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Warta Geologi (Newsletter of the Geological Society of Malaysia) is published quarterly by the Society. Warta Geologi covers short geological communications and original research, as well as reports on activities and news about the Society. It is distributed free-of-charge to members of the Society. Further information can be obtained from:

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CATATAN GEOLOGI GEOLOGICAL NOTES

Barremian-Aptian radiolaria from Chert-Spilite Formation, Kudat, Sabah

WAN NURSAIEDAH WAN ISMAIL*, SANUDIN HJ. TAHIR & BASIR JASIN

Program of Geology, School of Science and Technology, Universiti Malaysia Sabah, 888999 Kota Kinabalu, Sabah *Email address: wnursaiedah@gmail.com

Abstract: Radiolarian chert in study area is from ophiolitic rocks association and occurs as alternate thin layer with siliceous shale. The radiolaria were retrieved from their siliceous matrix with hydroflouric acid before analyzed using optical microscope and scanning electron microscope. Several species of radiolarian were identified and their age ranging from Barremian to Aptian (Early Cretaceous). Geochemical analysis of radiolarian chert shows very high silica content (>70%) followed by Fe₂O₃ as the second most abundant element. The result indicates that the radiolarian chert is from basalt association. The low content of CaO suggests that the chert were deposited below calcite compensation depth. Other elements such as Al₂O₃, TiO₂, Na₂O, MgO, MnO and P₂O₅ are less than 3%. The three major elements Fe₂O₃, Al₂O₃ and TiO₂ are used for interpreting the environment of chert deposition based on diagram of Murray, which suggests that the chert was deposited on ocean crust and their occurrence as thinly bedded chert indicates that the material was episodically transported by weak turbidity current.

Keywords: chert, radiolaria, micropaleontology, Sabah, Early Cretaceous

INTRODUCTION

Radiolarian chert at Bukit Pangaraban, Kudat (Figure 1) is related to the ophiolite association. The ophiolite association is comprising of diabase, basalt, lava pillow and spilite overlain by radiolarian chert. The association represents oceanic crust sequence of basic and ultrabasic rocks. The radiolarian chert has been studied by previous researchers (Basir *et al.*, 1985; Basir and Sanudin 1988; Basir, 1990). The aim of this paper is to review the taxa of radiolarian in the chert and to interpret the environment of deposition based on geochemical data.

PALEONTOLOGY OF RADIOLARIA

Five samples (K1-K5) were taken from a quarry at Bukit Pangaraban. The samples were crushed into 0.5 cm fragments. The radiolaria were retrieved from the rocks using hydroflouric acid technique (Pessagno and Newport, 1972). The residue was washed with hydrogen peroxide to remove the remaining matrix. The decanting and counting of fossils were done using an optical microscope and the microphotographs of their morphology were taken using a scanning electron microscope. The stratigraphic distribution of the radiolaria indicates that the cherts in Kudat are ranging from Barremian to Aptian in Early Cretaceous (124-113 Ma).

The samples from Bukit Pangaraban yielded a number of individual taxa. The most common species are *Thanarla*

pacifica, *Dictyomitra communis*, *Pseudoeucyrtis hanni* and *Podobursa typical*. This indicates that the age of the cherts is ranging from Barremian to Aptian (Basir, 2000). Microphotographs of radiolaria are shown in Figure 2.

GEOCHEMICAL ANALYSIS

Major elements compositions of five chert samples (K1-K5) were analysed using X-ray fluorescence method. The results are shown in Table 1. Generally, all the samples contain a high percentage of SiO_2 followed by Fe_2O_3 and Al_2O_3 . Three primary elements (Fe_2O_3 , Al_2O_3 and TiO_2)

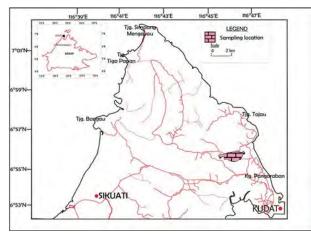


Figure 1: Sample locality in Kudat, Sabah.

