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Cover photo by Joanes bin Muda, JMG Sabah (first prize winner of GSM photo competition 2009)
Stepped Shore Platform — Steeply dipping sandstone/mudstone beds (Tajau member of Kudat Fm.) eroded by waves, Kudat, Sabah
Thermal conductivity values of some sandstones and shales from the Belait Formation

Masnan, M.S., Padmanabhan, E., Mokhtar, M.A., Rajamohan, G., & Prasanna, V.

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2 Department of Mechanical Engineering, Curtin University of Technology, Miri, Sarawak.
3 Current address: Petroleum and Geosciences Department, Universiti Teknologi Petronas, Bandar Seri Iskandar, 31750 Tronoh, Perak Darul Ridzuan

Abstract — The Belait Formation has been found to mainly consist of alternating sandstone and shale with conglomerate as the basal unit. There are five main facies that could be classified in the Belait Formation: 1) sandstone, 2) sandstone with clay drapes, 3) sandstone with carbonaceous material, 4) shale, and 5) conglomerate. Thermal conductivity analysis was done on the rock samples to understand the heat transfer between different rock facies. Apart from that, understanding the thermal conductivity characteristics enhances basin modeling and reservoir characterization. The general objective of this study was to estimate the thermal conductivities of rocks belonging to the Belait Formation and to link this information to the properties any possible signature trends that might bench mark the Formation. The study shows that there is an inverse relationship between the thermal conductivity and petrophysical properties such as porosity and particle size. The sedimentary rocks of the Belait Formation tend to have thermal conductivity values that are controlled by the internal fabric of the rocks. The relationship between thermal conductivity, porosity and particle size suggests that the trend line may be a unique signature for the Belait Formation.

INTRODUCTION

Liechti et al. (1960) stated that the Belait Formation mainly consisted of alternative sandstone with different proportion and thickness of sand and clay. These authors interpreted that the depositional setting to be a secluded basin in filled by material form deltaic-paralic and littoral sediment. The environmental changed from a deltaic-paralic environment and gradually developed into shallow marine and into fully marine environment. Belait Formation gradually merges the marine Lambir or Miri Formation (Liechti et al., 1960).

Mailvaganan (1974) stated that three different Formations (Belait, Lambir and Argillaceous Setap) were found in the Marudi area and described them on the basis of sandstone-shale ratios, the topography and depositional environment setting. Mailvaganan (1974) concluded that the Belait Formation has a 60:40 ratio of sandstone to shale and siltstone. Lambir Formation has a 40:60 ratio of sandstone to shale and siltstone and occurs in the lower elevations of Marudi area (Mailvaganan, 1974). The depositional environment for both Belait and Lambir Formation were interpreted to be tidal flats or estuaries environment. The Lambir Formation was deposited under marine influence. The Setap Formation is interpreted to have been deposited under shallow marine condition. Recent updates on the Cenozoic basins are given by Koopman (in Sandal, 1996) and an excellent account of the geology of NW Borneo has been given by Hutchison (2005).

Based on the above, it is evident that the distinction between the Lambir and Belait Formations has become somewhat arbitrary. Furthermore, it appears that spatial variability exists in this area and that arbitrary distinctions between two types of Formations may not be a suitable way to cater for this variability.

The thermal conductivity of the different rock facies is very important especially in oil and gas exploration. Knowledge of the thermal conductivity and the local geothermal gradient would provide the basis for a proper understanding of the behaviour/response of rocks or facies at a certain depth to geophysical exploration methods. Identification of potential source rocks, predicting the depth at which the source rock would be mature and predicting the properties of hydrocarbon (gas or oil) would be facilitated once the thermal conductivity is known. The viscosity, in the reservoir would also be possible if the thermal conductivity values were known. The thermal conductivity of rocks provides also an indication of the pressure, temperature and to some extent the volume of the fluid in the subsurface. Therefore, the thermal conductivity of different rock facies in Belait Formation could be of significant value in oil and gas exploration.
Masnan, M.S., E. Padmanabhan, Mokhtar, M.A., Rajamohan, G. & Prasanna, V.

Thermal conductivity of a rock is a function of the mineralogy, fabric/structure and conductivity mechanism of a specific rock (Clauser & Huenges, 1995). In sedimentary rocks, the paramount factors that would influence the thermal conductivity are porosity and anisotropy. Higher porosity causes lower thermal conductivity. This is attributed to lower thermal conductivity of air and other fluids like water and hydrocarbon that infill the pores of rock compared to the minerals. Consequently, a range of values have been reported (Birch 1966; Čermák & Rybach 1982; Haenel et al. 1988; Clauser & Huenges 1995; Clauser 2006).

Many methods have been developed to estimate the effective thermal conductivity of unsaturated porous rocks (Woodside & Messmer, 1961, Cosenza et al., 2003; Kohout et al., 2004, Gruescu et al., 2007; and Giraud et al., 2007). These models suffer from some weaknesses such as the general inability to establish relationships between electrical parameters and the effective thermal conductivity of the porous material.

