

PERSATUAN GEOLOGI MALAYSIA

WARTA GEOLOGI

NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MALAYSIA

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About the Society

The Society was founded in 1967 with the aim of promoting the advancement of earth sciences particularly in Malaysia and the Southeast Asian region.

The Society has a membership of about 600 earth scientists interested in Malaysia and other Southeast Asian regions. The membership is worldwide in distribution.

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CATATAN GEOLOGI

Geological Notes

Contrasting mineralogical and geochemical composition of mafic microgranular enclaves in granodiorite and monzogranite from northern part of the Lawit pluton, Besut, Terengganu

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Abstract: The mineralogical and geochemical differences of the mafic microgranular enclaves from the Peda granite and Guntong granodiorite are described. The main differences are the latter enclaves contain hornblende and biotite whereas the former only contain biotite as main mafic phases. The enclaves from Guntong granodiorite have low SiO₂, Zn, Ni, and Rb and high CaO, Ba, Zr and Sr compared to those from the Peda granite. Both enclaves contain the same mineral as their granitoid host but in totally different proportion, which suggests that the enclaves and their granitoid magmas have undergone an equilibration process.

INTRODUCTION

The Lawit composite pluton located to the east of the Boundary Range Batholith, consists of a central core of a very coarse, inequigranular, biotite granite known as the Peda granite, bordered to the east and west by the earlier Guntong granite which is a biotite-hornblende granite (Cobbing *et al.*, 1992, Fig. 1). Both granites (s.l) intruded the metasedimentary and metatuff of upper Paleozoic age (?). Both Peda and Guntong plutons contain mafic microgranular enclaves with the size range from 2 cm to 20 cm across. The enclaves are invariably darker coloured and finer grained than the enclosing granitic rocks and usually have sharp contacts with the granitic host. The short notes will describe the mineralogical and geochemical differences between the mafic microgranular enclaves in the Peda and Guntong plutons.

PETROGRAPHY AND TEXTURE OF THE ENCLAVE

Both mafic microgranular enclaves from Peda and Guntong plutons contain the same mineral as their granitoid host but in totally different proportion (e.g. Bateman *et al.*, 1963; Bateman, 1983; Barbarin, 1986, 1991). They are broadly composed of plagioclase (40–50%) and mafic mineral (35 to 45%), whereas the granitoid host contain fewer of these phases and much more quartz and K-feldspar (Barbarin *et al.*, 1989). The enclave from Peda granite contain biotite whereas those from Guntong granodiorite contain both hornblende and biotite as the main mafic phases. Table 1 summarises some of the textural differences between the two enclaves.

The mafic microgranular enclave from Peda granite constitutes up to 40% modal biotite

together with plagioclase, K-feldspar, quartz, apatite, zircon and opaque phase. Compared to the enclaves from granodiorite, the Peda granite enclaves have a more felsic mineralogy. The biotite crystal is relatively smaller (up to 0.25 mm across) sometimes show bladed texture which according to Hibbard (1991) is an unusual morphology of biotite that is prone to form in a heterogenous juxtaposition of melt and crystalline phase characterizing a mixing system.

In the mafic microgranular enclaves from Guntong granodiorite, biotite usually exceeds hornblende in a single thin section. Biotite is mostly euhedral with size up to 0.5 mm across. Both mafic phases frequently enclosed poikilitically in the plagioclase. Poikilitic texture is also shown by large hornblende and to a lesser extent K-feldspar crystals which enclose small euhedral plagioclase crystals. Plagioclase zonation is more obvious here compared to those from the Peda granite. Acicular apatite in the

enclaves indicates the magma have undergone rapid quenching.

GEOCHEMISTRY

Major and trace elements analyses of the enclaves is given in Table 2. In general the Guntong enclaves are more basic (SiO_2 : 53.2 to 58.4%) compared to those from the Peda granite (SiO_2 : 60.3 to 61.3%). Other elements that show significant differences between the enclaves are CaO, Zn, Ni, Ba, Zr, Rb and Sr. CaO in the enclave from the Guntong rock is about 2 times more compared to CaO content in the Peda enclave. Large ion lithophile element (Rb, Sr and Ba) also show contrasting behaviour between the enclaves. As expected the more felsic mafic microgranular enclave from the granitic rock have elevated Rb content (451 to 480 ppm) compared to the enclave from the granodiorites (61 to 81 ppm). On the other

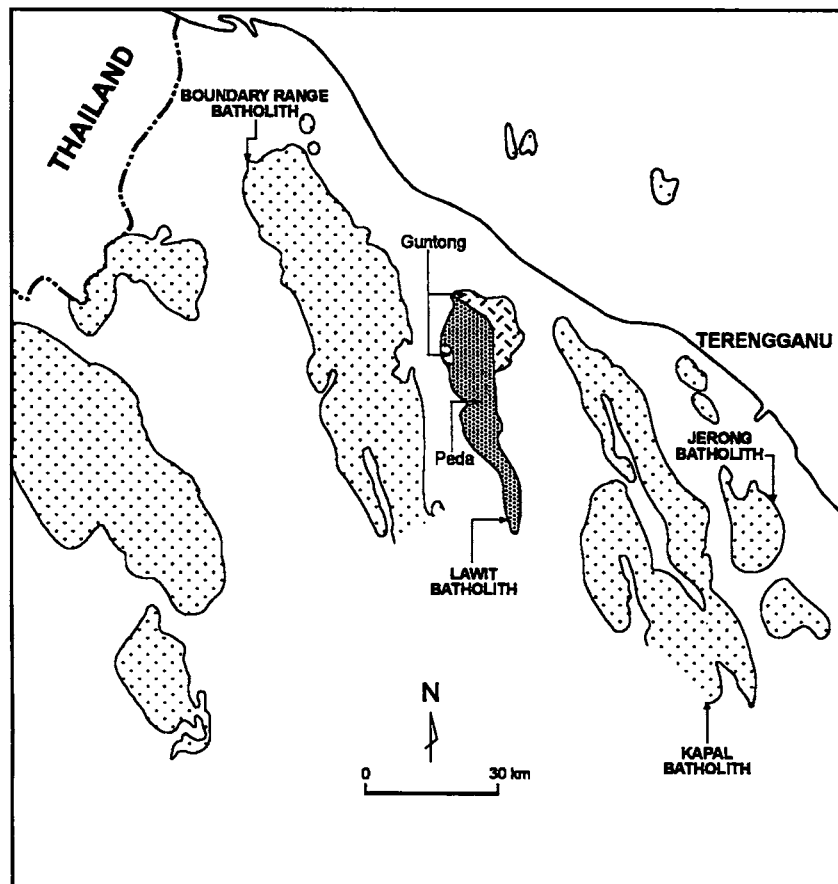


Figure 1. Map showing the Lawit batholith (after Cobbing *et al.*, 1992).

Table 1. Summary of textural differences between the Peda granite and Guntong granodiorite enclaves.

