

PERSATUAN GEOLOGI MALAYSIA

WARTA GEOLOGI

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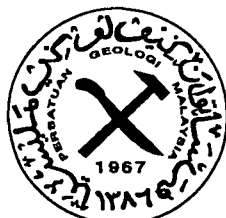
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GEOLOGICAL SOCIETY
OF MALAYSIA

DIKELUARKAN DWIBULANAN
ISSUED BIMONTHLY

PERSATUAN GEOLOGI MALAYSIA

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.

Occurrence of *mélange* in the Bengkoka Peninsula, Sabah

SANUDIN, H.T., MUHAMMAD, B.G., PEREIRA, J.J., AND QUEK, C.J.
Jabatan Sains Bumi, FSSA, Universiti Kebangsaan Malaysia, Kampus Sabah.

Abstract: The *mélange* in the Bengkoka Peninsula is randomly exposed along road cuts and river banks. Stratigraphically it forms the basement overlain by volcanic and Upper Miocene sedimentary sequences. Most of the outcrops consist of blocks of various sizes, and rock types including ultrabasic rocks which are mostly serpentized, gabbroic rocks, pillow basalts, metamorphic rocks, graywackes, limestone and red-coloured sediments such as chert and shale, surrounded by a foliated scaly clay matrix. Most of the rocks are intensely tectonized into a pervasively sheared mass.

INTRODUCTION

The Bengkoka Peninsula has been mapped and the general geology compiled by several undergraduate students of Universiti Kebangsaan Malaysia in 1988 (Fig. 1). The geological mapping is part of Quek (1989) and Pereira (1989) B.Sc. degree theses.

Mélange is a geological phenomenon which deserves attention in Sabah. Detailed study of the *mélange* has given a clearer picture of their distribution, stratigraphic position, genesis and mode of emplacement in tectonic analysis.

The occurrence of *mélange* in Sabah, which include the study area, has been reported briefly by Sanudin and Tan (1986), and Hutchison (1988). The area was formerly mapped as the Chert-Spilite Formation (Wilson, 1961).

REGIONAL GEOLOGICAL SETTING

The Bengkoka Peninsula is part of the complexly deformed and fragmented pre-Tertiary ophiolitic arc that forms a crescentic belt from Palawan Island to the Sulu Islands of the Philippines Archipelago curving through Sabah between the Bengkoka Peninsula to the Darvel Bay area. This arc borders the deformed

sediments, dominantly clastic, forming the backbone of a large mountain belt extending along west Sabah, from the low lying area in eastern Sabah. The folded sedimentary basin extends northeastward into the NE Sulu Sea contrasting with the apparent linearity of the north Borneo-Palawan trench extending offshore to the north (Holloway, 1981; Rangin *et al.*, 1990; Tjia *et al.*, 1987).

Based on the regional geology of the area, it is easy to recognize that the rock associations of the *mélange* are distributed along arcuate structures parallel or subparallel to the major structural trend of Sabah.

GEOLOGY OF THE BENGKOKA PENINSULA

The Bengkoka Peninsula is composed of Tertiary sedimentary sequence, *mélange* and volcanics. The Tertiary sediments can be divided into the Crocker Formation, a Paleogene sequence and the Bongaya Formation of Neogene age. Stratigraphically the Crocker Formation is separated from the Bongaya Formation by the *mélange* and volcanic sequence of Middle Miocene age.

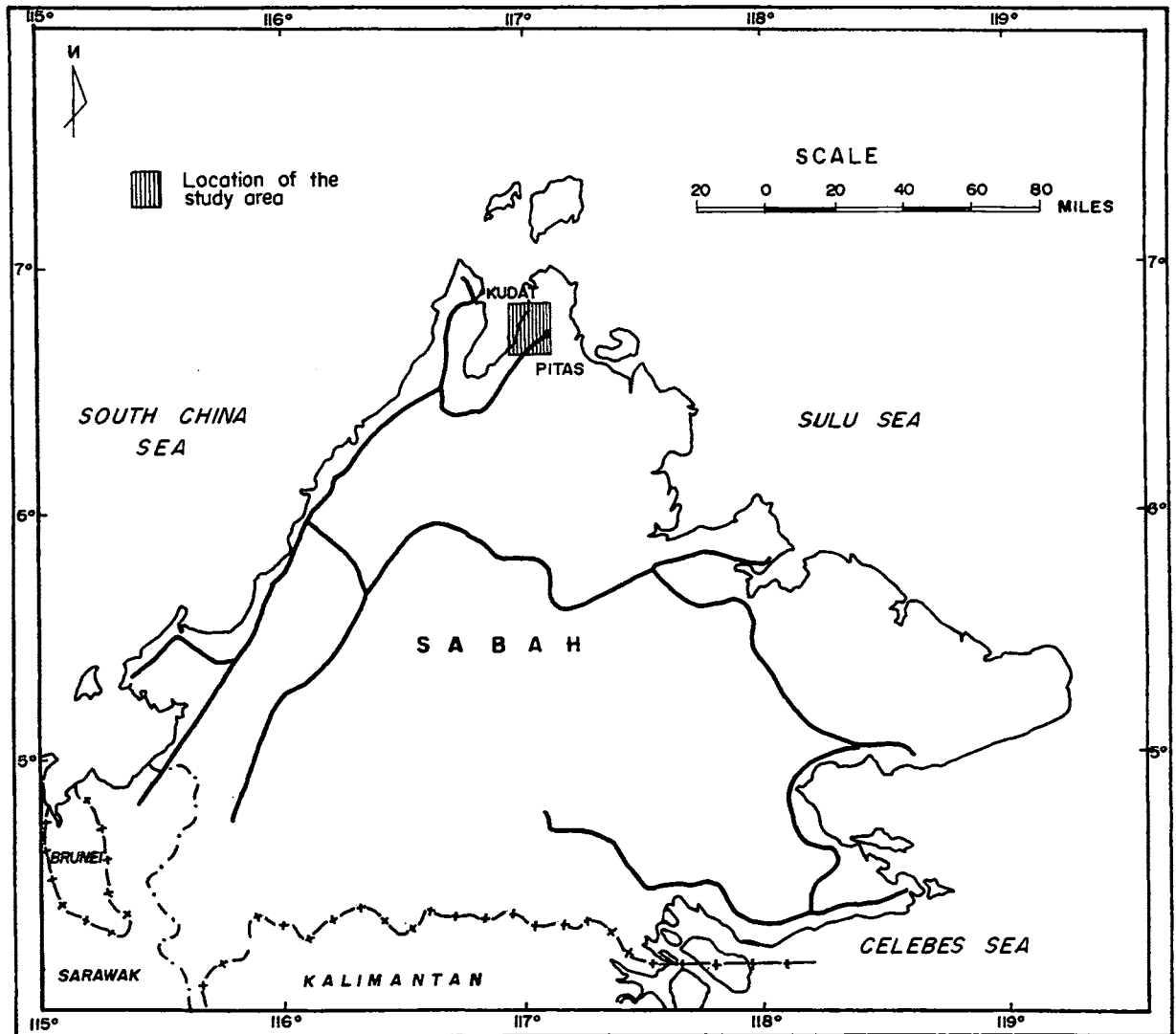


Figure 1. Map of Sabah showing the location of the study area.

The *mélange* in the study area is exposed stratigraphically as the basement of the volcanic deposits and the Neogene sedimentary sequence of the area. The *mélange* consists of blocks of various sizes representing serpentized ultrabasic rocks, gabbroic rocks, pillow basalts, metamorphic rocks, graywackes, gray and reddish-brown shale, chert, limestone, and volcanic rocks embedded in a pervasively sheared matrix. Wide and mappable exposures of dismembered ophiolite rocks occur in the peninsula, especially in the Pitass area. The

mélange is believed to have formed from two episodes of tectonism which occurred in the area, from the NW-SE and the other the NE-SW.

The Crocker Formation is the oldest sedimentary sequence deposited on top of the tectonized ophiolitic rock basement which is now incorporated within the sheared zone of the formation and in the *mélange*. The age of the formation is believed to be Late Eocene to Early Miocene (Jacobson, 1970). The formation is a clastic sequence which was deposited in a

deep sea basin considered to be the part of the submarine fan known as the Crocker basin. The influence of subduction that occurred through Tertiary time in this region is believed to have caused the formation to be strongly faulted and folded. The formation of the mélangé controls the topography of the study area. The main forces which influenced the beddings of the study area was compression from the NNE-SSW directions (Fig. 2).

The Bongaya Formation, of Middle Miocene to Pliocene age, unconformably overlies the andesitic-basaltic volcanics and the mélangé. The sedimentary rocks consist of sandstone, siltstone and claystone intercalated with limestone, marl, calcareous limestone, conglomerate and shale. Locally, larger foraminifera, coalified wood, resin and cross-stratification have been observed. The whole sequence has been affected by the Late Neogene tectonics, with beds dipping from east to south.