Therefore, the general objective of this study was to estimate the thermal conductivities of rocks belonging to the Belait Formation. These estimates need to be evaluated to establish any possible signature trends that might assist in benchmarking the Belait Formation.

MATERIALS AND METHODS

The study area is located NE of Marudi, Sarawak (Figure 1). Samples were collected along several outcrops in what has been identified as the Belait Formation. Samples were trimmed down to orthogonal blocks for the thermal conductivity analyses.

Samples were air dried for 1 week before being cut into small orthogonal blocks of dimensions 5 x 2 x 5 cm. Estimation of the thermal conductivity was carried out by constantly supplying heat to the rock sample for 20 minutes using a heater set at 100 W. After 20 minutes, two temperature readings were taken, one on either side of the sample. Both of the temperatures were taken simultaneously on the rock sample using a thermocouple linked to a data-logger. The differences between the two readings were measured as ΔT. The distances between the positions of the two readings were measured as L. The area, A, of the rock that touches the heater was also measured. The thermal conductivity of the rock sample was calculated by using the formula shown below. As this technique is somewhat cheaper and simpler to utilize compared to traditional methods, some variations in results can be expected.

Thermal conductivity is denoted as k or λ, with measurement units of W m⁻¹K⁻¹ and represents the measure of heat flow per unit temperature gradient. The formula of thermal conductivity k and specific heat c is given below:

\[ J_Q = -k \nabla T \]

\[ Q = mc \Delta T \]

Based on these two equations, an equation was derived for thermal conductivity as shown below.

\[ Q = -k A \frac{\Delta L}{\Delta T} \]

\[ k = \frac{Q L}{A \Delta T} \]

Q = Heat flow across the material
K = Thermal conductivity of the material
A = Cross sectional area of the material
ΔT = Temperature different (t₂ - t₁)

RESULTS AND DISCUSSION

The Belait mainly consists of alternating sandstone and shale with conglomerate deposits as the basal unit. There are five main facies: 1) sandstone, 2) sandstone with clay drapes, 3) sandstone with carbonaceous material, 4) shale, and 5) conglomerate.

The results show that the thermal conductivity for the different facies and lithologies vary (Table 1). Generally, sandstones should have much higher thermal conductivity values compared to shales. One possible reason for this could be the mineralogy. Quartz in sandstones has higher conductivity compared to clay minerals. Thermal conductivity values are around 6.6 - 13 for quartz with mean values of 2.9 for clay minerals. However, since rocks are not homogeneous in terms of mineralogy, other minerals can also influence thermal conductivity. The thermal conductivity of pure sandstone, laminated sandstone-shale, ferruginous sandstone, sandstone with mud drapes and sandstone with mud clasts have different values (Table 1). Porosity and particle size of samples can also influence the thermal conductivity.

Thermal Conductivity versus Porosity

The results suggest that smaller particle sizes and lower porosities give high thermal conductivity values (Figure 2). Thermal conductivity drops steeply with...
increasing porosity up until porosity values of around 10%. Subsequently, the thermal conductivity appears to be fairly constant with increasing porosity. Considering the fact that the facies assemblage sequence present in this Formation is not generally seen in Lambir Formation or any stratigraphic time equivalent Formations in the vicinity, it is proposed that the trend line that approximates the distribution of the data could be a possible signature for the Belait Formation. More work needs to be done in order to verify if it is possible to separate this Formation from other Formations based on thermal conductivity.

The results may also provide an indication on type of overburden pressure experienced by these rocks. Variations in the thermal conductivity within a group of sandstones, siltstones or shales can also be explained by a possible reduction in porosity due to increase in overburden pressure and therefore, an increase in thermal conductivity. In general terms, it has been noted that the thermal conductivity of rocks in the Malay Basin increase with increasing burial depth (Wan Ismail Wan Yusoff, 1984).

**Thermal conductivity versus particle size**

Similar trends were observed when thermal conductivity was evaluated against porosity (Fig. 3). The thermal conductivity drops steeply between clay to silt size (0 - 0.05 mm). This reaffirms the current knowledge that argillaceous materials have high thermal conductivities. Wan Ismail Wan Yusoff (1988) made similar observations working with Late Miocene shales from the Malay Basin. Subsequent to the initial steep decrease, thermal conductivity decreases at a much slower rate until particle size approaches that of very fine sand (0.15 mm). The thermal conductivity remains fairly constant when the particle size is larger than very fine grain sand (> 0.15 mm). The data shows that clay, silt and sand tend to have different ranges of thermal conductivities.

These findings suggest that two rocks with same textural classification and porosities would have similar thermal conductivities. However, variations at the facies or subfacies level will change the thermal conductivity. Therefore, two rocks with the same thermal conductivity need not have the same internal fabric.

**CONCLUSIONS**

There is an inverse relationship between the thermal conductivity and petrophysical properties such as porosity and particle size. Sedimentary rocks of the Belait Formation tend to have thermal conductivity values that are controlled by internal fabric as the Formation has

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several facies and subfacies. Taking into considering the fact that the facies assemblage present in this Formation is not generally seen in Lambir Formation or any stratigraphic time equivalent Formations in the vicinity, it is proposed that the trend line that approximates the distribution of the data could be a possible signature for the Belait Formation. This proposal is preliminary and the ongoing research is aimed at verifying this proposal. Such variations are also important for basin modeling as well as reservoir characterization.