Host Rock	Guntong Granodiorite	Guntong Granodiorite	Guntong Granodiorite	Peda Granite	Peda Granite
Sample	AX	AX2	AX3	SBX1	SBX2
Wt %					
SiO ₂	58.36	56.22	53.2	60.31	61.33
Al ₂ O ₃	16.47	17.15	18.49	17.48	16.47
Fe ₂ O ₃	5.80	6.65	7.38	8.34	7.29
MnO	0.12	0.11	0.18	0.23	0.25
MgO	4.87	4.67	4.97	1.65	1.41
CaO	7.15	7.29	8.02	3.82	3.78
Na ₂ O	4.04	5.42	5.69	4.77	6.43
K ₂ O	2.14	2.14	1.91	2.93	2.7
Total	98.95	99.58	99.84	99.53	99.66
ppm					
Zn	59	65	81	143	140
Ni	10	9	13	27	26
Co	27	31	34	31	33
Cr	452	277	171	293	386
Ba	794	691	486	452	447
Nb	7	2	1	3	2
Zr	128	120	110	168	173
Sr	467	454	415	86	91
Rb	81	74	61	480	451

Table 2. Chemical composition of both Peda granite and Guntong granodiorite enclaves and their host rocks.

Enclave in Peda granite	Enclave in Guntong granodiorite
More felsic mineralogy and finer grained.	More mafic mineralogy and coarser grained.
Small biotite, bladed (up to 0.25 mm across) and anhedral.	Biotite relatively larger (0.5 mm across) and euhedral.
K-feldspar is about the same size as other minerals.	Large K-feldspar plates enclosed poikilitically small plagioclase, biotite and hornblende.
Hornblende absent.	Hornblende present as individual crystal or as mafic clot with biotite. Euhedral to subhedral and up to 1 mm across.
Plagioclase rarely shows zonation.	Plagioclase zonation is more obvious.

hand the former has low Ba and Sr (447 to 452 ppm and 86 to 91 ppm respectively) compared to the latter (486 to 794 ppm and 415 to 467 ppm respectively).

DISCUSSION

Mineralogical and geochemical study clearly show that both enclaves are different. On textural ground both enclaves are of igneous origin and generally more basic than their host rocks. Geochemical analysis show that the enclaves from Guntong granodiorite are more basic compared to those from Peda granite (Table 2). The former has low SiO₂, Zn, Ni, and Rb and high CaO, Ba, Zr and Sr. Both enclaves also show identical mineralogical content to their host rocks but with different modal abundance (cf. Stephens *et al.*, 1991). Thus, the Guntong granodiorite and its enclave contain biotite and hornblende whereas the Peda granite and its enclave only contain biotite as their main mafic phase. This suggests that both the enclaves and their granitoid magmas have undergone an equilibration process. The principle of equilibration between enclave and their granitic magma were first established by Bowen (1922) and his essential conclusion relevant to the present study was that enclave minerals higher up in the reaction series (continuous or discontinuous) would react with the host magma until they are converted into the minerals with which the magma is saturated.

The origin of such enclaves may be directly related either in the granitic source region or as an early crystallised product. Relative fine grained size of the enclaves is consistent with a high nucleation rate and low growth rate, which occurs when the degree of undercooling of a magma is relatively large. This can occur when a globule of relatively mafic magma comes into contact with the granitic magma (Vernon, 1983). The mafic magmas are introduced when the effective viscosity of the granitic host magmas is still significantly low (Fernandez and Barbarin, 1991) but sufficiently large to permit mingling only. The viscosity in the host felsic magma generally remains low enough to allow either scattering of the mafic microgranular

enclaves throughout the pluton by convection or other dispersal forces (Fernandez and Barbarin, 1991).

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PERTEMUAN PERSATUAN Meetings of the Society

Ceramah Teknik (Technical Talk)

Slope failures vs material types

TAN BOON KONG

Laporan (Report)

To set a good example as Chairman, and to start the ball rolling on the year's activities of the Working Group on Engineering Geology and Hydrogeology, Boon Kong gave the above talk on Wednesday 10th January 2001 at 5.30 pm at the Geology Department, University of Malaya.

Digging into his treasure chest of numerous case studies, he was able to clearly show the distinctive role played by material types in slope failures.

Abstrak (Abstract)

Slope failures constitute one of the more common failures related to geotechnical works. The causes and factors contributory to slope failures are multi-faceted and site specific. One of the more common factors of slope failures is, of course, the material type forming the slope, with some material types (either soil or rock types) being more prone to failures than others.

This paper highlights the role of material types in the incidence of slope failures. The objective of the paper is to put in record the occurrences of certain soil and rock types which have been identified or recognised to be particularly susceptible to slope failures. Soil types



commonly involved in slope failures include: fill materials, colluvial deposits, alluvial soils including the Old Alluvium/Old river terrace deposits, mine tailings, residual soils of graphitic and quartz-mica schists, granitic soils with core boulders, etc. The Pinosuk Gravels, a unique glacial deposit in the Kundasan area of Sabah, is also the subject of a recent study on landslide. Rock types commonly involved in slope failures include interbedded sedimentary rocks such as sandstone/shale interbeds, highly jointed and faulted granite, and limestone as in subvertical to overhanging limestone cliffs. Major dykes intersecting other country rocks can, depending on the nature of the dykes, be sources of problems or contribute to slope instability.

Some case studies of slope failures associated with various engineering works in Peninsular Malaysia, Sabah and Sarawak are provided to illustrate the role of material types in slope failures.

G.H. Teh

GSM

Isotopic age and tempo of the Permian-Triassic boundary and mass extinction: problems of accuracy and precision

IAN METCALFE

(Asia Centre, University of New England, Armidale NSW 2351, Australia)

Laporan (Report)

Ceramah Teknik tersebut di atas telahpun dijalankan dengan jayanya di Bilik Mesyuarat Program Geologi Universiti Kebangsaan Malaysia dari jam 11.15 pagi hingga 12.30 tengahari, Hari Selasa 30 Januari 2001.

Ceremah Teknik tersebut telah dihadiri seramai 40 peserta yang terdiri daripada ahli akademik dan pelajar Program Geologi UKM serta beberapa peserta lain dari Institut Alam Sekitar dan Pembangunan LESTARI UKM, Jabatan Geologi UM dan Institut Penyelidikan Teknologi Nuklear Malaysia (MINT).

Saudara Mohd Rozi Umor telah banyak membantu menyediakan prasarana dan jamuan tengahari untuk para peserta.

Abstrak (Abstract)

The Permian-Triassic (Palaeozoic-Mesozoic) boundary, about 253 Ma, marks the most significant mass extinction of global biota in the Phanerozoic (last 545 million years), and perhaps in the entire history of life on Earth. More than 90% of shelly marine genera were wiped out at that time, and land organisms suffered similarly. The cause of this event is still a matter of vigorous debate, with both brief and catastrophic as well as gradual mechanisms



having been proposed. The Permian-Triassic transition is difficult to study because there is a stratigraphic gap at this level in most parts of the world principally due to a major eustatic low sea level (Erwin, 1993, 1994). Biostratigraphic correlation of marine and terrestrial sequences has also proved inadequate to answer the question of whether or not the mass extinction events in the sea and on land were synchronous. The time-duration over which the mass extinction events took place is also an important constraint on possible causative mechanisms. In apparently continuous marine sequences which span the P-T boundary, a transitional zone has been identified where the earliest typical Mesozoic fossils co-exist with Palaeozoic relic faunas (Erwin, 1993, 1994; Knoll *et al.*, 1996; Hallam and Wignall, 1997) and this has led to much debate as to where to place the P-T boundary in terms of global biostratigraphy. A global Permian-Triassic boundary stratotype (reference section) was proposed at Section D, Meishan, South China by Yin *et al.* (1996) and has now been ratified by the Subcommission on Triassic Stratigraphy. The boundary between the Permian and Triassic is defined by the first appearance of the conodont microfossil species *Hindeodus parvus* (Kozur and Pjatakova) within the evolutionary cline *Hindeodus latidentatus-Hindeodus parvus-Isarcicella turgida-Isarcicella isarcica*. Permian-Triassic boundary extinctions of marine faunas in South China occurred in three phases, two phases in the uppermost Permian and one in the earliest Triassic (Yin *et al.*, 1996). These three phases are respectively at the bases of beds 24e, and 25 (most important) in the uppermost Permian, and at the base of bed 28 in the early Triassic at Section D, Meishan.