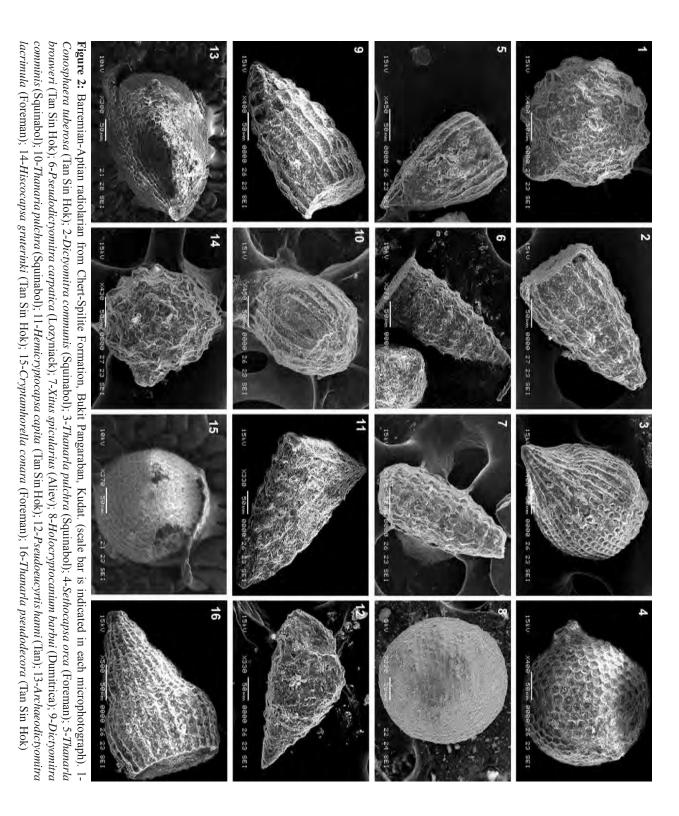


Table 1 : Major elements compositions of chert samples K1-K5 from	Kudat,	Sabah.
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	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	MgO	CaO	Na ₂ O	K ₂ O	MnO	P_2O_5	LOI	Total
K1	91.50	2.30	2.97	0.15	0.35	0.05	0.50	0.52	0.02	0.01	1.60	99.97
K2	91.60	2.11	2.96	0.18	0.34	0.04	0.48	0.56	0.09	0.01	1.80	100.17
K3	92.52	2.55	1.80	0.20	0.34	0.05	0.50	0.35	0.02	0.03	1.81	100.17
K4	92.33	2.90	1.80	0.10	0.35	0.02	0.59	0.58	0.02	0.04	1.80	100.53
K5	92.19	2.98	1.72	0.19	0.33	0.02	0.50	0.55	0.01	0.03	1.90	100.42

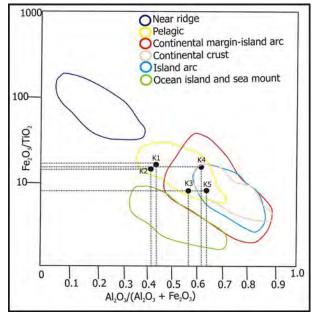


Figure 3: Geochemical data of chert plot on Fe_2O_3/TiO_2 vs $Al_2O_3/(Al_2O_3+Fe_2O_3)$ discrimination diagram of Murray (1994).

are used to interprete the deposition environment for chert by Murray (1994).

ENVIRONMENT OF DEPOSITION

The ophiolitic rocks association and the geochemical data indicates that the chert from Kudat was deposited on oceanic crust. Geochemical data from the chert were plotted on the Fe_2O_3/TiO_2 vs $Al_2O_3/(Al_2O_3+Fe_2O_3)$ discrimination diagram of Murray (1994). All

sample points are located on pelagic domain (Figure 3), suggesting that the depositional environment was deep oceanic environment near the spreading centre. The occurrence of siliceous beds of cherts indicates the presence of hemipelagic argillaceous material that was transported episodically by weak turbidity currents into the environment.

CONCLUSION

The age of radiolarian chert from Bukit Pangaraban, Kudat is ranging from Barremian to Aptian. The ophiolitic chert in the study area represents the oceanic crust that was formed during Early Cretaceous and this association represents the oldest rocks in Sabah.

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Retirement Lecture No. 4

Groundwater contributions in times of drought - Role of JMG

Mohammed Hatta B. Abd. Karim (Minerals and Geoscience Department, JMG)

13 August 2014

Department of Geology, University of Malaya

The talk on Groundwater was presented by Sdr. Mohammed Hatta B. Abd. Karim (JMG) on 13th August, 2014, at Department of Geology, University of Malaya, Kuala Lumpur.