NATURE AND PHYSICAL FEATURES OF THE MÉLANGE

The mélangé in the Bengkoka Peninsula consists of serpentinized peridotites and other types of ultrabasic rocks, gabbroic rocks, pillow basalts and chert (which together form an ophiolite suite of the area, limestone), shale, and graywackes which originated from the Crocker Formation. Locally, the blocks are surrounded by a matrix of scaly clay with shiny frictional surfaces. The graywackes show turbidite characteristics equivalent to that of the Paleogene sedimentary sequence of northwest Borneo. The scaly clay and the graywackes are native materials in this rock assemblage.

The assemblage of various rock types which appear as blocks (phacoids) does not always have a scaly clay matrix. The scaly clay is generally soft, disintegrates easily, and of

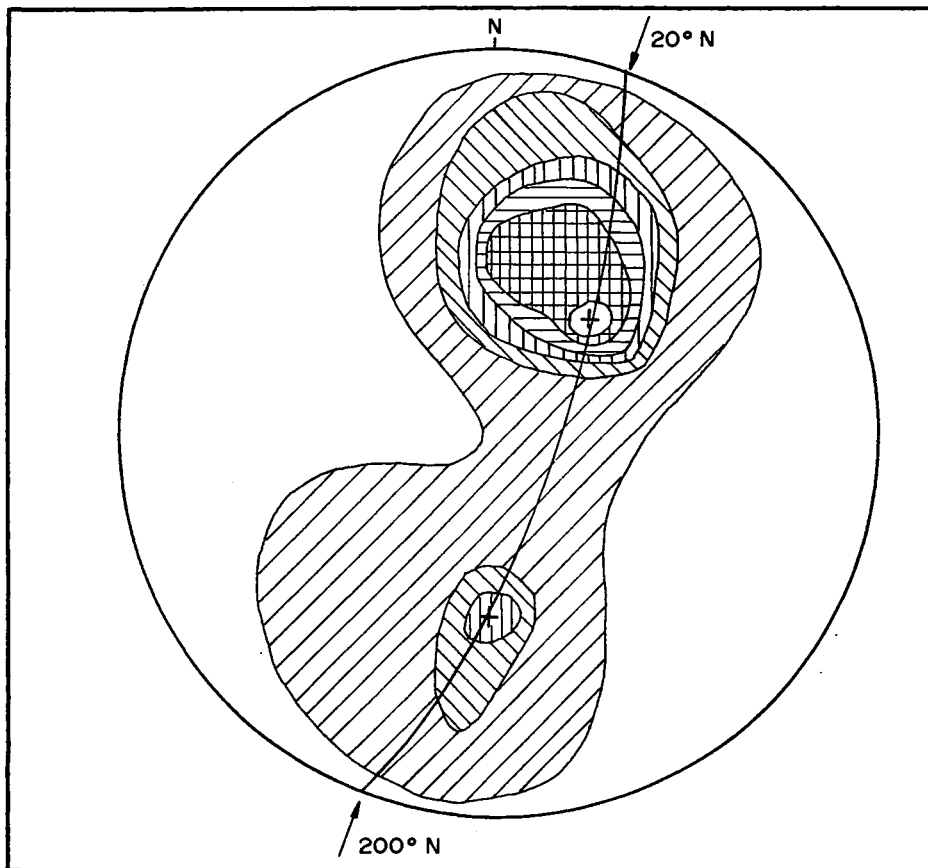


Figure 2. Equal-area projection, lower hemisphere, of beddings from Crocker Formation, shows NNE-SSW compression.

greenish gray and reddish-brown colours. Most of the rocks are intensely tectonized into a pervasively sheared mass.

Field evidence proves that where one of these blocks occurs most of the other rock types are also present. Most of the sections observed represent the assemblage of the ophiolite complex, sedimentary rocks and blocks of the native materials. Most of the boundaries and matrix of these blocks are sheared and are often buried under slumped material. Normal wavy foliation, schistosity and lens-shaped (phacoid) blocks with their long axis sub-parallel to the trend of the foliation can be observed in every outcrop. The phacoids sometimes show extensional fractures and some appear to have been rotated (Fig. 3). The rotation of the rock fragments and the extensional fractures within the red shale fragment relative to the foliation are significant characteristics of the tectonic *mélange*. These characteristics lead the authors to suggest that the tectonic *mélange* is similar to those which have been described by Hsu (1968) in Franciscan area, by Sukanto (1980) in Talaud Island and other parts of the world.

Mélange are bodies of deformed rocks characterized by the inclusion of tectonically mixed fragments or blocks, which may range up to several kilometres long, in pervasively sheared matrix (Greenly, 1919 in Hsü, 1968). These blocks are disrupted brittle layers which once interbedded with ductilely deformed matrix, while the dismembered ophiolites formerly formed the basement of the Crocker basin.

The autoclasts of the *mélange* consists of old and young rock clasts chaotically distributed in a foliated and non-foliated matrix. The graywacke blocks are fragmented from the native sequence of Paleogene age, while the ophiolite suites were derived from the dismembered oceanic crustal materials. The basalt and pillow lava are not sheared, but instead is extensively fractured and disorderly oriented and are most probably olistoliths introduced by gravity slumping.

TECTONIC SIGNIFICANCE

Mélanges are tectonic units in an accretionary prism and their contacts with adjacent units are almost invariably sheared

surfaces. However, the nature of contacts with the neighbouring rock sequence in the study area is difficult to observe locally. The base of the *mélange* is nowhere observed and the upper contact is dominated by slump and brecciated material of the country rock sequences. The rock boundaries, however, can be traced regionally on aerial photographs.

The deformed rocks of the Crocker Formation have a general strike to the west with several evidences of thrust faults (Fig. 4). Judging from the exposures on several traverses, it is interpreted that the formation is made up of a series of thrust fault slabs. The general dip of the thrust faults is to the south. The mappable ophiolite rocks would be slabs derived from an oceanic floor upthrust together with the Crocker Formation, whereas the volcanic rocks exposed on the western part of the peninsula would be part of the Middle Miocene volcanic arc deposits; these are the northward thrust slabs of Sabah (Rangin *et al.*, 1990). The volcanism in the eastern part of Sabah has continued until the Pleistocene time, but in the Bengkoka area the volcanism seemed to have ceased since the Middle Miocene time. Unfortunately, there is no evidence of subduction nearby, however, the volcanic rocks could be the part of the Middle to Late Miocene subduction of Zamboanga-Dent which extend northwestward and the slab of the Middle to Late Miocene volcanics incorporated with other rock blocks during the formation of the *mélange*. The bending and the rapturing of the volcanic arc have affected the Crocker Formation and *mélange* rocks occurring in the arc-system of eastern part of Sabah; possibly during the Middle Miocene. In relation with this process part of the oceanic materials, Crocker Formation and the volcanics broke up into some slabs and were injected into the *mélange* mass.

CONCLUSION

The *mélange* in the study area consists of blocks of various sizes and type of rocks, namely; serpentized ultrabasics, gabbroic rocks, pillow basalts, metamorphic rocks, graywackes, limestone, chert and red shale embedded in a sheared clay matrix. Disrupted strata are randomly distributed and boundinage of