Some results of our recent SHRIMP and IDTIMS U-Pb isotope geochronology studies of zircons from bentonitic ash layers in the Permian-Triassic transition beds in China are presented. Relatively low precision of individual SHRIMP Zircon analyses limits its resolving power to approximately ± 1 million years around the Permian-Triassic boundary. Problems with zircon standards have indicated that ages derived using the SL13 standard are unreliable. Problems remain with other SHRIMP zircon standards.

High precision IDTIMS single grain analyses demonstrate that zircon populations from bentonitic ash beds in the Permian-Triassic boundary transition at Meishan, China show subtle inter and intra-grain heterogeneities including inheritance (with multiple generations of xenocrysts which only slightly differ in age), and lead loss effects. If multi-grain IDTIMS analyses are used on such zircon populations the biases can become impossible to recognise because of resulting age-averaging. The pooling of these multigrain analyses can produce biased ages with very small, understated uncertainties. All the zircon populations at Meishan suffer from lead-loss bias. This bias can be minimized by HF leaching of the grains prior to dissolution. Only single grain or fractional grain analyses should be applied to zircon populations such as those at Meishan. Multi-grain analyses tend to result in an apparently coherent and precise, but inaccurate age.

Ages reported by Bowring *et al.* (1998) from Meishan, are too young by several million years. The age of the currently defined Permian-Triassic Boundary is here estimated at c. 253 Ma. The claimed < 165,000y short duration for the negative carbon isotope excursion at the P-T boundary (Bowring *et al.*, 1998) is not justified by the isotopic data.

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Mohd Shafeea Leman

The mystery of Paleocene-Eocene boundary — examples from Austrian Alps

HANS EGGER

Laporan (Report)

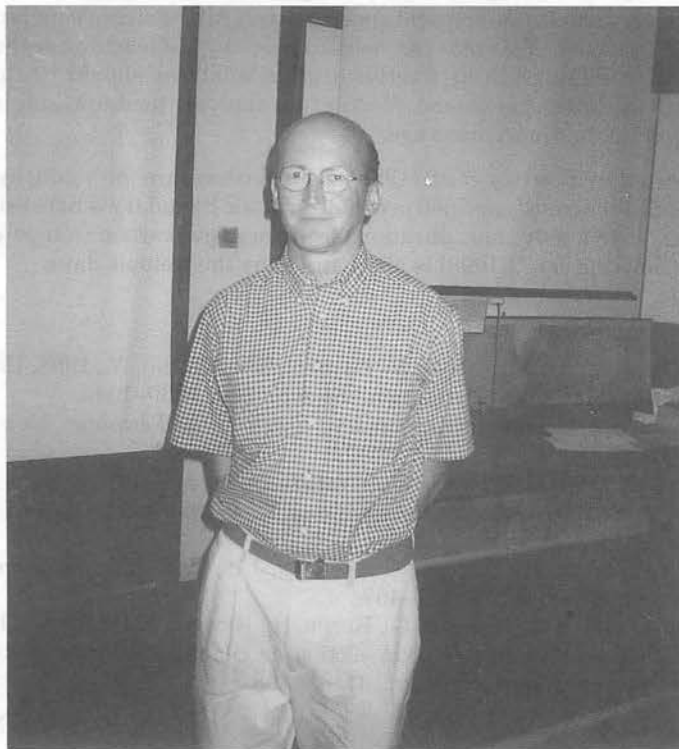
Dr. Hans Egger of the Geological Survey of Austria (and also Secretary General, Geological Society of Austria) gave the above talk at 5.30 pm on Friday 16 February 2001 at the Geology Department, University of Malaya.

The talk was attended by about 20 participants. Among the audience was His Excellency, the Ambassador of Austria to Malaysia.

Abstrak (Abstract)

The late Paleocene — early Eocene interval was a critical episode in Earth's history and of special interest for the geoscience community because a dramatic move to a "greenhouse world" took place at that time. Significant turnovers in marine and terrestrial biotas reflect major changes in ocean circulation and global climate. The most expanded upper Paleocene-lower Eocene sedimentary sequence known to date was found in Austria. It records several of the Paleocene-Eocene boundary events, including the negative carbon isotope excursion. This global geochemical event is interpreted to reflect a massive and abrupt input of ^{12}C -enriched carbon to the ocean-atmosphere reservoir, possibly as a result of catastrophic gas-hydrate dissociation. Associated high carbon dioxide release caused humid conditions even in high latitudes. Coeval acmes of diatoms, radiolaria and dinoflagellates indicate high surface water fertility, probably as a consequence of increased continental run-off. The associated high flux of organic carbon to the sea floor led to a mass extinction of benthic foraminifera. Further up in the section volcanic ash-layers occur which have been attributed to a major eruption event in the North Sea Basin. Obviously, these ashes were deposited over vast areas in Europe and represent unique and widespread correlation tools.

G.H. Teh



GSM

Corundum — rubies and sapphires

LAU YIN LEONG

Laporan (Report)

Mr. Lau gave the above talk on Friday 16 February 2001 at 6.00 pm at the Geology Department, University of Malaya.

This is another talk in the series of talks on gemology by the Working Group on Economic Geology. This is also the second talk given by Mr. Lau and as usual there was a good crowd of about 40.

In his presentation, Mr. Lau started off with the legends of rubies and sapphire before touching on their optical, chemical and physical properties for identification. Next he dealt with the types of synthetic rubies and sapphires; imitation and assembled corundum; heat treatment and enhancement; sources of rubies and sapphire in the world; quality factors; and finally the world market and pricing of rubies and sapphires.

A good and lively discussion followed before the participants adjourned to view the numerous samples of natural rubies and sapphires, synthetic corundum, ruby on host rock, dyed ruby, imitations and some gemological instruments which Mr. Lau had set up for display.

G.H. Teh



Development of the Caledonian Nappes of the Southern Highlands of Scotland

A.L. HARRIS

Laporan (Report)

Prof. A.L. Harris of the Department of Earth Sciences, University of Liverpool gave the above talk on Wednesday 28 February 2001 as the Geology Department, University of Malaya at 5.30 pm.



