice President:	Koh Tuck Wai
Secretary:	Ng Tham Fatt
Treasurer:	Samsudin Hj. Taib
Advisor:	Head, Geology Department, Universiti Malaya
Members:	Ahmad Nizam Hasan
	Ahmad Tajuddin Hj. Ibrahim
	Azimah Ali
	Denis Tan
	Ismail Yusoff
	Mustaffa Kamal Shuib
	Yeap Cheng Hock
	Yu Sheng Mou

For more information, please contact Dr. Ng Tham Fatt (thamfatt@gmail.com) or any of the committee members above.

BERITA-BERITA LAIN (Other News)

Up Coming Events

September 3-7, 2007: Basic petroleum geology, Kuala Lumpur. Contact: PetroSkills, P.O. Box 35448, Tulsa, Ok. 74153-0448, USA. Tel: 800 821 5933/918 828 2500; Fax: 918 828 2580; email: registrations@petroskills.com

September 3-7, 2007: Wireline formation testing and interpretation, Kuala Lumpur. Contact: PetroSkills, P.O. Box 35448, Tulsa, Ok. 74153-0448, USA. Tel: 800 821 5933/918 828 2500; Fax: 918 828 2580; email: registrations@petroskills.com

September 4-6, 2007: Malaysian Science and Technology Congress 2007, Holiday Villa Subang. Contact: COSTAM Secretariat, C3A-10, Damansara Intan, No. 1, Jalan SS20/27, 47400 Petaling Jaya, Selangor, Malaysia. Tel: 603 71182062/64; Fax: 603 7118 2063; email: secretariat@costam.org.my ; website: www.costam.org.my

September 5-7, 2007: 10th International Conference on Environmental Science, lie de Cos, Greece. Contact: Fax: +30 210 6492499; email: cest2007@ngest.org; website: www.gnest.org/cest

September 17-21, 2007: 35th IAH Congress – Groundwater and Ecosystems, Lisbon, Portugal. Contact: website: www.geo.ua.pt/aih-gp/iah2007

October 16-19, 2007: Sixth Asian Regional Conference on Geohazards in Engineering Geology, Seoul, Korea. Contact: email: iaeg@plaza.snu.ac.kr; website: www.iaeg2007.org/

October 18-19, 2007: The 2nd International Workshop on Opto-Electronic Sensor-based Monitoring in Geo-Engineering, Nanjing, China. Contact: Dr. Zhang Dan, Center for Engineering Monitoring with Opto-Electronic Sensing (CEMOES), Dept. of Earth Sciences, Nanjing University, Nanjing 210093, China. Tel: +86-25-83596220/83597888/83596194; Fax: +86-25-83596220; email: osmg2007@nju.edu.cn; website: http://www.acei.cn

October 29-November 2, 2007: Coring and core analysis, Kuala Lumpur. Contact: PetroSkills, P.O. Box 35448, Tulsa, Ok. 74153-0448, USA. Tel: 800 821 5933/918 828 2500; Fax: 918 828 2580; email: registrations@petroskills.com

October 31-November 3, 2007: Oil & Gas Technology, Jakarta, Indonesia. Contact: website: www.pamerindo.com/2007/ogti/ogi07exh.htm

November 5-9, 2007: Introduction to offshore oil and gas systems, Kuala Lumpur. Contact: PetroSkills, P.O. Box 35448, Tulsa, Ok. 74153-0448, USA. Tel: 800 821 5933/918 828 2500; Fax: 918 828 2580; email: registrations@petroskills.com

BERITA-BERITA LAIN (Other News)

November 6-7, 2007: Cities and Conservation – International Symposium, Putrajaya, Kuala Lumpur, Malaysia. Contact: Joy Pereira, email: joy@pkrisc.cc.ukm.my

November 8-12, 2007: International Symposium on Gondwana to Asia and 2007 IAGR Annual Convention, Kyushu University, Kyushu, Japan. Contact: Dr. Nobuhiko Nakano, Symposium Secretariat, International Symposium on Gondwana to Asia, Division of Evolution of Earth Environment, Kyushu University, Fukuoka 810-8560, Japan. Fax: +81-92-726-4843; email: good-asia@scs.kyushu-u-ac.jp

November 12-16, 2007: Seismic interpretation, Kuala Lumpur. Contact: PetroSkills, P.O. Box 35448, Tulsa, Ok. 74153-0448, USA. Tel: 800 821 5933/918 828 2500; Fax: 918 828 2580; email: registrations@petroskills.com