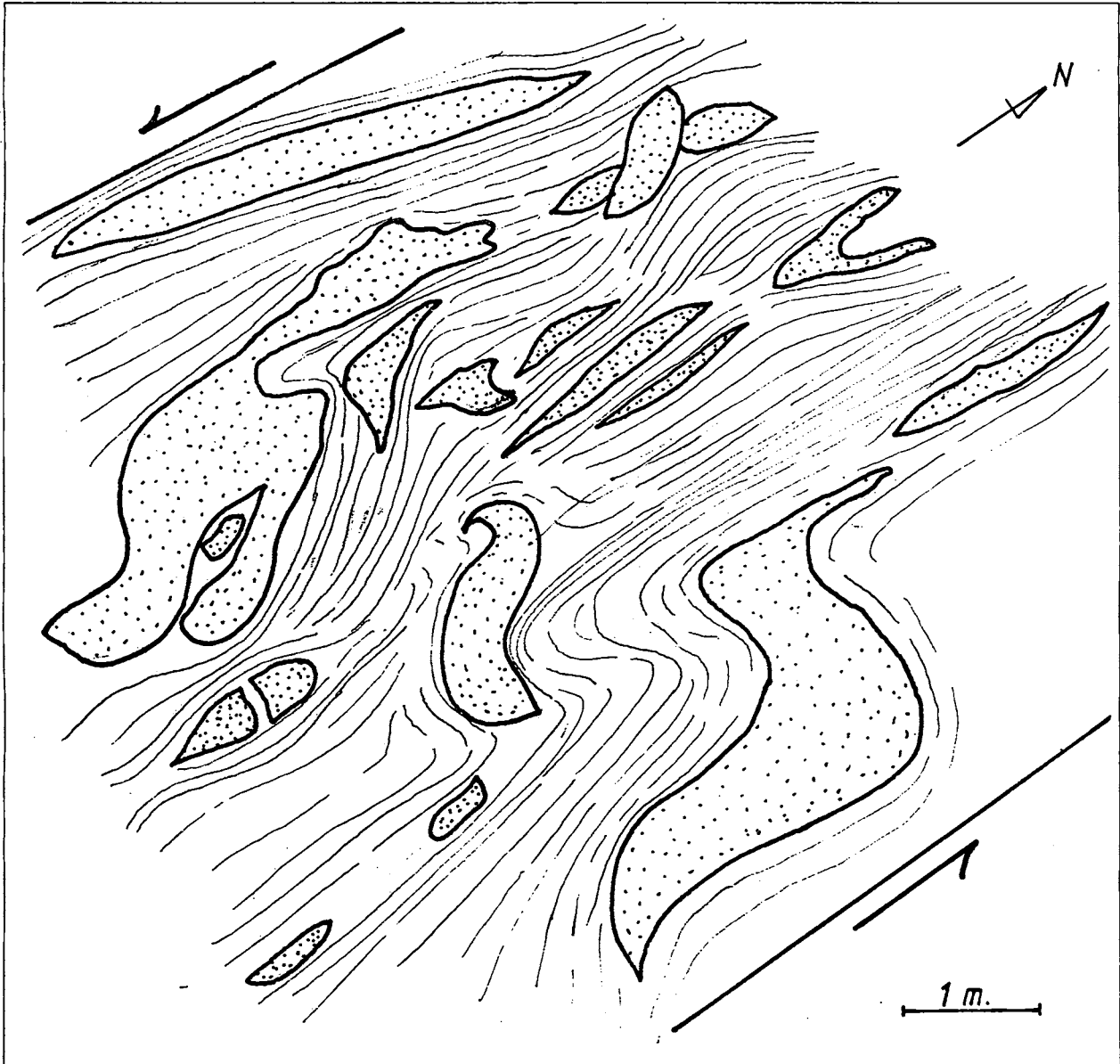


Figure 3. A 6 metre wide shear zone, consisting of phacoid lenses of arenaceous clasts in argillaceous matrix.

sedimentary beds are fragmented where shales are dominant. Phacoid lenses of rocks especially sandstones engulfed within a highly sheared shaly matrix with common shiny frictional surfaces. Complexity is introduced in places where dismembered ophiolites are incorporated within the sheared and highly deformed sediments. These ophiolites are generally interpreted as fragments of oceanic floor incorporated into the thick sedimentary sequence

of the Crocker Formation. Large serpentinite lenses are injected into the thrust plates crosscutting the clastic sedimentary sequence. The above fabric is also observable in the Kudat Peninsula, Banggi Island and Mt. Kinabalu area which result in a complex deformation belt in the northern part of Sabah. This Early Cretaceous ophiolites incorporated to this belt also extends to Palawan (Holloway, 1981).

The rock associations of the mélangé and

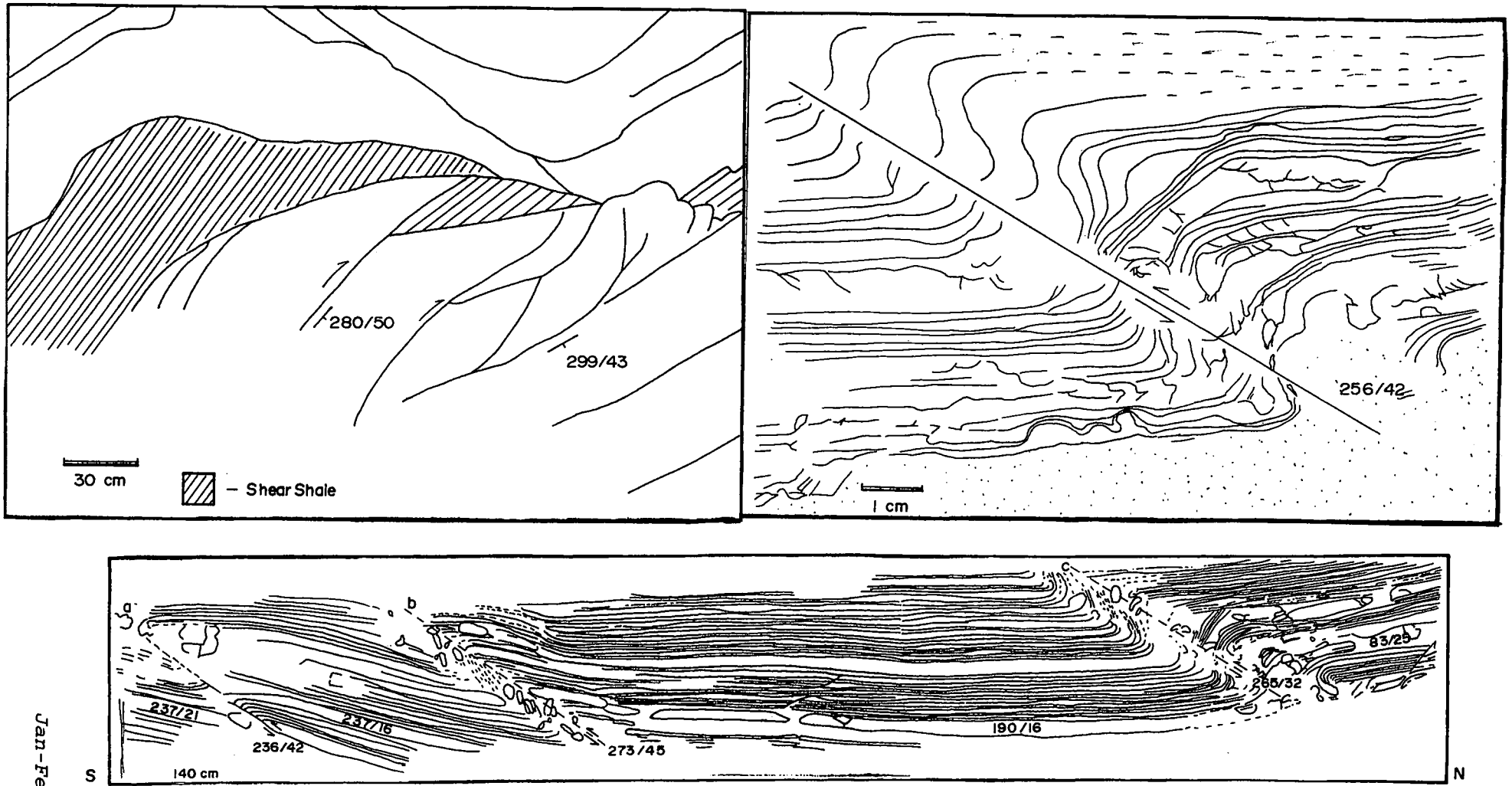


Figure 4. Outcrops of Crocker Formation beds along the Mempakad-Rosob road cut of the study area, showing high-angle reverse fault planes with different strikes.

their internal structures represent an imbricate wedge which clearly demonstrates an accreted terrain in the study area. This structural feature is the result of a complex deformation history initiated in the Middle Miocene and the climax of this deformation is evidenced all around the Sulu Sea (Rangin, 1989). The rapid folding, repeated slabs, the imbricate accretionary prism and the belts of mélangé could be relevant to arc-continent collision as suggested by Rangin *et al.* (1990).

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Manuscript received 23 September 1991

PERTEMUAN PERSATUAN Meetings of the Society

Half-Day Seminar

Dale I. Bray: Groundwater Contamination – The Hidden Problem

Laporan (Report)

The half-day seminar by Prof. Dale I. Bray (University of New Brunswick, Canada) was jointly held by the Geology Department, University of Malaya and the Society on 16th January, 1992 at the Geology Department, University of Malaya.

Sinopsis (Synopsis)

Currently, groundwater contamination often occurs resulting from leachate of disposal sites, chemicals from leaking underground storage tanks, and chemicals from accidental spillage. This occurrence may result in the degradation of soil quality for economic activities and the unsuitability of groundwater for drinking purposes, among others.

In late 1987, the Department of Environment (DOE), Malaysia and Dames & Moore, USA conducted a feasibility study on treatment and disposal of toxic and hazardous waste and estimated about 377,000 m³ of wastes are being generated annually but proper regulations are yet to be made available.

The seminar touched upon the following themes: (i) the groundwater problems; (ii) groundwater quality and human health; (iii) contaminant properties; (iv) evaluation of contaminant problems; (v) field studies (case studies of groundwater transport); (vi) modelling of groundwater contamination; (vii) remedial measures of groundwater contamination and (viii) reducing groundwater contamination.



Dale I. Bray

Ceramah Teknik (Technical Talks)

Jim Brooks : The New Role of Petroleum Geochemistry in Oil and Gas Exploration

Laporan (Report)

On Wednesday 19th of February 1992, Dr Jim Brooks of Brooks Associate and currently a visiting lecturer at the University of Glasgow, U.K., presented a talk entitled *The New Role of Petroleum Geochemistry in Oil and Gas Exploration*. Dr Brooks has extensive experience in the field of petroleum geology both as an academician and as an industry consultant.