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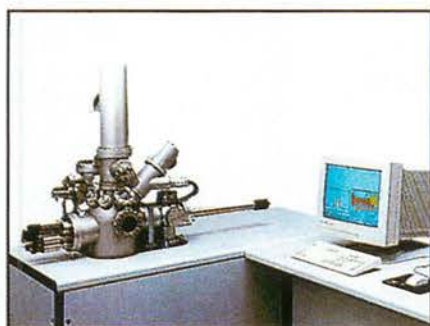
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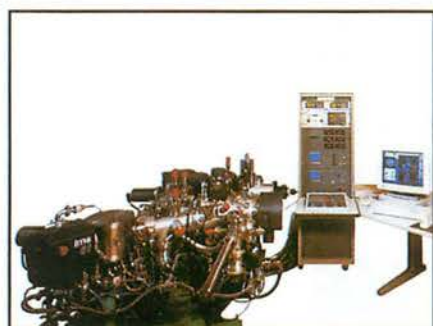
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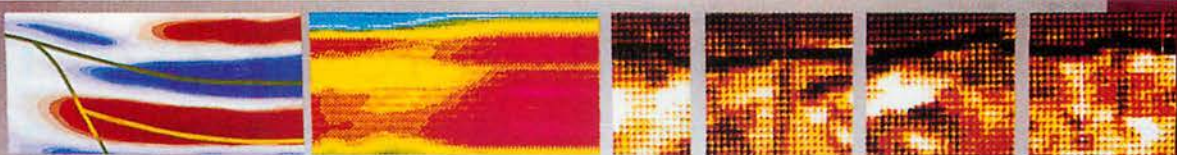


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Understanding the internal structure of the rock can confirm hypotheses regarding its geological evolution and can provide valuable clues to geologists and engineers regarding local porosity and permeability changes. This is possible with the enhanced textural analysis from the new high-resolution sensors, as well as detailed evaluation of fracture networks and other secondary porosity.

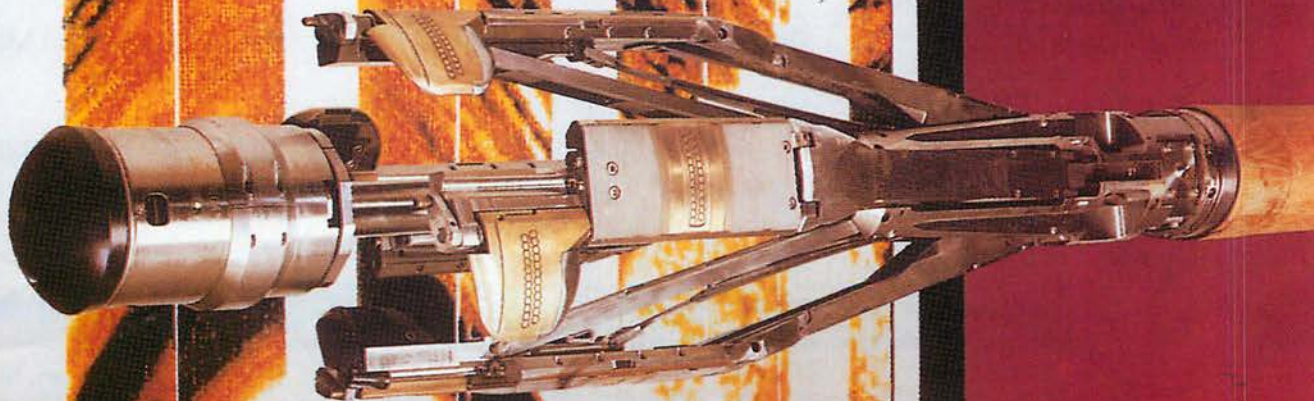
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MALAYSIA

Telephone : 603-20266641/2/3
Facsimile : 603-20266640
e-mail : Malaysia.kl@geosrv.com



People, Knowledge & Technology

BERITA-BERITA PERSATUAN

News of the Society

KEAHLIAN (Membership)

The following applications for membership were approved:

Full Members

- | | |
|--|---|
| 1. Nawarat Intarapanich
308-310 Trok Isranuphap, Yaowraj Road,
Chinatown, Bangkok 10100, Thailand. | 3. Surawit Pradidtan
PTT Exploration and Production Public
Co., Bangkok 10900, Thailand. |
| 2. David Leonard Bond
600 North Dairy Ashford, Houston, Texas
77079, USA. | 4. Safarudin Mat Tahir
BTS Eng. Sdn. Bhd., 9151B, Jalan Bandar
4, Taman Melawati, 53100 Kuala Lumpur. |

Student Members

- | | |
|---|--|
| 1. Nor Dalila Desa
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur. | 6. Hedilisyam Jamaludin
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur. |
| 2. Noor Azmah Abdullah
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur. | 7. Donny Osmond Julius
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur. |
| 3. Mohd Azamie Wan Abd. Ghani
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur. | 8. Suraya Tulot
Program Geologi, Fakulti Sains dan
Teknologi, Universiti Kebangsaan
Malaysia, Bangi. |
| 4. Fakrudin Ismail
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur. | 9. Siti Aishah Osman
Program Geologi, Fakulti Sains dan
Teknologi, Universiti Kebangsaan
Malaysia, Bangi. |
| 5. Tuty Zalmy Mohd Hasim
Jabatan Geologi, Universiti Malaya, 50603
Kuala Lumpur. | |

PETUKARAN ALAMAT (Change of Address)

The following members have informed the Society of their new addresses:

- | | |
|--|--|
| <p>1. Pieter J. Rebel
10-0-3 Villa Puteri City Gardens
Condominium, Persiaran Raja Chulan,
50200 Kuala Lumpur.</p> | <p>3. Zulrani bin Mohd Dahlim
No. 43-1, Jalan 2A/27A, Seksyen 1, Pusat
Bandar Wangsa Maju, 53300 Kuala
Lumpur.</p> |
| <p>2. Yunus Abdul Razak
Jabatan Mineral dan Geosains Malaysia,
Tingkat 19-22, Bangunan Tabung Haji,
Jalan Tun Razak, Peti Surat 11110, 50736
Kuala Lumpur.</p> | |

GSM

CURRENT ADDRESSES WANTED

The GSM is seeking the address of the following members. Anyone knowing the new address please inform the Society.

- | | |
|--|--|
| <p>1. James Bujang Sabah
Ekran Bhd., Wisma Ting Pek Khiing, No.
1, Jalan Padungan, 93100 Kuching,
Sarawak.</p> | <p>2. Mohd. Fairuz Mohamed Isa
Ikram Geotechnics S/B, Taman Ilmu
Ikram, Jalan Serdang, 43000 Kajang,
Selangor D.E.</p> |
|--|--|

GSM

PERTAMBAHAN BAHARU PERPUSTAKAAN (New Library Additions)

The Society has received the following publications:

1. Oklahoma Geology Notes, vol. 59, nos. 4-6, 1999 and vol. 60, nos. 1-2, 2000.
2. Tin International, vol. 73, no. 12, 2000/2001.
3. Genetic stratigraphy on the exploration and the production scales edited by P.W. Homewood and G.P. Eberli (2000).
4. Best practices in sequence stratigraphy for explorationists and reservoir engineers by P.W. Homewood *et al.* (2000).
5. Geologica Belgica, vol. 2, nos. 3-4, 1999.
6. International Mining, Quarterly Review, no. 4, 2000.
7. AAPG Bulletin vol. 84, nos. 11 & 12, 2000.
8. AAPG Explorer, Dec 2000 and Jan 2001.
9. Geosciences Journal, vol. 4, no. 4, 2000.
10. Proceedings of the First & Second symposia on collection building and natural history studies in Asia. Edited by Kaiichi Matsuura.
11. USGS Professional Paper: 2000: nos. 1623, 1423-C.
12. USGS Circular: 2000: 1173-C, 1173-D.