November 18-21, 2007: Challenge our Myths: Energy Conference & Exhibition. Presented by AAPG & AAPG European Region. Venue: Megaron – Athens International Conference Centre. Contact: Marvetta McNeel, Tel: 1 888 945 2274 ext. 692 (toll free USA & Canada only); 1 918 560 2692 (direct); email: marvetta@aapg.org; website: www.aapg.org/athens

November 28-30, 2007: 2nd International Conference on Geotechnical Engineering – "New Developments in Geotechnics", Central South University, Changsha, Hunan, China – call for papers. Contact: Tel: 065 67332922; Fax: 065 62353530; email: cipremie@singnet.com.sg

December 2-7, 2007: Securing groundwater quality in urban and industrial environments, Fremantle, Western Australia. Contact: Viv Baker, Tel: 61 8 9333 6274; email: viv.baker@csiro.au or Greg Davis: Tel: 61 8 9333 6386; email: greg.davis@csiro.au. Website: www.csiro.au/GQ07; email: GQ07@csiro.au

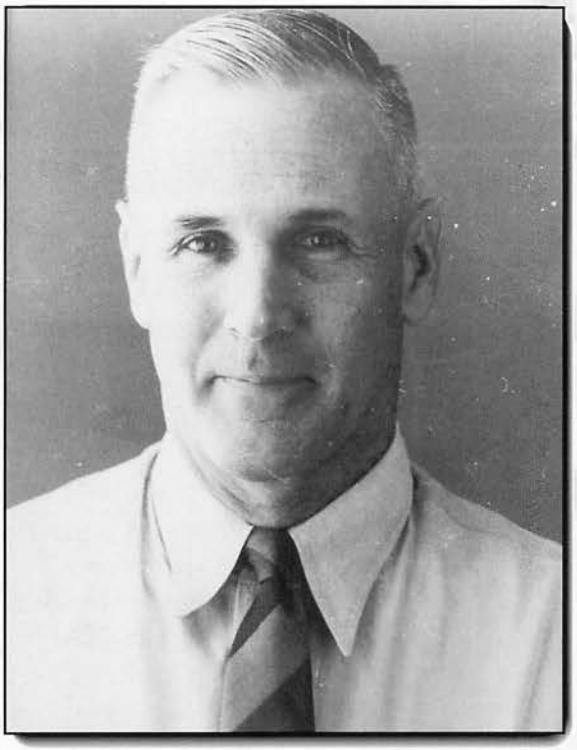
December 5-7, 2007: 8th Pacific Conference on Earthquake Engineering, Singapore. Contact: The Secretariat, 8th Pacific Conference on Earthquake Engineering, c/o CMA International Consultants Pte. Ltd., 1, Liang SeahStreet, #02-12 Liang SeahPlace, Singapore 189022. Tel: +65-6336 2328; Fax: +65-6336 2583; email: 8PCEE@ntu.edu.sg; website: www.ntu.edu.sg/cee/8PCEE/

2008: The International Year of Planet Earth (IYPE). Contact: website: www.esfs.org/index.htm or www.yearofplanetearth.org

January 14-16, 2008: Middle East Petrotech, Manama, Bahrain. Contact: Fax: +704 365 8426; email: info@imexmgt.com

February 5-8, 2008: Global Workshop on High Resolution Digital Soil Sensing & Mapping, Sydney, Australia. Contact: email: r.viscarra-rossel@usyd.edu.au; website: www.digitalsoilmapping.org/2008/DSM2008.html

Snapshots of GSM's Yesteryear.....



Th. H. F. Klompé
1903–1963
Professor of Geology 1962–3

An early field excursion from Singapore. Dr. Jaafar bin Ahmad (second from left standing) Mr. J.H. Leow (centre squatting). Mr. Law Wei Min (with crossed hammers on the right). Mr. Ignatius Wong (on right). Mrs. Helene Lin (on his right).

Above photos hang on the wall of the Department of Geology with original caption

ISSN 0126-5539/PP2509/2/2008

Prof Dr Chandrasekar

Opening Ceremony of NGC 2007

Prof Dr Wan Hasiah

WARTA GEOLOGI

Newsletter of the

PERSATUAN GEOLOGI MALAYSIA
Geological Society of Malaysia

Kandungan (Contents)

Jilid /Volume 33, No 3. May - June 2007