In his presentation, Dr Brooks began by drawing attention to the many different aspects of organic geochemistry before concentrating on its applications to petroleum geochemistry. Much of the talk was taken up discussing these applications within the framework of North Sea case studies. A brief history of North Sea exploration was given before going on to discuss the importance of basin modelling to assessing the amount of *in situ* hydrocarbon that has accumulated in a particular region. The importance of expulsion and migration were particularly emphasized.

The talk presented a good overall picture involving real situations of the importance of basin modelling and was well received by the audience which included students, academicians and oil industry personnel.

W.H. Abdullah

Jim Brooks : The Origin of Life — Religious and Scientific Considerations

Laporan (Report)

Although the title of the talk was "The Origin of Life — Religious and Scientific Considerations", Dr Jim Brooks on 20th February, 1992 had time only to deal with the scientific aspects of the topic. The chances of getting clear answers to the question of the origin of life are not good because of the great age differences of the evidence involved. The search for answers is concentrated in basically two areas of research. One is by looking into space at how the universe began and what are the compounds found which can perhaps give us some clue to the origin of organic life. The other is by looking at the minute components of life found within the cell.

The world can be viewed as consisting of the biosphere in addition to the atmosphere, lithosphere and hydrosphere – all interacting with each other. A comparison between the biological and non-biological systems reveals that order is produced by biological material while non-biological systems tend to produce randomness. For example, photosynthesis produces stable carbon isotope fractionation while abiotic synthesis produces no stable carbon isotope fractionation.

The general requirement for early life to form under the reducing atmosphere of the young earth was a primeval atmosphere of methane, ammonia, carbon monoxide and water reacting with a lot of energy input from lightning, volcanic activity, meteorite impacts or some other sources of power.

The linking of amino acids into the correct sequence had to be very specific and this is unknown outside of cell systems. Such synthesis has not been possible outside of the cell in the laboratory. We have not succeeded in making our own macromolecule or single cell up to the present.

Defining life is not easy and there are many exceptions when such definitions are based on enzyme systems. Looking at the increasingly complex organization from atoms to molecules to cells to organisms, the gap between the non-living and the living is still unfilled in our knowledge.

The history of life on earth is mainly derived from a study of fossils. In the past, men thought that fossils was only present in the last one eighth of the four and a half billion years that the earth has existed, but the discovery of microfossils (bacteria and blue-green algae) in many Pre-Cambrian rocks all over the world shows that life has existed for probably four-fifths of the age of the earth in rocks dated older than 3000 million years and extending probably back to 3800 million years before present.

Claims that life on earth had arisen from organic material brought in by meteorites had been proven to be due to the contamination of the samples analyzed. Traces of organic material coating minerals such as clays have been detected in 3800 to 3900 million year old sediments.

Protein cannot exist at high temperatures ($>100^{\circ}\text{C}$) for more than a few seconds. The primeval soup in the early earth would have contained nitrogenous compounds which in concentration at high temperatures would form nitrogenous tars. The puzzle is these tars have never been found in Pre-Cambrian rocks. The conditions (timing, temperatures and compounds) in the early earth were not conducive for the building blocks of life.

We know when life probably started (3800 to 3900 million years ago) but we do not really know where, how or why it began. Popular science in magazine articles and TV documentaries has tended to oversimplify the answers to the origin of life from ideas to hypothesis to facts when in actual fact we do not really know the answers. The origin of life is still very much a mystery.



Dr. Jim Brooks

C.P. Lee

BERITA-BERITA PERSATUAN News of the Society

Hadiah Buku (Book Prize)

The council at its meeting on 6th December 1991, agreed to donate RM6,000 to each of the 3 local universities with geology courses, namely, Universiti Malaya (UM), Universiti Kebangsaan Malaysia

(UKM) and Universiti Sains Malaysia (USM). The interest of about RM300 per year (at 6% interest) is to be used for the GSM Book Prize for the best student in geology for that particular university.

Kehilangan (Membership)

The following applications for membership were approved:

Full Members

1. **Ahmad Zainuddin Yusoff**
Yazman-Hume Quarry, Semenyih.
2. **Johnny Ating Kading**
Sarawak Shell Bhd., PES/34, 98100 Lutong, Sarawak.
3. **Malcolm R. Hobson**
Digicon, 06-01, Union Bldg., 37 Jalan Pemimpin, S'pore 2057.
4. **Tuan Zaid Tuan Muda**
Petronas Carigali, P.O. Box 12407, 50776 Kuala Lumpur.
5. **Shamsudin Jirin**
PRI, Lot 1026, PKNS Ind. Est., 54200 Ulu Kelang.
6. **Wan Rosli Wan Abdullah**
Exlog, 1003, 10th Floor, Wisma Lim Foo Young, 86 Jalan Raja Chulan, 20400 Kuala Lumpur.
7. **Ha Kong Yin**
Fletcher Challenge Petroleum Asia, 15, Scotts Road, Thong Teck Bldg., 04-09, S'pore 0922.

Student Members

1. **Aniza Abdul Rahman**
Jabatan Geologi, Universiti Malaya, 59100 Kuala Lumpur.
2. **Mazlan Abdullah**
Jabatan Geologi, Universiti Malaya, 59100 Kuala Lumpur.

Pertukaran Alamat (Change of Address)

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

1. **T. Koning**
Texaco 3100, 150-6 ave. S.W., Calgary, Alberta, Canada T2P 4M5.
2. **Kazuo Hoh**
MMKC Co. Ltd., Letter Box 119, 10 Fl., UBN Tower, Jalan P. Ramlee, 50250 Kuala Lumpur.
3. **David Wong**
WMC, P.O. Box 11990, 50764 Kuala Lumpur.
4. **A.J. Burley**
Trehinnick, Trolver Croft, Feock, Truro, Cornwall TR3 6RT, U.K.

- | | |
|--|---|
| <p>5. H. Macrae
Western Mining Corporation Ltd., HML
28-42 Ventnor Avenue, P.O. Box 1099, West
Perth, WA 6005, Australia.</p> <p>6. T. Magee
Western Mining Corporation Ltd., HML
28-42 Ventnor Avenue, P.O. Box 1099, West
Perth, WA 6005, Australia.</p> | <p>7. Awang Kasumajaya Awang Mahran
PES/3, Sarawak Shell Berhad, Locked Bag
No. 1, 98009 Miri, Sarawak, Malaysia.</p> <p>8. Bernie S. Hodges
c/o Amarit & Associates Co. Ltd., 28 Sadao
Road, Songkhla 90000, Thailand.</p> |
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Pertambahan Baru Perpustakaan (New Library Additions)

The Society has received the following publications:

- | | |
|---|---|
| <p>1. Berliner Geowissenschaftliche
Abhandlungen, Band 128, 130, 133, 134,
136 (1991) & 131 (1990).</p> <p>2. IMM Bulletin no. 1003, 1991.</p> <p>3. Geosurvey Newsletter, vol. 23, nos. 7-15,
1991.</p> <p>4. Memoirs of the Ehime University, vol. XI,
no. 4, 1991.</p> <p>5. Bulletin Elf Aquitaine, vol. 15, no. 2, 1991.</p> <p>6. Scripta Geologica, nos. 95 (1990) & 96 (1991)</p> <p>7. Belgische Geologische Dienst, Professional
paper 1991/5 - no. 249.</p> <p>8. Veröffentlichungen des Zentralinstituts für
Physik der Erde no. 117, 1991.</p> <p>9. Statistics on mining industry 1986.</p> <p>10. Commonwealth Science Council,
Newsletter, Sept-Oct & Nov-Dec, 1991.</p> <p>11. AAPG Explorer, Dec 1991 & Jan 1992.</p> | <p>12. American Museum Novitates, nos. 3023,
3022, 3014, 3009, 3007, 3006, 3000, 2998,
2997, 2982, 2972, 2970, 2968, 2960, 2959,
2958.</p> <p>13. U.S. Geol. Survey Circular 1991: 1067.</p> <p>14. U.S. Geol. Survey Professional paper, 1991:
1513-C, 1512.</p> <p>15. U.S. Geol. Survey Bulletin, 1991: 1938.</p> <p>16. Earthquakes & volcanoes, vol. 22, no. 5,
1990.</p> <p>17. American Museum of Natural History, Bull.
no. 194, 1990.</p> <p>18. National Science Museum, Bulletin, vol.
17, nos. 2 & 3, 1991.</p> <p>19. Acta Palaeontologica Sinica, vol. 30, nos. 3,
4 & 5, 1991.</p> <p>20. Palaeontological abstracts, vol. 6, no. 2 & 3,
1991.</p> <p>21. Acta Micropalaeontologica Sinica, vol. 8,
no. 2 & 3, 1991.</p> |
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BERITA-BERITA LAIN
Other News

25th International Symposium

Remote Sensing and Global Environmental Change

Tools for Sustainable Development

4-8 April 1993

You are invited to attend the 25th International Symposium on Remote Sensing & Global Environmental Change in charming, historic Graz, Austria.