GEOLOGICAL SOCIETY OF MALAYSIA PUBLICATIONS

- Bulletin 1** (Feb 1968). 79 p. Studies in Malaysian Geology. Edited by P.H. Stauffer. A collection of papers presented at a meeting of the Geological Society on 31st January 1967. **Out of Stock.**
- Bulletin 2** (Dec 1968). 152 p. Bibliography and Index of the Geology of West Malaysia and Singapore by D.J. Gobbett. Price: RM5.00.
- Bulletin 3** (Mar 1970). 146 p. Papers in Geomorphology and Stratigraphy (with Bibliography supplement). Edited by P.H. Stauffer. Price: RM5.00.
- Bulletin 4** (Jun 1971). 100 p. Papers in Petrology, Structure and Economic Geology. Edited by P.H. Stauffer. Price: RM5.00.
- Bulletin 5** (Feb 1973). 70 p. The Search for Tungsten Deposits by K.F.G. Hosking. Price: RM5.00.
- Bulletin 6** (Jul 1973). 334 p. Proceedings, Regional Conference on the Geology of Southeast Asia. A collection of papers, Kuala Lumpur, March, 1972. Edited by B.K. Tan. Price: RM5.00.
- Bulletin 7** (Jun 1974). 138 p. A collection of papers on geology. Edited by B.K. Tan. Price: RM5.00.
- Bulletin 8** (Dec 1977). 158 p. A collection of papers on geology. Edited by T.T. Khoo. Price: RM5.00.
- Bulletin 9** (Nov 1977). 277 p. The relations between granitoids and associated ore deposits of the Circum-Pacific region. IGCP Circum-Pacific Plutonism Project Fifth Meeting. 12-13 November 1975, Kuala Lumpur. Edited by J.A. Roddick & T.T. Khoo. **Out of stock.**
- Bulletin 10** (Dec 1978). 95 p. A collection of papers on the geology of Southeast Asia. Edited by C.H. Yeap. **Out of stock.**
- Bulletin 11** (Dec 1979). 393 p. Geology of Tin Deposits. A collection of papers presented at the International Symposium of 'Geology of Tin Deposits', 23-25 March 1978, Kuala Lumpur. Edited by C.H. Yeap. Price: RM20.00.
- Bulletin 12** (Aug 1980). 86 p. A collection of papers on geology. Edited by G.H. Teh. **Out of stock.**
- Bulletin 13** (Dec 1980). 111 p. A collection of papers on geology of Malaysia and Thailand. Edited by G.H. Teh. Price: RM5.00.
- Bulletin 14** (Dec 1981). 151 p. A collection of papers on geology of Southeast Asia. Edited by G.H. Teh. **Out of stock.**
- Bulletin 15** (Dec 1982). 151 p. A collection of papers on geology. Edited by G.H. Teh. Price: RM10.00.
- Bulletin 16** (Dec 1983). 239 p. A collection of papers on geology. Edited by G.H. Teh. Price: RM10.00.
- Bulletin 17** (Dec 1984). 371 p. A collection of papers on geology. Edited by G.H. Teh. Price: RM10.00.
- Bulletin 18** (Nov 1985). 209 p. Special Issue on Petroleum Geology. Edited by G.H. Teh & S. Paramanathan. Price: RM15.00.
- Bulletins 19** (Apr 1986) & **20** (Aug 1986). GEOSEA V Proceedings Vols. I & II, Fifth Regional Congress on Geology, Mineral and Energy Resources of SE Asia, Kuala Lumpur, 9-13 April 1984. Edited by G.H. Teh & S. Paramanathan. Price for both Bulletins 19 & 20: Members: RM30.00; Non-Members: RM60.00.
- Bulletin 21** (Dec 1987). 271 p. Special Issue on Petroleum Geology Vol. II. Edited by G.H. Teh. Price: RM20.00.
- Bulletin 22** (Dec 1988). 272 p. Special Issue on Petroleum Geology Vol. III. Edited by G.H. Teh. Price: RM20.00.
- Bulletin 23** (Aug 1989). 215 p. A collection of papers on the geology of Malaysia, Thailand and Burma. Edited by G.H. Teh. Price: RM10.00.
- Bulletin 24** (Oct 1989). 199 p. A collection of papers presented at GSM Annual Geological Conference 1987 and 1988. Edited by G.H. Teh. Price: RM10.00.
- Bulletin 25** (Dec 1989). 161 p. Special Issue on Petroleum Geology Vol. IV. Edited by G.H. Teh. Price: RM20.00.
- Bulletin 26** (Apr 1990). 223 p. A collection of papers presented at GSM Annual Geological Conference 1989 and others. Edited by G.H. Teh. Price: RM10.00.
- Bulletin 27** (Nov 1990). 292 p. Special Issue on Petroleum Geology Vol. V. Edited by G.H. Teh. Price: RM20.00.
- Bulletin 28** (Nov 1991). 292 p. Special Issue on Petroleum Geology Vol. VI. Edited by G.H. Teh. Price: RM20.00.
- Bulletin 29** (Jul 1991). 255 p. A collection of papers presented at GSM Annual Geological Conference 1990 and others. Edited by G.H. Teh. Price: RM10.00.
- Bulletin 30** (Apr 1992). 90 p. Annotated bibliography of the geology of the South China Sea and adjacent parts of Borneo by N.S. Haile. Edited by G.H. Teh. Price: RM10.00.
- Bulletin 31** (Jul 1992). 176 p. A collection of papers presented at GSM Annual Geological Conference 1991 and others. Edited by G.H. Teh. Price: RM10.00.
- Bulletin 32** (Nov 1992). 283 p. Special Issue on Petroleum Geology Vol. VII. Edited by G.H. Teh. Price: RM30.00.
- Bulletin 33** (Nov 1993). 419 p. Proceedings Symposium on Tectonic Framework and Energy Resources of the Western Margin of the Pacific Basin. Edited by G.H. Teh. Price: RM40.00.
- Bulletin 34** (Dec 1993). 181 p. Bibliography and Index — Publications of the Geological Society of Malaysia 1967-1993. Compiled by T.F. Ng. Edited by G.H. Teh. Price: RM20.00.
- Bulletin 35** (Jul 1994). 174 p. A collection of papers presented at GSM Annual Geological Conference 1992 & 1993. Edited by G.H. Teh. Price: RM20.00.
- Bulletin 36** (Dec 1994). 186 p. Special issue on Petroleum Geology Vol. VIII. Edited by G.H. Teh. Price: RM50.00.
- Bulletin 37** (Jul 1995). 506 p. Proceedings AAPG-GSM International Conference 1994. Southeast Asian Basins: Oil and Gas for the 21st Century. Edited by G.H. Teh. Price: RM60.00.
- Bulletin 41** (Dec 1997). 165 p. Papers from Petroleum Geology Conference 1996 and others. Edited by G.H. Teh. Price: RM50.00.
- Field Guide 1** (1973). 40 p. A 7-day one thousand mile, geological excursion in Central and South Malaya. By C.S. Hutchison. **Out of stock.**
- Abstracts of papers** (1972). Regional Conference on the Geology of Southeast Asia, Kuala Lumpur, 1972. 64 p. 8 figs, 3 tables, many extended abstracts. Edited by N.S. Haile. Price: RM2.00.
- Proceedings of the Workshop on Stratigraphic Correlation of Thailand and Malaysia Vol. 1.** (1983). 383 p. Technical Papers. Price: Member: RM5.00; Non-member: RM15.00.
- WARTA GEOLOGI** (Newsletter of the Geological Society of Malaysia). Price: RM5.00 per bimonthly issue from July 1986.
- Geological Evolution of Southeast Asia** (1996) (Reprinted Edition) by C.S. Hutchison. 368 p. Price: Member: RM50.00; Non-member: RM100.00; Student: RM30.00.
- Common Rocks of Malaysia (Colour Poster)**. Price: Member: RM8.00; Non-member: RM10.00; Student: RM7.00.
- Malaysian Stratigraphic Guide** (Dec 1997). 30 p. Price: Member: RM5.00; Non-member: RM10.00; Student Member: RM2.00.
- Proceedings Annual Geological Conference 2000**. 435 p. Edited by G.H. Teh, Joy J. Pereira and T.F. Ng. Price: RM60.00.
- PACKAGE DEAL A: General Geology/Malaysian Geology**
Bulletins 3, 4, 7, 15, 16, 17, 24, 26, 29, 31 (10 books)
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- PACKAGE DEAL B: Bibliography**
Bulletins 2, 30, 34 (3 books)
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Bulletins 6, 13, 19 & 20, 23, 33, Strati. Correl. (7 books)
Member: RM60.00 Student Member: RM40.00
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- PACKAGE DEAL D: Petroleum Geology**
Bulletins 18, 21, 22, 25, 27, 28, 32 (7 books)
Member: RM120.00 Student Member: RM80.00
Non-member: RM150.00 Student Non-member: RM100.00
- PACKAGE DEAL E: Economic Geology**
Bulletins 5, 11 (2 books)
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- PACKAGE DEAL 5: Bulletins 26, 27, 28, 29, 30** (5 books)
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- PACKAGE DEAL 6: Bulletins 31, 32, 33, 34, 35** (5 books)
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c/o Dept. of Geology, University of Malaya,
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Tel: 603-79577036, Fax: 603-79563900, e-mail: geologi@po.jaring.my