This talk is the 4th in the series of Retirement Lectures initiated in 2006, with the objective of capturing retirees/ imminent retirees to talk on their life-time work experience and expertise.

Sdr Hatta presented a comprehensive view of JMG's role in the investigations of groundwater resources in the country, and provisions of such resources in places that require them badly, especially in times of drought/dry seasons. Groundwater potential maps for all the states, detailed analyses and monitoring of water qualities, R&D including groundwater modelling, etc. are some of the various scopes of works conducted by JMG. These data base and publications are all accessible to the general public and other government agencies, such as the Water Works departments.

As usual, lively discussions followed the presentation.

We thank Sdr Hatta for his contribution to the Society's activities, and in reactivating the Retirement Lectures series which has been dormant for a while. We also wish him joy and happiness in his retirement years ahead.

Tan Boon Kong,

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

CERAMAH TEKNIK TECHNICAL TALK

Occurrence of Early Eocene to Middle Eocene planktic foraminifera from bedded shale at the Suang Pai quarry, Kudat, Sabah: A preliminary interpretation Junaidi Asis (UMS)

Effects of moisture and clay minerals on the strength of soil along Kota Belud – Ranau Road, Tamparuli, Sabah

Mohd Ali Yusuf (UMS)

16 May 2014, School of Science & Technology, UMS

Technical talk series 1 (Sabah zone) was held on the 16th May 2014 at the Bilik Mesyuarat Utama (BMU), Faculty of Science and Natural Resources (FSSA-Fakulti Sains dan Sumber Alam), Universiti Malaysia Sabah (UMS), organized in collaboration with the Geological Society of Malaysia (GSM) and the FSSA, UMS. The technical talk was officiated by the Dean of FSSA, UMS, Assoc. Prof. Dr. Baba Musta, followed by opening from Mr. Rodeano Hj. Roslee, GSM-regional representative of Sabah zone.

Technical talk series 1 (Sabah zone) is aimed to provide a platform for discussing the current geosciences research conducted in Sabah, Malaysia. This event attracted participants from various government agencies namely the Mineral and Geosciences Department of Malaysia (JMG), Meteorological Department of Malaysia (JMM), Department of environmental protection of Sabah (JAPAS), Kota Kinabalu City Hall (DBKK), Public Works Department of Sabah (JKR), Environment Department of Malaysia (JAS), as well as researchers, academicians and students from UMS.

PERTEMUAN PERSATUAN (MEETINGS OF THE SOCIETY)

Two technical papers were presented by Sdr. Junaidi Asis (UMS) and Sdr. Mohd Ali Yusuf Mohd Husin (UMS).

Sdr. Junaidi Asis has presented a paper entitled "Occurrence of Early Eocene to Middle Eocene planktic foraminifera from bedded shale at the Suang Pai quarry, Kudat, Sabah: a preliminary interpretation". In this research, four samples of shale from the Suang Pai quarry, Kudat, Sabah have been collected and processed according to micropaleontological technique. Sdr. Junaidi found that all samples contain an abundance of planktic and benthic foraminifera. A total of sixteen taxa of planktic foraminifera have been identified and eleven selected species are used for age determination. He concluded that the planktic foraminiferal assemblage represents an age of Ypresian to Bartonian (Early Eocene to Middle Eocene). The age and characteristic of the shale unit can be interpreted as part of the Crocker Formation.

Sdr. Mohd Ali Yusuf Mohd Husin has presented a paper entitled "Effects of moisture and clay minerals on the strength of soil along Kota Belud – Ranau Road, Tamparuli, Sabah". The main objective of the study is to determine the effects of moisture, mineral and microstructure on the strength of soil. In this research, the soil samples were collected from the major road of Kota Belud – Ranau, Sabah. Moisture analysis was applied by using manipulation of Unconfined Compression Test by treating the samples with 5% of increment and decrement of moisture from the optimum moisture content. The analysis yielded the strength of soil ranges from 50.5 kPa to 131 kPa for optimum moisture, 20.5 kPa to 50 kPa for 5% increment and 98 kPa to 210.5 kPa for 5% decrement. He found that the sandy soil have a higher shear strength when subjected to less moisture and clay soil have a lower shear strength when more moisture is added. As a conclusion, this research shows that effect of moisture is characterize by the mineral and microstructure properties of the sample and it has a direct impact on the shear strength of soil.