- Social and Natural Science Partnerships:
Successful Interdisciplinary Case Studies

Technical Program

The Symposium will focus on the challenges involved in achieving sustainable development through sound environmental programs, international and regional partnerships, and methodologies for better understanding the human dimensions of global change. The symposium program will include plenary and interactive presentations, workshops, and roundtable discussions designed for both the novice and expert audience on the following topics:

- Data Policy and Sources
- Disaster Monitoring and Mitigation
- Early Warning Systems for Food Security
- Education and Training
- Environmental Degradation of Air, Land, and Water
- Environmental Measurement and Monitoring Systems
- Integration of Remote Sensing and GIS
- International Research Programs and Plans
- Land Cover and Land Use Change
- Mountain Ecosystems

Special Programs

Additional highlights include the exhibits program, which will show case more than 80 displays of the latest remote sensing and GIS products and other earth science services. Training programs (workshops, field trips, laboratory tours) will give you the opportunity to obtain hands-on experience and observe the most recent developments and applications of contemporary environmental technologies. Social and guest programs will entertain you and introduce you to Austrian life, Styrian culture, and the history of Graz.

Contact Nancy J. Wallman for more information.

ERIM/25th International Symposium
P.O. Box 134001
Ann Arbor, MI 48113-4001, USA
Telephone: 313-994-1200, Ext. 3234
Fax: 313-994-5123
Telex: 4940991 ERIMARB

Preregistration Deadline: 15 February 1993

GEOLOGICAL SOCIETY OF MALAYSIA PUBLICATIONS

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WARTA GEOLOGI - NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MALAYSIA

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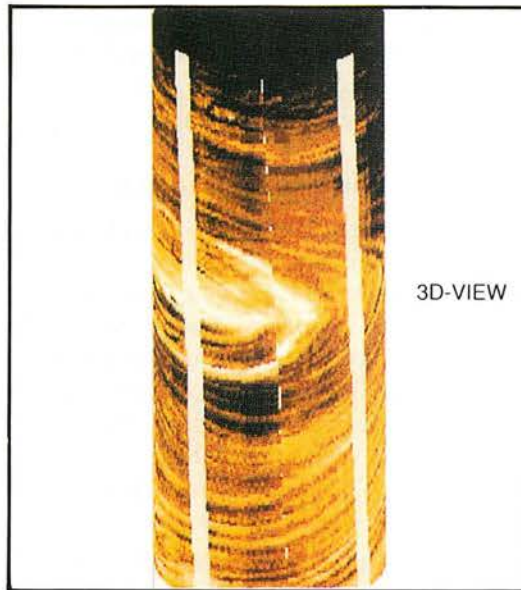
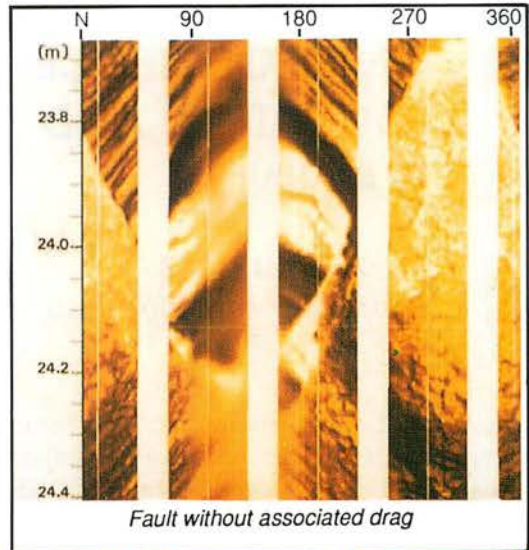
Fullbore Micro Imager*

Formation imaging using microelectrical arrays has benefited the oil industry since its introduction in the mid-80s. The FMI*, Fullbore Formation MicroImager tool, is the latest-generation electrical imaging device. It belongs to the family of imaging services provided by the MAXIS 500* system with its digital telemetry capability.

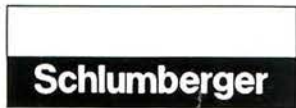
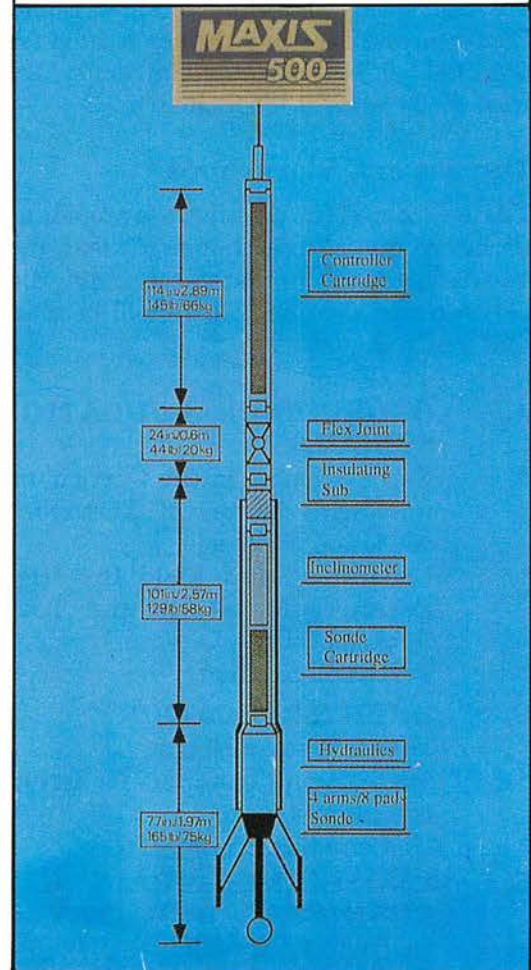
The FMI log, in conductive muds, provides electrical images almost insensitive to borehole conditions and offers quantitative information, in particular for analysis of fractures.

The FMI tool combines high-resolution measurements with almost fullbore coverage in standard diameter boreholes, thus assuring that virtually no features are missed along the borehole wall. Fully processed images and dip data are provided in real time on the MAXIS 500 imaging system.

The tool's multiple logging modes allow wellsite customization of results to satisfy client needs without compromising efficiency.



"Bullseye" structure



INTERNATIONAL CONFERENCE ON GEOSCIENCE EDUCATION AND TRAINING

**April 20-24, 1993
Southampton, England**

The Association of Geoscientists for International Development (AGID) and the Commission on Geoscience Education and Training (COGEOED) of the International Union of Geological Sciences are convening an International Conference on Geoscience Education and Training to be held at Southampton University, England from 20-24 April, 1993 inclusive.

Themes and Workshops

The main aim of the meeting is to provide a forum for international interchange of ideas, methods and data, and to stimulate a continuing dialogue between participants. There will be four main conference themes:

A. GEOSCIENCE EDUCATION IN SCHOOLS

- * Earth Sciences in the Curriculum - a worldwide survey of Earth Sciences education in schools
- * Laboratory and Field Investigation, Resource Materials and Teaching Strategies
- * Teacher Education

B. HIGHER EDUCATION

- * The Geoscience Degree
- * Methods and materials for lecture and laboratory
- * Higher education interfaces

C. GEOSCIENCE TRAINING FOR BUSINESS, INDUSTRY AND PUBLIC SERVICE

- * Vocational and Technical Training

- * Institution Twinning and Professional Linkages
- * Environmental Education for Business and Industry
- D. **PUBLIC UNDERSTANDING OF GEOSCIENCE**
- * Geoscience and Industry
- * Geomovies
- * National Bodies
- * Adult Education

Each of the above will be supported by a number of workshops and there will be an additional workshop on Women in Geoscience and a Geological Film evening.

Invitation to participate

The conference will be open to all those with an interest in geoscience education and training. It is intended both for practitioners and for those involved in administration course development, and the supply of resource materials. There will be a limited number of keynote presentations within each theme; most of the conference will be taken up with workshops. There will be open plenary sessions on all topics as well as some parallel workshop sessions.

The conference has received wide-ranging support throughout the world and we seek to encourage this international dialogue. In particular generous sponsorship by the UK Overseas Development Administration will facilitate participation by delegates from developing countries.

Registration

Full registration (includes lunch, coffee, receptions etc)

before Jan 1st '93	£100.00
after Jan 1st '93	125.00
Single day registration	30.00
Accompanying person	10.00

Registration fees cover the costs of abstracts, programme and other conference papers, field excursions, attendance at all parts of the conference and exhibition, coffees and receptions.

Accommodation

5 nights bed and breakfast and evening meal (in University Halls of Residence)	£135.00
Conference Dinner — non-residents	£25.00
— residents	£18.00

Immigration/Visa Requirements

A passport is required for entry to the UK. Delegates should enquire at their own passport offices to check whether a visa is required to enter the UK.

Personal invitations

Potential registrants who require a personalised invitation to attend the Conference should apply in writing to the Secretariat. The Committee will supply these invitations, but will not assume any financial responsibility in this regard.