BERITA-BERITA LAIN

Other News

KALENDAR (CALENDAR)

2001

March 13-15

3RD SEMINAR ON ANALYSIS, METHODOLOGY OF TREATMENT AND REMEDIATION OF CONTAMINATED SOILS AND GROUNDWATERS, Paris, France. (Contact: Howard Hornfeld, programme coordinator for the chemical industry, United Nations Economic Commission for Europe, Palais des Nations 429-3, CH-1211 Geneva 10, Switzerland. Tel: +41 22 917 3254; Fax: 41 22 917 0178; E-mail: chem@unece.org)

March/April 2001

1ST INTERNATIONAL CONFERENCE ON SALT WATER INTRUSION AND COASTAL AQUIFERS, Essaouira, Morocco. (Contact: Prof. Driss Ouazar, Ecole Mohammadia d'ingénieurs, B.P. 765, Agdal Rabat, Morocco. Tel: +212-7-670579; Fax: +212-7-778853; E-mail: ouazar@emi.ac.ma; Website: www.ce.udel.edu/cheng.saltnet/swica.html)

April 8-11

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, Denver, Colorado, USA. (Contact: AAPG Conventions Dept., P.O. Box 979, 1444 S. Boulder Ave., Tulsa, OK 74101-0979; Fax: 1 918 560 2684; E-mail: dkeim@aapg.org)

May 2001

ANATOMY OF CARBONATE BODIES, Marseilles, France. (Contact: M. Floquet and J.P. Masse, Centre de Sédimentologie-Paléontologie, Université de Provence, Case 67, 13331 Marseilles Cedex 03, France. E-mail: reef@newsup.univ-mrs.fr)

May 2001

GEOCHEMICAL EXPLORATION (20th International Symposium). (Contact: Association of Exploration Geochemists. Website: www.aeg.org/)

May 5-12

PHODOPE GEODYNAMIC HAZARDS, LATE ALPINE TECTONICS AND NEOTECTONICS, International Conference with extensive field trip in SW Bulgaria. Sofia, Bulgaria. (Contact: Website: http://www.geology.bas.bg/Rhodope_conference; E-mail: Zagor@router.geology.bas.bg)

May 11-21

MID-PALAEOZOIC BIO- AND GEODYNAMICS: THE NORTH GONDWANA-LAURUSSIA INTERACTION, Joint meeting of the 'International Geological Correlation Program (IGCP) 421' and the 'Subcommission on Devonian Stratigraphy (SDS)' hosted by the 'Senckenbergische Naturforschende Gesellschaft', Frankfurt am Main at the 'Forschungsinstitut und Naturmuseum Senckenberg' Frankfurt am Main, Germany. (Contact: G. Plodowski, Forschungsinstitut Senckenberg, Senckenberganlage 25. D-60325 Frankfurt am Main. Tel: ++49-69-97075127; Fax: ++49-69-97075137; E-mail: gplodows@sngkw.uni-frankfurt.de)

May 27-30

GEOLOGICAL ASSOCIATION OF CANADA-MINERALOGICAL ASSOCIATION OF CANADA (Joint Annual Meeting), St. John's, Newfoundland, Canada. (Contact: Newfoundland Geological Survey, E-mail: dgl@zeppo.geosurv.gov.nf.ca; Website: www.geosurv.gov.nf.ca/)

June 3-6

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (Annual Meeting), Denver, Colorado, USA. (Contact: AAPG Conventions Department, P.O. Box 979, 1444 S. Boulder Ave., Tulsa, OK 74101-0979, USA. Tel: +1 918 560 2679; Fax: +1 918 560 2684; E-mail: dkeim@aapg.org)

June 6-8

SEDIMENT 2001, Jena, Germany. (Contact: Organisationskomitee Sediment 2001, Institut für Geowissenschaften, Universität Jena, Burgweg 11, D-07749 Jena, Germany. Tel: +49 3641 948 621; Fax: +49 3641 948 622; E-mail: sediment2001@geo.uni-jena.de; Website: <http://www.uni-jena.de/chemie/geowiss/tagungen/tagungen.html>)

June 10-15

WATER-ROCK INTERACTION (10th International Symposium, Sponsored by Working Group of the International Association of Geochemistry and Cosmochemistry), Sardinia, Italy. (Contact: Rosa Cidu, Dipartimento di Scienze della Terra, via Trentino 51, I-09127 Cagliari, Italy. E-mail: cidur@unica.it)

June 11-16

63RD EUROPEAN ASSOCIATION OF GEOSCIENTISTS AND ENGINEERS CONFERENCE & TECHNICAL EXHIBITION, Amsterdam, The Netherlands. (Contact: EAGE Conference Dept., P.O. Box 59, 3990 DB Houten, The Netherlands. Tel: +31 30 6354055; Fax: +31 30 6343524)

June 18-21

GROUNDWATER QUALITY 2001. NATURAL AND ENHANCED ATTENUATION OF GROUNDWATER POLLUTION. Organised by IAHS, Sheffield, U.K. (Contact: David Lerner, University of Sheffield, Tel: +44 114 222 5743; Fax: +44 114 222 5701 or 5700; E-mail: d.n.lerner@sheffield.ac.uk)

June 24-28

EARTH SYSTEM PROCESSES (International Meeting sponsored by the Geological Society of America and the Geological Society of London), Edinburgh, Scotland. (Contact: Ian Dalziel, University of Texas at Austin; E-mail: ian@utig.ig.utexas.edu)

June 25-27

3RD INTERNATIONAL CONFERENCE OF FUTURE GROUNDWATER RESOURCES AT RISK, Lisbon, Portugal. (Contact: FGR'01 International Conference, CVRM Geosystems Center, Instituto Superior Técnico, Av. Rovisco Pais, 1049-001 Lisbon, Portugal. Tel: +351 21 841 72 47; Fax: +351 21 841 74 42; E-mail:

fgr@alfa.ist.utl.pt; Website: www.alfa.ist.utl.pt/~cvrm/FGR)