The presentation by the two speakers was followed by a question and answer session. The technical talks received a very good response from the 38 participants. Closing remarks and a summary of the technical talk were given by Mr. Rodeano Roslee. Besides that, token of appreciation were delivered to the presenters by Prof. Dr. Sanudin Hj. Tahir.

Rodeano Roslee

Regional Presentatives of GSM (Sabah zone), Universiti Malaysia Sabah



Pentafsiran sub-strata dan penentuan potensi akuifer dalam batuan sedimen Kumpulan Dent, Lahad Datu Sabah dengan menggunakan kaedah geofizik gunaan

Hardianshah Saleh (UMS)

6 June 2014

School of Science & Technology, UMS

Technical talk series 2 (Sabah zone) was held on the 6th June 2014 at the Bilik Seminar, Faculty of Science and Natural Resources (FSSA-Fakulti Sains dan Sumber Alam), Universiti Malaysia Sabah (UMS), organized in collaboration with the Geological Society of Malaysia (GSM) and the FSSA, UMS. The technical talk was officiated by the Mr. Rodeano Hj. Roslee, GSM-regional representative of Sabah zone.

The aim of the technical talk is to provide a platform for discussing the current geosciences research conducted in Sabah, Malaysia. This event attracted participants from various government agencies, namely the Mineral and Geosciences Department of Malaysia (JMG), Meteorological Department of Malaysia (JMM), Department of environmental protection of Sabah (JAPAS), Kota Kinabalu City Hall (DBKK), Public Works Department of Sabah (JKR), Environment Department of Malaysia (JAS), as well as researchers, academicians and students from UMS. The technical talk was presented by Sdr. Hardianshah Salleh (UMS).

Sdr. Hardianshah Salleh talk entitled "Pentafsiran sub-strata dan penentuan potensi akuifer dalam batuan sedimen Kumpulan Dent, Lahad Datu Sabah dengan menggunakan kaedah geofizik gunaan". In this research, correlation of the interpreted VES, ERI, and IP with the lithologic logs from the borehole sections in the study area produced seven geo-electrical profiles and labelled as S1 (in Sebahat Formation area), G1, G2, G3, G4, G5 (in Ganduman Formation area) and T1 (in Togopi Formation area). He found that the Ganduman Formation consists of four different lithologic layers with variable thicknesses. The first layer representing topsoil, the second layer representing thick sandstone layer partly associated with clay and calcareous lenses, the third layer representing mudstone layer and the fourth layer representing sandstone layer. Meanwhile, the Togopi Formation consists of topsoil layer, followed by clay and sandstone layers with fractured limestone blocks. Results of the study indicate that the Sebahat Formation dominated by aquitard and aquiclude layers. As conclusions, a good aquifer layers was interpreted was formed in thick sandstone layer in Ganduman Formation and limestone with sandy layer in Togopi Formation.

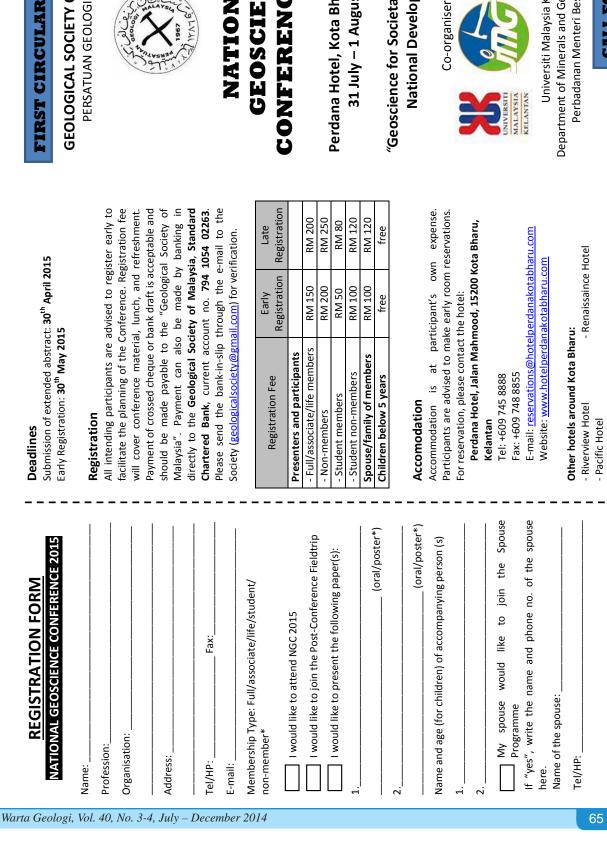
The presentations were followed by a question and answer session. The technical talks were well received and attended by 35 participants. Closing remarks and a summary of the technical talk were given by Mr. Rodeano Roslee. Besides that, token of appreciation was also delivered to the presenters by him.