CONFERENCE PUBLICATION

A special conference volume entitled "Geoscience Education and Training: A World View" will be published following the meeting as one of the AGID Special Publication series. This will include keynote papers, thematic overviews and individual contributions.

Deadline for manuscripts: July 31 1993 (3 months post-conference)

Instructions for authors: available on request from the Chief Editor, Dorrik A V Stow, Geology Department, The University, Southampton, UK.

REVISED TIMETABLE

September 1992

Second Circulation with Registration and call for Abstracts

December 31 1992

Early Registrations and Abstracts

March 1993

Third Circular and Conference Papers

April 20-24 1993

CONFERENCE*

Monday 19th eve arrivals

Tuesday 20th field trips

Wednesday 21st) conference plenary,
– Saturday 24th) workshops, exhibitions,
(morning)) films, & social activities.

Saturday 24th pm

Departure

July 31 1993

Deadline for Manuscripts

For further information enquiries, etc, please contact

Dr Dorrik A V Stow,
GEOED Conference Convener or

Mrs Esther Johnson,
GEOED Conference Secretariat,
Department of Geology,
University of Southampton,
Southampton,
SO9 5NH, UK;

Tel: 44(0) 703 593049 or 592140,

Fax: 44(0) 703 593052,

Telex: 47662 SOTONU G.

Workshop on Applicability of Geostatistics in the Mining Industry

Following the 3-day successful Workshop on Geostatistics held in Bandung, Indonesia last September, the SEATRAD Centre, in collaboration with the Government agencies and universities in Thailand and Malaysia, have pleasure in announcing that it will be holding a second similar workshop in Ipoh from 25 May to 27 May 1993. The Bandung workshop was held largely for the benefit of Indonesian participants, whereas the second workshop is being organized for participants from the other two member countries: viz. Thailand and Malaysia.

The workshop objectives will be to provide a forum for discussion on the results of research projects, as well as the UNDP-funded projects carried out by the Centre and the member countries in the areas of mining and exploration geostatistics; to compile case studies on the applicability of geostatistics; and to present the findings and transfer knowledge on improved evaluation technique to the mining industry. On the whole, the workshop is intended to provide an opportunity for those who wish to develop a broad yet comprehensive understanding on the application of geostatistics in the mining industry.

The number of participants is limited to twenty (20) only. The workshop programme will start with a Keynote address on recent trends in geostatistics. The major part of the programme, however, will be papers offered by the workshop delegates.

Papers are invited and the prospective authors should submit either abstracts of 250-300 words of their proposed papers or manuscripts (draft papers) before April 26, 1993. The papers presented will be published in workshop proceedings.

Accommodation either at the Tambun Inn or Hotel excelsior, at the participants' own expense, can be arranged upon request.

For further information:

The Director
SEATRAD Centre
Jalan Sultan Azlan Shah
31400 Ipoh
Malaysia
Tel.: 05-559366/559589
Fax.: 605-579759

KALENDAR (CALENDAR)

1993

► April 1993

◆◆◆ April 1-3

FRACTALS AND DYNAMICS SYSTEMS IN GEOSCIENCES (International Meeting), Frankfurt/Main, Germany (Jörn H. Kruhl, Geology-Paleontology Institute, JW Goethe-University, Senckenberganlage 32, D-6000 Frankfurt/Main, Germany. Phone: 0049-69-7982695)

◆◆◆ April 1-30

COMPUTER SIMULATED MINERAL EXPLORATION (22nd Workshop), Fontainebleau, France. (L. Zanone, Ecole des Mines de Paris, CGGM-IGM, 35, rue Saint-Honoré, 77305 Fontainebleau Cedex, France. Phone: (33 1) 64 69 49 30; telefax: (33 1) 64 69 47 01; telex: 694 736F)

◆◆◆ April 4-8

REMOTE SENSING AND GLOBAL ENVIRONMENTAL CHANGE (25th International Symposium), Graz, Austria. (Dorothy M. Humphrey, ERIM, P.O. Box 134001, Ann Arbor, MI 43113-4001, USA. Phone: (313) 994-1200, ext. 2290; telefax: (313) 994-5123)

◆◆◆ April 5-8

GLOBAL WARMING, int'l. mtg., Chicago. (Sinyan Shen, Natural Resource Management Division, SUPCON International, One Heritage Plaza, Woodridge, III. 60517-0275. Phone: 708/910-1551; 419/372-8207. Fax: 708/910-1561)

◆◆◆ April 17-20

INTEGRATED METHODS IN EXPLORATION AND DISCOVERY (International Conference), Denver, Colorado, USA. (SEG Conference '93, P.O. Box 571, Golden, CO 80402, USA. Telefax: (303) 279-3118)

◆◆◆ April 21-25

GEOSCIENCE EDUCATION AND TRAINING (International Conference), Southampton, UK. (Mrs. Esther Johnson, GEOED Conference Secretariat, Department of Geology, University of Southampton, Southampton S09 5NH, UK. Phone: (0703) 593049; telefax: (0703) 593052; telex: 47662 SOTONU G)

◆◆◆ April 19-23

REMOTE SENSING, int'l mtg., Enschede, The Netherlands, by international Institute for Aerospace Survey and Earth Sciences, and others. (Myriam Fahner, Box 6, 7500 AA Enschede, The Netherlands. Phone: 31-53-874 255. Fax: 31-53-874 436) Deadline for manuscripts: March 11.

◆◆◆ April 25-28

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (Annual Meeting), New Orleans, Louisiana, USA. (Convention Department, AAPG, Box 979, Tulsa, OK 74101, USA. Phone: (918) 584-2555; telefax: (918) 584-0469)

► May 1993

◆◆◆ May 5-8

PROTECTING THE EARTH - CHALLENGES TO SCIENCE AND TECHNOLOGY (1st International Fair and Congress), Köln, Germany. (Alfred-Wegener-Stiftung zur Förderung der Geowissenschaften, Wissenschaftszentrum Ahrstraße 45, Postfach 20 14 48, D-5300 Bonn 2, Germany. Phone: 02 28/302-260; telefax: 02 28/302-270; telex: 885 420 wzd).

◆◆◆ May 5-8

GEOTECHNICA '93 (International Symposium), Cologne, Germany. (Hans Teetz, Cologne International Trade Fairs Inc., 21st Floor, 666 Fifth Ave., New York, NY 10103-0165, USA. Phone: (212) 974-8836; telefax: (212) 974-8838)

◆◆◆ May 15-21

ENVIRONMENTAL HYDROLOGY AND HYDROGEOLOGY (2nd USA/CIS Joint Conference), Arlington, Virginia, USA. (Americal Institute of Hydrology, 3416 University Avenue, SE, Minneapolis, MN 55414-3328, USA. Phone: (612) 379-1030; telefax: (612) 379-0169)

◆◆◆ May 17-19

GEOLOGICAL ASSOCIATION OF CANADA/ MINERALOGICAL ASSOCIATION OF CANADA (Joint Annual Meeting), Edmonton, Alberta, Canada. (J.W. Kramers, Alberta Geological Survey, P.O. Box 8330, Station F, Edmonton, Alberta T6H 5X2, Canada. Phone: (403) 438-7644; telefax: (403) 438-3644)

◆◆◆ **May 25–June 15**

BASIN TECTONIC AND HYDROCARBON ACCUMULATION (International Conference), Nanjing, China. Professor Shi Yangshen, Department of Earth Sciences, Nanjing University, Nanjing, China. Phone: 86-25-634651, ext. 2890; telefax: 86-25-302728; telex: 34151 PRCNU CH. Or David Howell, U.S. Geological Survey, 345 Middlefield Road, MS 902, Menlo Park, CA 94025, USA. Phone: (415) 354-5430; telefax: (415) 354-3224

◆◆◆ **May 31–June 2**

APPLIED MINERALOGY, int'l. mtg., Perth, Western Australia. (Jim Graham, ICAM '93, Private Bag, P.O. Wembley 6014, Australia. Phone: 619/387-0371)

▶ **June 1993**◆◆◆ **June 1–5**

GEOTECHNICAL ENGINEERING (International Meeting), St. Louis, Missouri, USA. (Norma R. Fleming, 119 ME Annex, University of Missouri, Rolla, MO 65401-0249. Phone: (314) 341-6061; (800) 752-5057. telefax: (314) 341-4992)

◆◆◆ **June 7–16**

SUBCOMMISSION ON CARBONIFEROUS STRATIGRAPHY 1993 FIELD AND GENERAL MEETING (International Symposium), Liège, Belgium, and field excursions to Belgium, Germany, and the Pyrenees in France. (Dr. M. Streel, Paléontologie, Université de Liège, 7 Place du Vingt-Août, B-4000 Liège, Belgium)

◆◆◆ **June 20–27**

ZEOLITES (International Meeting), Boise, Idaho, USA. Sponsored by International Committee on Natural Zeolites. (F.A. Mumpton, Dept. of Earth Sciences, State University of New York, Brockport, 14420. Phone: 716/395-2635; 716/637-2324. Fax: 716/395-2416)