July 3-8

CLIMATE AND BIOTA OF THE EARLY PALEOGENE, Plowell, Wyoming, USA. (Contact: Scott Wing, Dept. of Paleobiology, Smithsonian Inst., Washington, DC 20560, USA. Tel: (202) 3578 2649; E-mail: wing-scott@nmnh.si.edu)

July 17-20

OIL AND GAS MALAYSIA 2001: THE 9TH MALAYSIAN OIL, GAS AND PETROCHEMICAL ENGINEERING EXHIBITION, Kuala Lumpur, Malaysia. (Contact: Overseas Exhibition Services Ltd., 11 Manchester Square, London W1M 5AB, Angleterre. Tel: +44 (0) 207 862 2000; Fax: +44 (0) 202862 2078; E-mail: pmckean@montnet.com)

July 29 - August 2

BIOGEOCHEMISTRY OF TRACE ELEMENTS (6th International Conference, University of Guelph, Guelph, Ontario, Canada. (Contact: ICOBTE Secretariat, Department of Land Resource Science, University of Guelph, Guelph, Ontario, Canada N1G 2W1. Tel: +1-519 829 4120 ext. 2531; Fax: +1-519 823 1587; E-mail: icobte@lrs.uoguelph.ca; Website: icobte.crle.uoguelph.ca)

July 29 - August 4

12TH INTERNATIONAL CLAY CONFERENCE, Bahía Blanca, Argentina. (Contact: Fernanda Cravero, Secretary-General 12 ICC, Departamento de Geología, Universidad Nacional del Sur, 8000 Bahía Blanca, Argentina. Tel: +54 291 459 51 01 ext. 30 41; Fax: +54 291 459 51 48; E-mail: 12icc@criba.edu.ar; Website: <http://www.12ICC.criba.edu.ar>)

July 30 - August

INTERNATIONAL ASSOCIATION OF ENGINEERING GEOLOGY AND THE ENVIRONMENT (IAEG), "Engineering Geological Problems of Urban Areas" (International Symposium), Ekaterinburg, Russia. (Contact: Secretariat, "EngGeolCity-2001, UralTISIZ 79, Bazhov str., Ekaterinburg, Russia 620075. Tel: +7 3432 559772; Fax: +7 3432 550043; E-mail: UralTIS@etel.ru)

August 6-10

7TH INTERNATIONAL CONFERENCE ON FLUVIAL SEDIMENTOLOGY, University of Nebraska-Lincoln, USA. (Contact: Mike Blum, Department of Geosciences, 214 Bessey Hall, University of Nebraska-Lincoln, Lincoln, NE 68588-0340, USA. Tel: +1 402 472 78 72; Fax: +1 402 472 49 17; E-mail: mblum@unl.edu; Website: <http://www.unl.edu/geology/icfs.html>)

August 6-10

AGGREGATE 2001 — ENVIRONMENT AND ECONOMY, Helsinki, Finland. (Contact: Tampere University of Technology, Lab. of Engineering Geology, P.O. Box 600, FIN-33101 Tampere, Finland. Fax: +358 3 3652884; E-mail: kuuluvai@cc.tut.fi or pekka.ihalainen@luyv.fi)

August 10-13

THE INTERNATIONAL SYMPOSIUM ON THE GLOBAL STRATOTYPE OF THE PERMIAN-TRIASSIC BOUNDARY AND THE PALEOZOIC-MESOZOIC EVENTS, Changxing, Zhejiang Province, China. (Contact: Dr. Tong Jinnan, Faculty of Earth Science, China University of Geosciences, Wuhan 430074, China. Tel: +86-27-87482031; Fax: +86-27-8780 1763; E-mail: jntong@public.wh.hb.cn)

August 20-24

PALEOFORAMS 2001 (International Conference on Paleozoic Benthic Foraminifera), Middle East Technical University, Ankara, Turkey. (Contact: Demir Altiner, Department of Geological Engineering, Middle East Technical University (ODTÜ), 06531 Ankara, Turkey. Tel: +90-312-2102680, +90-312-4275195; Fax: +90-312-2101263; E-mail: <altiner@tubitak.gov.tr><demir@metu.edu.tr>)

August 23-28

INTERNATIONAL CONFERENCE ON GEOMORPHOLOGY (5th), Tokyo, Japan. (Contact: Prof. K. Kashiwaya, Dept. of Earth Sciences, Kanazawa University, Kanazawa, 920-1192 Japan. E-mail: kashi@kenroku.kanazawa-u.ac.jp)

August 24-27

1ST INTERNATIONAL CONFERENCE ON SUSTAINABLE DEVELOPMENT IN KARST REGIONS, Beijing, China. (Contact: Prof. Yuan Daoxian, E-mail: dxyuang@osmanthus.gxnu.edu.cn)

August 27-29

SOCIETY FOR GEOLOGY APPLIED TO MINERAL DEPOSITS "Mineral Deposits at the Beginning of the 21st Century" (6th Biennial Meeting), Kraków, Poland. (Contact: 6th Biennial SGA Meeting, Dr. Wojciech Mayer, University of Mining and Metallurgy, Faculty of Geology, Geophysics & Environmental Protection, av. Mickiewicza 30; 30-059 Kraków, Poland. Tel: +48-12 617 2385; Fax: +48-12 633 2936; E-mail: wmayer@geol.agh.edu.pl; Website: <http://galaxy.uci.agh.edu.pl/~sga>)

September 3-5

21ST IAS MEETING OF SEDIMENTOLOGY, Davos, Switzerland. (Contact: Haruko Hartmann, IAS-2001, Institute of Geology, ETH-Zentrum, 8092 Zurich, Switzerland. Fax: +41 1 632 1080; E-mail: info@ias-2001.ethz.ch; Website: <http://www.ias-2001.ethz.ch>)

September 6-12

IAMG2001 (THE ANNUAL CONFERENCE OF THE INTERNATIONAL ASSOCIATION FOR MATHEMATICAL GEOLOGY), Cancún, Mexico. (Contact: IAMG2001 Conference Secretariat, c/o Jorgina A. Ross, Kansas Geological Survey, 1930 Constant Avenue, Lawrence, KS 66047-3724, USA. Tel: +785-864-3965; Fax: +785-864-5317; E-mail: aspiazu@kgs.ukans.edu; Website: <http://www.kgs.ukans.edu/Conferences/IAMG/index.html>)

September 8-15

MAEGS-12 (12TH MEETING OF THE ASSOCIATION OF EUROPEAN GEOLOGICAL SOCIETIES), "Carpathians Palaeogeography and Geodynamics: Multidisciplinary Approach", Kraków, Poland. (Contact: Polish Geological Society, MAEGS-12, Oleandry 2a, PL 30-063 Kraków, Poland. Fax: +48 12 6332270; E-mail: ptg@ing.uj.edu.pl)

September 9-14

SOCIETY OF EXPLORATION GEOPHYSICISTS (71st Annual Meeting and International Exposition), San Antonio, Texas, USA. (Contact: SEG Business Office, Tel: +1-918 497 5500; Fax: +1-918 497 5557; Website: seg.org/)

September 9-15

INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS, "New Approaches to Characterising Groundwater Flow" (31st International Congress), Munich, Germany. (Contact: Munich 2001, Institute of Hydrology, GSF National Research Centre of Environment and Health GmbH, Ingolstädter Landstr. 1, D-85764 Neuherberg, Germany. Tel: +49 89 3187 2585; Fax: +49 89 3187 3361; E-mail: seiler@gsf.de; Website: agh.iaag.geo.uni-muenchen.de/)