Rodeano Roslee

Regional Presentatives of GSM (Sabah zone), Universiti Malaysia Sabah



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GEOLOGICAL SOCIETY OF MALAYSIA PERSATUAN GEOLOGI MALAYSIA



CONFERENCE 2015 **GEOSCIENCE** NATIONAL

Perdana Hotel, Kota Bharu, Kelantan **31 July – 1 August 2015** 'Geoscience for Societal Benefits and National Development $^{\prime\prime}$



Department of Minerals and Geoscience Malaysia Perbadanan Menteri Besar Kelantan Universiti Malaysia Kelantan

GEOLOGICAL SOCIETY OF MALAYSIA TIONAL GEOSCIENCE CONFERENCE 2015 PERSATUAN GEOLOGI MALAYSIA

announce that the National Geoscience Conference 2015 (PMBK). NGC 2015 is co-organised by Universiti Malaysia Kelantan event in Malaysia, which is well-attended by geoscientists August 2015. The Conference is the premier geoscientific the Perdana Hotel, Kota Bharu, Kelantan from 31 July to 1 (NGC 2015), 28th in the annual conferences, will be held at The Geological Society of Malaysia (GSM) is pleased to (UMK), the Department of Mineral and Geoscience (JMG) from academia as well as the public and private sectors. Malaysia, and Perbadanan Menteri Besar Kelantan

National Development" Theme: "Geoscience for Societal Benefits and

becoming more and more frequent. Geoscience can play a urbanization, industrialization and deforestation, are and hazards due to anthropogenic factors, be more innovative rather than peripheral development, but the time has come for Geoscientists to always contributed role in understanding and mitigating all these issues. It has discoveries. Natural hazards continue to be unpredictable gradually depleting without significant additions of new Natural resources – such as fossil fuels and minerals - are developing and underdeveloped countries are facing to be understood properly before proposing mitigation change and global warming are other big issues which be synchronized with environmental issues. Climate industrial growth for creation of employment, this has to multifarious. While we are now assuring a sustained Challenges of the 21st Century are numerous and measures. Provision of safe drinking water to every have gained global significance in this Century and needs household is another challenge that most of the to the society and national and like

Programme

Student Session (Undergraduate Seminar). Post-NGC 2015 Fieldtrip to several sites in Kelantan and a national and international interest. There will be a one-day keynote speakers on topics relevant to the theme and of related to the theme. Presentations will be delivered by poster presentations on all aspects of geoscience, mainly The technical programme of NGC 2015 consists of oral and

Call for Papers

benefit of the country and future generations. knowledge, ideas, experiences, and expertise for the poster presentations. So, please come and share your submit more than one papers, but the Organizing Once again, we seek your support to ensure the success of first author for oral presentations, while the rest will be for Committee has the right to select only one paper by any Malaysia for the Technical Sessions. Contributors may papers on original research either in English or Bahasa NGC 2015 in Kelantan. Participants are invited to present

abstract (s) to one of the following addresses: participants of NGC 2015. Please send your extended and/or tables and at least 3 references. All accepted should be between 500 - 750 words, up to 3 figures submit an extended abstract(s). An extended abstract Those who would like to present paper(s) are required to extended abstracts will be distributed to all presenters and <u>eologicalsociety@gmail.com</u> (GSM) <u>secretariat.ngc2015@gmail.com</u> (UMK)

Post-NGC 2015 Field Trip

Charges: RM 70 per person Date Number of participants: Maximum 30 Location: 1. Some flood-impacted areas, Kuala Krai : 2 August 2015 (Sunday) 2. Gunung Stong

Seminar) Student Session (Undergraduate Student

Location: Perdana Hotel, Kota Bharu, Kelantan Date : 1 August 2015 (Saturday)

conventional.