◆◆◆ **June 21–25**

ROCK ENGINEERING (Meeting and Workshop), Lisbon, Portugal. Sponsored by the International Society for Rock Mechanics. (Luis Ribeiro e Sousa, Portuguese Society for Geotechnique, Laboratório Nacional de Engenharia Civil, Av. do Brasil, 101, 1799 Lisboa Codex Portugal. Phone: 848 21 31; telefax: 89 76 60)

◆◆◆ **June 28–July 2**

INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS: HYDROGEOLOGY

OF HARD ROCKS (24th IAH Congress), Oslo, Norway. (Geological Survey of Norway, P.O. Box 3813, Ullevål Hageby, N-0805 Oslo, Norway. Phone: 47-2-950895)

▶ **July 1993**◆◆◆ **July**

ENVIRONMENTAL CONTEXT OF HUMAN EVOLUTION (International Scientific Congress and Exhibition), The Netherlands and Indonesia. (Dr. Hans Beijer, Geological Survey of The Netherlands, P.O. Box 157, NL-2000 AD Haarlem, The Netherlands. Telefax: 31 23 351614)

◆◆◆ **July 5–8**

ROCK FRAGMENTATION BY BLASTING (4th International Symposium), Vienna, Austria. (Dr. H.P. Rossmann, Institute of Mechanics, Technical University Vienna, Wiedner Hauptstraße 8–10/325, A-1040 Vienna, Austria. Phone: (222) 588 01 5514 or 5519; telefax: (222) 587 5863)

◆◆◆ **July 5–9**

FLUVIAL SEDIMENTOLOGY (5th International Conference), Brisbane, Australia. (Continuing Professional Education, The University of Queensland, Queensland 4072, Australia. Phone: 61 7 365 7100; telefax: 61 7 365 7099; telex: UNIVQLD AA40315)

◆◆◆ **July 5–16**

VERY LOW GRADE METAMORPHISM: MECHANISMS AND GEOLOGICAL APPLICATIONS (IGCP Project 294 Thematic Meeting and Field Excursions), Xi'an, People's Republic of China. (Dr. Wu Hanquan, Xi'an Institute of Geology and Mineral Resources, 116 Easy Youyi Road, Xi'an 710054, People's Republic of China)

◆◆◆ **July 17–24**

GEOLOGICAL AND LANDSCAPE CONSERVATION, int'l. mtg., Great Malvern, U.K. (Margaret Phillips, The Company, St. John's innovation Centre, Cowley Road, Cambridge CB4 4WS. Phone: (0223) 421124. Fax: (0223) 421158)

◆◆◆ **July 18–23**

CLAY CONFERENCE (10th International Conference in conjunction with Commission VII of the International Soil Science Society), Adelaide, South Australia. (Dr. Tony Eggleton, Geology Department, ANU, GPO Box 4, Canberra, ACT 2601, Australia)

◆◆◆ July 25-30

ORIGIN OF PARENTAL ANORTHOSITE MAGMAS, TECTONIC AND METAMORPHIC PROCESSES IN THE EVOLUTION OF ANORTHOSSITES (Conference), Kadalaksha, Kola Peninsula, Russia. Sponsored by International Geological Correlation Programme Project 290. (Michael Higgins, Sciences de la Terre, Université du Québec à Chicoutimi, Chicoutimi, Québec G7H 2B1, Canada. Phone: (418) 545-5012)

► August 1993

◆◆◆ August

INTRAPLATE VOLCANISM: THE POLYNESIAN PLUME PROVINCE (International Workshop), Tahiti, French Polynesia. (Workshop Tahiti 1993, C. Dupuy, Centre Géologique et Géophysique, Case 060, Université de Montpellier II, place E. Bataillon, 34095 Montpellier Cedex 5, France. Phone: (33) 67-634-983; telefax: (33) 67-523-908)

◆◆◆ August 1-6

GEOCHEMISTRY OF THE EARTH SURFACE (3rd International Symposium), University Park, Pennsylvania, USA. (Lee Kump, Department of Geosciences, Pennsylvania State University, 210 Deike Bldg., University Park, PA 16802, USA. Phone: (814) 863-1274; telefax: (814) 865-3191)

◆◆◆ August 4-7

PALEOZOIC MICROVERTEBRATES (IGCP Project-328) (2nd International Symposium), Berlin, Germany. In conjunction with the birthday anniversary of Professor Walter Gross. (Dr. S. Turner, Queensland Museum, P.O. Box 3300, South Brisbane, Qld 4101, Australia. Telefax: 617 846 1918. Or Prof. H. Jaeger, Museum für Naturkunde, Invalidenstr. 43, 00-104 Berlin, Germany)

◆◆◆ August 8-12

STRATIGRAPHIC RECORD OF GLOBAL CHANGES: CLIMATE, SEA LEVEL, AND LIFE (SEPM Meeting), University Park, Pennsylvania, USA. (Mike Arthur, Department of Geosciences, Pennsylvania State University, University Park, PA, 16802, USA. Phone: (814) 865-6711)

◆◆◆ August 11-15

GEOSCIENCE IN URBAN DEVELOPMENT (International Conference), Beijing, China. (Professor Wang Sijing, Chairman LANDPLAN IV, Institute of Geology, Academia Sinica, P.O.

Box 634, Beijing 100029, China. Phone: 86-1-2027766; telefax: 86-1-4919140; telefax: 22474 ASCHI CN c/o Institute of Geology)

◆◆◆ August 15-19

CARBONIFEROUS TO JURASSIC PANGAEA: A GLOBAL VIEW OF ENVIRONMENTS AND RESOURCES (International Symposium), Calgary, Alberta, Canada. (Dr. Benoit Beauchamp or Dr. Ashton Embry, Geological Survey of Canada, 3303 33rd St. NW, Calgary, Alberta T2L 2A7, Canada. Phone: (403) 292-7190; telefax: (403) 292-4961)

◆◆◆ August 23-29

GEOMORPHOLOGY (3rd International Conference), Hamilton, Ontario, Canada. (3rd International Geomorphology Conference, Department of Geography, McMaster University, Hamilton, Ontario L8S 4K1, Canada. Phone: (416) 525-9140, ext. 4535; telefax: (416) 546-0463; E-mail: GEOMORPH)

◆◆◆ August 23-29

COASTAL SEDIMENTOLOGY (Meeting), Hamilton, Ontario, Canada. (William F. Tanner, Dept. of Geology B-160, Florida State University, Tallahassee, FL 32306, USA) Phone: 904/644-3208)

◆◆◆ August 28-September 15

LANDSLIDES (International Meeting and Workshop), Czech and Slovak Federal Republic. (ICFL-C.S. Landslides '93, c/o NOVOSAD IG/EG, I. Sekaniny 1801, CS-70800 Ostrava 4, Czechoslovakia. Phone: (42-69) 473028; telefax: (42-2) 381848)

► September 1993

◆◆◆ September 5-11

NUCLEAR-WASTE MANAGEMENT, int'l mtg., Prague, Czech and Slovak Federal Republic, by American Society of Mechanical Engineers. Czech and Slovak Mechanical Engineering Society, and the Czech and Slovak Nuclear Society. (Radovan Kohout, Ontario Hydro (H11 A2), 700 University Ave., Toronto, Ontario M5G 1X6. Phone: 416/592-5384. Fax: 416/592-4485)

◆◆◆ September 6-8

STRUCTURES AND TECTONICS AT DIFFERENT LITHOSPHERIC LEVELS (International Conference), Graz, Austria. (Wolfgang Unzog, Department of Geology, University of Graz, Heinrichstrasse 26, A-8010 Graz, Austria. Phone: 43 316 380 5584; telefax: 43 316 38 28 85)

◆◆◆ September 8-13

JURASSIC GEOLOGY (Arkell International Symposium), London, UK. (Dr. Stewart Brown, Conference Secretary, Petroleum Science and Technology Institute, 25 Ravelston Terrace, Edinburgh EH4 3EX, UK. Phone: 031 451 5231; telefax: 031 451 5232)

◆◆◆ September 8-17

LAYERING IN IGNEOUS COMPLEXES - WAGER AND BROWN 25th ANNIVERSARY COMMEMORATIVE MEETING (Symposium), Johannesburg, South Africa. (Professor R. Grant Cawthorn, Department of Geology, University of the Witwatersrand, P.O. Wits 2050, Republic of South Africa. Phone: 11 716 2711 or 2608; telefax: 11 339 1697 or 430 1926)

◆◆◆ September 14-16

AFRICAN GEOLOGY (16th International Colloquium), Ezulwini, Swaziland. (The Chairman or Secretary, Organizing Committee, 16th Colloquium of African Geology, P.O. Box 9, Mbabane, Swaziland. Phone: 42411; telefax: 45215; telex: 2301 WD; telegram: GSM)