September 17-21

7TH INTERNATIONAL CONFERENCE ON PALEOCEANOGRAPHY, Sapporo, Japan. (Contact: Prof. Helmut Weissert, Geological Institute, ETH-Zurich, CH-8092 Zurich, Switzerland. Tel: +41 (0)1 632 37 15; Fax: +41 (0)1 632 10 30; E-mail: helmi@erdw.ethz.ch; Website: <http://www.ijnet.or.jp/jtb-cs/icp7/>)

September 24-26

ARCHEAN SYMPOSIUM (4th International), Perth, Western Australia. (Contact: Website: redback.geol.usa.edu.au/~ias/)

September 25-29

SIXTH INTERNATIONAL SYMPOSIUM ON LAND SUBSIDENCE (SISOLS 2000), Ravenna, Italy. (Contact: Dr. Laura Carbognin, CNR-ISDGM, S. Polo 1364, 30125, Venezia, Italy. Tel: +39-041 5216826; Fax: +39 041 5216892; E-mail: jane@isdgm.ve.cnr.it)

November 5-8

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Boston, Massachusetts, USA. (Contact: GSA Meetings Dept., P.O. Box 9140, Boulder, CO 80301-9140, USA; Tel: +1 303 447 2020; Fax: +1 303 447 1133; E-mail: meetings@geosociety.org; WWW: <http://www.geosociety.org/meetings/index.htm>)

2002

INTERNATIONAL ASSOCIATION ON THE GENESIS OF ORE DEPOSITS (11th International Symposium), South Africa. (Contact: Dr. Erik Hammerbeck, Geological Survey, Department of Mineral and Energy Affairs, 280 Pretoria Street, Private Bag X112, Silverton, Pretoria 0001, South Africa. Tel:

+012 841 1130; Fax: +012 841 1203; E-mail: ehammerb@geoscience.org.za)

March 10-13

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (Annual Meeting), Houston, Texas, USA. (Contact: AAPG Conventions Dept., P.O. Box 979, Tulsa, OK 74101-0979, USA. Tel: +1-918 560 2679; Fax: 1-918 560 2684; E-mail: convene@aapg.org; Website: <http://www.aapg.org/>)

April 7-10

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (Annual Meeting), Houston, Texas, USA. (Contact: AAPG Conventions Department, P.O. Box 979, 1444 S. Boulder Ave., Tulsa, OK 74101-0979, USA. Tel: +1 918 560 2679; Fax: +1 918 560 2684; E-mail: dkeim@aapg.org)

May 27-30

EUROPEAN ASSOCIATION OF GEOSCIENTISTS AND ENGINEERS (63rd Conference & Technical Exhibition), Florence, Italy. (Contact: Website: <http://www.eage.nl/>)

July 7-12

16TH INTERNATIONAL SEDIMENTOLOGICAL CONGRESS, Auckland Park, Gauteng, South Africa. (Contact: Bruce Cairncross, Department of Geology, Rand Africans University, P.O. Box 524, Auckland Park, 2006, South Africa. Tel: +27 11 489 23 13; Fax: +27 11 489 23 09; E-mail: bc@na.rau.ac.za; Website: <http://general.rau.ac.za/geology/announcement.htm>)

September 16-20

INTERNATIONAL ASSOCIATION OF ENGINEERING GEOLOGY AND THE ENVIRONMENT (IAEG), "Engineering Geology for Developing Countries" (9th International Congress), Durban, South Africa. (Contact: South African Institute for Engineering and Environmental Geologists, P.O. Box 2812, Pretoria, 0001, South Africa. E-mail: saieg@hotmail.com; Website: home.geoscience.org.za/saieg/2002.htm)

September 22-27

SOCIETY OF EXPLORATION GEOPHYSICISTS (72nd Annual Meeting and International Exposition), Las Vegas, Nevada, USA. (Contact: SEG Business Office, Tel: +1-918 497 5500; Fax: +1-918 497 5557; Website: seg.org/)

October 21-25

INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS, "Groundwater and Human Development" (32nd International Congress), Mar del Plata, Argentina. (Contact: Dr. Emilia Bocanegra, Centro de Geología de Costas y del Cuaternario, Facultad de Ciencias Exactas y Naturales, Universidad Nacional de Mar del Plata, Casilla de Correo 722, 7600 Mar del Plata, Argentina; Tel: +54 223 475 4060; Fax: +54 223 475 3150; E-mail: ebocaneg@mdp.edu.ar; or download Circular)

October 28-31

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Denver, Colorado, USA. (Contact: GSA Meetings Dept., P.O. Box 9140, Boulder, CO 80301-9140, USA; Tel: +1 303 447 2020; Fax: +1 303 447 1133; E-mail: meetings@geosociety.org; Website: <http://www.geosociety.org/meetings/index.htm>)

2003

28 September - 3 October

SOCIETY OF EXPLORATION GEOPHYSICISTS (73rd Annual Meeting and International Exposition), Dallas, Texas, USA. (Contact: SEG Business Office, Tel: +1-918 497 5500; Fax: +1-918 497 5500; Fax: +1-918 497 5557; Website: seg.org/)

November 2-5

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Seattle, Washington, USA. (Contact: GSA Meetings Dept., P.O. Box 9140, Boulder, CO 80301-9140, USA. Tel: +1 303 447 2020; Fax: +1 303 447 1133; E-mail: meetings@geosociety.org; Website: <http://www.geosociety.org/meeting/index.htm>)

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HOSKING, K.F.G., 1973. Primary mineral deposits. In Gobbett, D.J. and Hutchison, C.S. (Eds.), *Geology of the Malay Peninsula (West Malaysia and Singapore)*. Wiley-Interscience. New York, 335-390.

HUTCHISON, C.S., 1989. *Geological Evolution of South-east Asia*. Clarendon Press, Oxford. 368p.

SUNTHARALINGAM, T., 1968. Upper Paleozoic stratigraphy of the area west of Kampar, Perak. *Geol. Soc. Malaysia Bull. 1*, 1-15.

TAYLOR, B., AND HAYES, D.E., 1980. The tectonic evolution of the South China Sea basin. In: D.E. Hayes (Ed.), *The Tectonic and Geologic Evolution of Southeast Asian Sea and Islands, Part 2. Am. Geophy. Union Monograph 23*, 89-104.

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MYANMAR

CAMBODIA

VIETNAM

NEGERI-NEGERI MALAYSIA

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| 3 PULAU PINANG | 10 MELAKA |
| 4 PERAK | 11 JOHOR |
| 5 KELANTAN | 12 SABAH |
| 6 TERENGGANU | 13 SARAWAK |
| 7 SELANGOR | |



200 km

THAILAND
SELAT MELAKA
(Strait of Malacca)

LAUT CHINA SELATAN
(South China Sea)

P. Langkawi
Alor Setar

Kota Bharu

Kuala Terengganu

Ipoh

Kuantan

Kuala Lumpur

Seremban

SINGAPORE

Nias

Siberut

SUMATRA

Lingga
Singkep

Bangka

Belitung

BRUNEI

Miri

Bintulu

Kuching

KALIMANTAN

SULAWESI

P. Banggi

Kudat

Kota Kinabalu

P. Labuan

12

Tawau

13

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