atmosphere in the seminar. Prizes will be given to three all over Malaysia and possibly some other countries to Undergraduate Student Seminar as a part of the NGC Committee will provide a Student Session which is an students will meet fellow Geoscience/Geology students participate in this one-day seminar to share their ideas, best presenters each for oral and poster presentations. knowledge and research by presenting their papers. The 2015. We will accommodate Geoscience/Geology students For the first time in the history of NGC, the Organizing from various universities and engage in a professional-like

Spouse Programme

Number of participants: Maximum 30 Date Location: Tax-free market and Masjid Beijing, Rantau : 1 August 2015 (Saturday) Panjang

Charges: RM 20 For inquiries, please contact

E-mail: secretariat.ngc2015@gmail.com UMK Jeli Campus, Locked Bag No.100 Geoscience Programme National Geoscience Conference 2015 (NGC 2015) Tel: 09-947 7155 HP: 016-304 8860 Fax: 09-947 7032 17600 Jeli, Kelantan, Malaysia Universiti Malaysia Kelantan Secretariat Faculty of Earth Science

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UPCOMING EVENTS

April 15-17 2015: SEAPEX 2015: For the Industry: By the Industry, Singapore. Contact: peter.woodroof@ petrofac.com or chris.howells@tgs.com. Website: www.seapexconf.org

April 16 - 17 2015: AAPG Fractured Reservoirs: Geological, Geophysical and Engineering Tools to Crack Them. Sicily, Italy. https://europeevents.aapg.org/ ehome/94905/sicily2015/AbstractSubmission/

April 27 - 29 2015: AIPG 2015 - The Expanding Wolrd of Uncoventional Shale Hydrocarbon Resources. Worthington, Ohio. http://www.aipg.org/

April 29 2015: Global Mining Water Management Congress 2015. Denver, Colorado, USA. http://www. cim.org/en/News-and-Events/Events/EventsList/2015/4/ GlobalMiningWaterManagementCongress2015.aspx

May 10 - 13 2015: CIM - Canadian Institute of Mining, Metallurey and Petroleum Annual Convention, Montreal, Quebec. http://convention.cim.org/

May 10 - 13 2015: International Society for Rock Mechanics (ISRM) 13th International Congress on Rock Mechanics: Innovations in Applied and Theoretical Rock Mechanics, Montreal, Canada. http://www. isrm2015.com/

May 11 - 15 2015: 36th International Symposium on Remote Sensing of Environment "Observing the Earth, Monitoring the Change, Sharing the Knowledge". Berlin, Germany. http://www.isrse36.org/

May 17-19 2015: 18th Asia Oil & Gas Conference. Contact: email: aogc@icep.com.my

May 19 - 21 2015: Global Soil Security Symposium, Texas A&M University, College Station, Texas, USA. https://www.soils.org/meetings/global-soil-security

May 25 - 28 2015: Asia Mining Congress. Suntec City, Singapore. http://www.cim.org/en/News-and-Events/ Events/EventsList/2015/5/AsiaMiningCongress2015. aspx

May 25 - 29 2015: International conference on groundwater vulnerability, Ustron, Poland. http://khgi. wnoz.us.edu.pl/vulnerability.html

May 31 - 3 June 2015: AAPG 2015 Annual Convention & Exhibition. Denver, Colorado, USA. http://ace.aapg. org/2015

June 2-4, 2015: Asian Oil, Gas & Petrochemical Engineering Exhibition, Kuala Lumpur, Malaysia. Website: www.oilandgas-asia.com

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June 9 - 10 2015: International Workshop on Supporting Future Earth with Geo-information, Beijing, China. http://ngcc.sbsm.gov.cn/article/isprs_cn/

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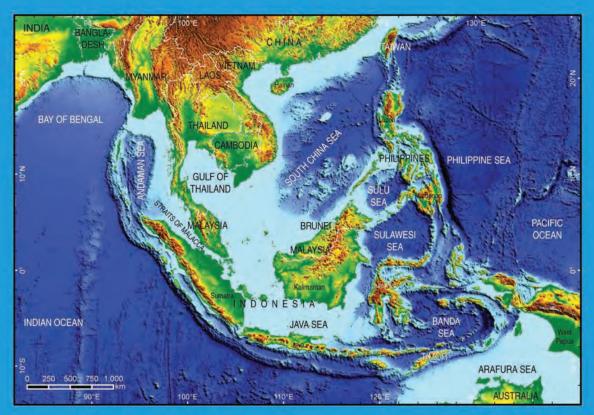
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