◆◆◆ September 21-23

ANDEAN GEODYNAMICS (2nd International Symposium), Oxford, UK. Sponsored by University of Oxford and Institut Francais de Recherche Scientifique pour le Développement en Coopération (Orstom). (Pierre Soler, ISAG 93, Orstom, CS1, 213 rue Lafayette, 75480 Paris Cedex 10, France. Telefax: 33 1 48 03 08 28)

◆◆◆ September 25-October 1

INTERNATIONAL ASSOCIATION OF VOLCANOLOGY AND CHEMISTRY OF THE EARTH'S INTERIOR (Meeting), Canberra, Australia. (IAVCEI ACTS, GPO Box 2200, Canberra ACT 2601, Australia. Phone: 61 6 257-3299. Fax: 61 6 257-3256)

◆◆◆ September 27-30

ENVIRONMENTAL BIOGEOCHEMISTRY (11th International Symposium), Salamanca, Spain. (Dr. J.F. Gallardo Lancho, I.E.T./CSIC, Aptdo. 257, Salamanca 37071, Espana, Spain. Phone: (923) 219606; telefax: (923) 219609)

◆◆◆ September 27-29

GLOBAL BOUNDARY EVENTS (Interdisciplinary Conference of IGCP Project 293, Geochemical Marker Events in the Phanerozoic), Kielce, Poland. (Barbara Studencka, Muzeum Ziemi PAN, Al. Na Skarpie

20/26, 00-488 Warszawa, Poland. Phone: (4822) 217-391; telefax: (4822) 297-497. Or Helmut H.J. Geldsetzer, Geological Survey of Canada, 3303-33rd St. NW, Calgary, Alberta T2L 2A7, Canada. Phone: (403) 292-7155; telefax: (403) 292-5377)

◆◆◆ September 28-October 1

ENVIRONMENTAL POLLUTION (International Conference), Barcelona, Spain. (ICEP Conference Office, ICTR Secretariat, 11-12 Pall Mall, London SW1Y 5LU, UK. Phone: 44 71 930-6825; telefax: 44 71 976-1587; telex: 925312 REICO)

▶ October 1993

◆◆◆ October 4-9

BASIN INVERSION (International Conference), Oxford, UK. (James G. Buchanan, British Gas Exploration and Production Limited, 100 Thames Valley Park Drive, Reading, Berkshire RG6 IPT, UK. Phone: 0734-353222; telefax: 0734-353484; telex: 846231)

◆◆◆ October 10-15

INTERNATIONAL ASSOCIATION FOR MATHEMATICAL GEOLOGY (Silver Anniversary Meeting), Prague, Czechoslovakia. (John C. Davis, Kansas Geological Survey, University of Kansas, Lawrence, KS 66047, USA. Phone: (913) 864-3955; telefax: (913) 864-5317; E-mail: john_davis.moore_@msmail.kgs.ukans.edu. Europe, Africa, and Asia: Jan Harff, Institute for Baltic Sea Research, Seestr. 15, 0-2530 Warnemuende, Germany. Phone: 49 381 58 261; telefax: 49 381 58.336; E-mail: harff@geologie.io-warnemuende.dbp.de)

◆◆◆ October 11-24

INTERGEMS '93 (2nd International Symposium on Precious and Decorative Stones), Prague, Czechoslovakia. Sponsored by Czech and Slovak Geological Services and Museums. (Secretariat INTERGEMS, Malostranske nam. 19, CS-11821 Praha 1, Czechoslovakia. Phone: 535 357; telefax: 533 564)

◆◆◆ October 17-20

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (International Meeting), The Hague, The Netherlands. (AAPG, Box 979, Tulsa, OK 74101, USA. Phone: (918) 584-2555; telefax: (918) 584-0469)

◆◆◆ October 18-23

NEW DEVELOPMENTS IN GEOTHERMAL MEASUREMENTS IN BOREHOLES (Meeting), Klein Koris, Germany. (Prof. E. Hurtig, GFZ Potsdam, Telegrafenberg A45, 0-1561 Potsdam, Germany. Phone: 49 331 310 347; telefax: 49 331 310 610; E-mail: gth@gfz-postsdam.dbp.de)

◆◆◆ October 25-28

GEOLOGICAL SOCIETY OF AMERICA (Annual Meeting), Boston, Massachusetts, USA. (Vanessa George, GSA, P.O. Box 9140, Boulder, CO 80301, USA. Phone: (303) 447-2020)

▶ November 1993

◆◆◆ November 15-30

LOW TEMPERATURE METAMORPHISM: PROCESSES, PRODUCTS AND ECONOMIC SIGNIFICANCE (IGCP Project 294 Thematic Meeting), Santiago, Chile. (Professor M. Vergara, Universidad de Chile, Departamento de geologia y Geofisica, Casilla 13518-Correo 21 Santiago, Chile. Telefax: 56 2-6963050)

1994

◆◆◆ June 6-10

EUROPEAN ASSOCIATION OF EXPLORATION GEOPHYSICISTS (56th Annual Meeting and Exhibition), Austria Center, Vienna, Austria. (Evert Van der Gaag, Business Manager, European Association of Exploration Geophysicists, Utrechtseweg 62, NL-3704 HE Zeist, the Netherlands. Phone: (03404) 56997; telefax (03404) 62640; telex:33480)

1995

◆◆◆ May 29-June 2

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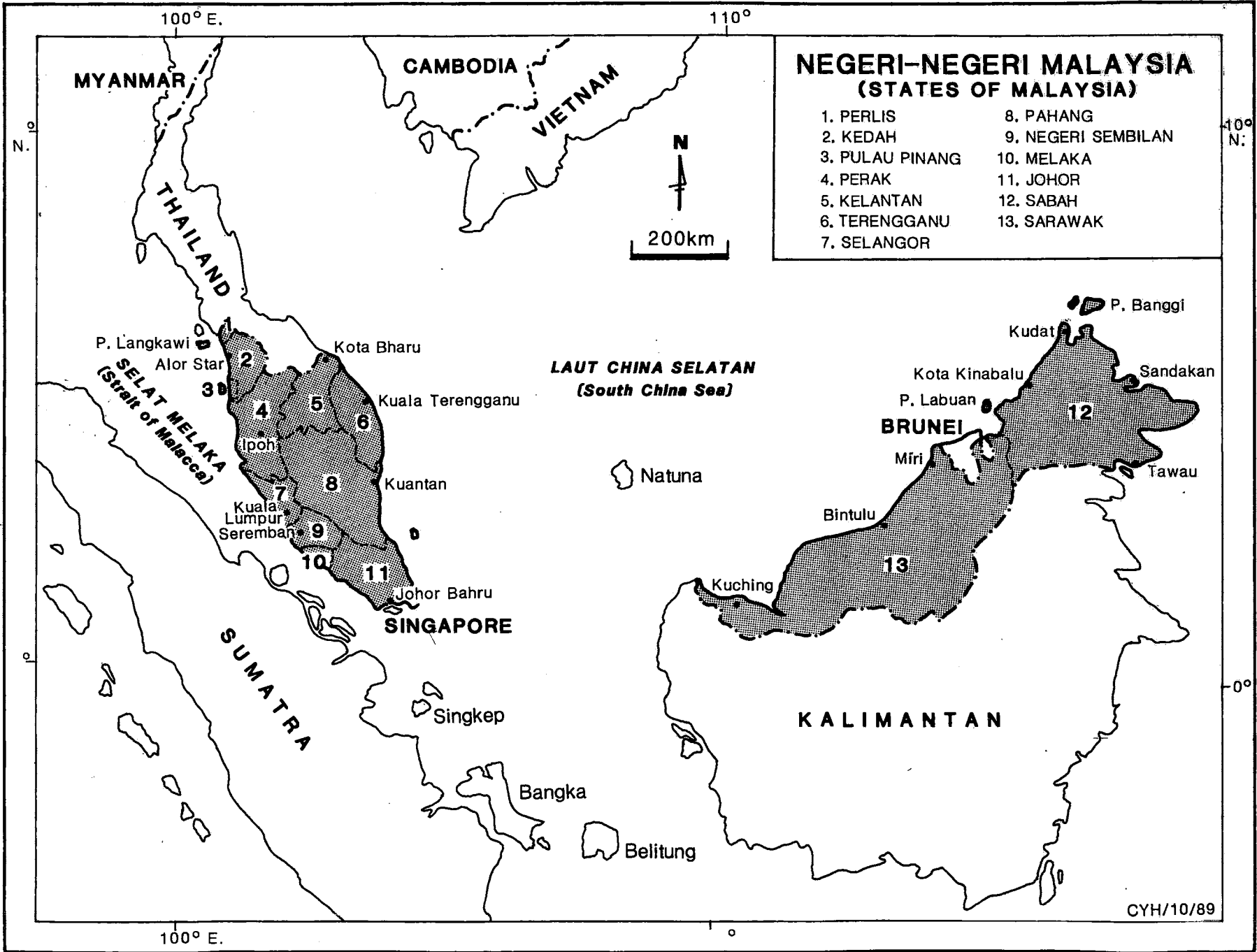
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