ACKNOWLEDGMENT

The authors gratefully acknowledge the critical review, comments and suggestions given by Prof. Em. Dr. C.S. Hutchison and the anonymous reviewer.

REFERENCES


Figure 2: Graph showing the relationship between thermal conductivity and rock porosity. A best fit line shows a steep decrease in thermal conductivity until a porosity of about 5%.

Figure 3: Graph showing the relationship between thermal conductivity and the particle size of. A best fit line shows three trends coinciding with three different particle size ranges.
LETTER TO EDITOR

The Northwest Sabah trough is currently inactive

Comment on Two Recent Articles in Geological Society of Malaysia Publications

H.D. Tjia

Email: hdtamsp@streamyx.com

Two recent articles by Mustaffa Kamal Shuib (2009) and Kessler (2009) in the Bulletin No. 55 and Warta Geologi Volume 35 (3) reproduced two separate figures attributed to Simons et al. 2007. The “Northwest Borneo Trench” is shown to possess active reverse faulting on its Sabah side. When the digital internet article of Simons et al. became available, in early 2008*, I wrote an email to the primary author noting that seismic sections of BGR (Bundesanstalt fuer Geowissenschaften und Rohstoffe, Hannover, Germany) across the “trench” do not show any disturbance for the essentially horizontal reflectors in the top most 0.6 second TWT of the “trench” fill. This is especially clear on the seismic line BGR86-06 (a copy is in the Petronas data archive). Furthermore, geoseismic sections across the NW Sabah Trough published by Hazebroek & Tan (1993, pp. 203-204) show similar undisturbed conditions of the upper trough-fill sequence.

The undisturbed top 0.6 s TWT sediment sequence on the Sabah side of the trough is estimated to represent “Pliocene to Recent” (basing on dated seismic sections published by Levell & Kasumajaya, 1985) and suggests strongly that no crustal movement had occurred during that period on the Sabah side of the trough. It is unlikely that movement had occurred since the seismic sections were shot in the early 1980s. Moreover, Simons et al. (and Kessler) tie up of the “NW Borneo Trench” with the West Baram Line is not supported by seismiticy. The epicenter of an MW 5.2 earthquake on 1 May 2004 did occur and is consistent with left slip on the Tubau Wrench fault, striking N-S and located more than 60 kilometres to the southwest of the West Baram Line (see Yan, A.S.W. Saim Suratman, Adam Liau et al. 2006).

* The email to W. Simons at Delft, The Netherlands, has yet to be replied to.

REFERENCES


How active are Sabah Trough and Baram Line?
A comment on a letter by H.D.Tjia, sent to the Geological Society of Malaysia

FRANZ L KESSLER
Email: franz@curtin.edu.my

Although the larger parts of the “Northwest Borneo Trench” are indeed seismically inactive, as rightfully stated by H.D.Tjia in his letter, there are certain areas (such as the “allochthonous sheet”) that may have seen activity up to the late Pliocene – the picture below being a 2008 model, based on Shell seismic.

The exact location, and width of the Baram Line have been a matter of debate. In Simons et al. (2007), some evidence for tectonic activity in the area of the Baram Line is presented. Though the MW 5.2 earthquake of 1 May 2004 may not be in itself conclusive, or even directly related to the Baram Line, the differential relative speed of GPS-based block movements (between areas of Sabah (Kota Kinabalu) and Sarawak (Bintulu), for instance) speaks a stronger language.

Somewhere between KK and Bintulu, contemporaneous compression and/or strike slip movements in the order of 1-3 mm/year have to be inferred.

With evidence that the axis of Baram Delta oilfields immediately East to the Baram Line have been bent from NE/SW to NW/SE (again Pliocene, possibly younger)- see Tan et al. (1999) - this phenomenon occurring near to the edge of the “Northwest Borneo Trench” – could be seen as further circumstantial evidence for young tectonic activity along the SW edge of the “Northwest Borneo Trench”, the so-called Baram Line.

In a nutshell, the “Northwest Borneo Trench” is predominantly inactive, but the SW boundary, the Baram Line, could be active.

REFERENCES
“Crafting Ideas for Challenging Discoveries”

PGCE

Petroleum Geology Conference & Exhibition 2010
Kuala Lumpur Convention Center
29 - 30 March, 2010
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<td>Recent Developments and Future Challenges In 3D Reservoir Modelling</td>
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<td>True amplitude seismic imaging beneath gas cloud using full waveform transmission deconvolution.</td>
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<td>William Ng, Tomas Van Hoek, William Wiiks, Peter Shiner and Charlie Lee (Shell)</td>
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| 11:55 – 12:20 am | Time-Depth Conversion Challenges in the Overpressure Environment, a Case Study from Caspian Sea  
                         Richard Swarbrick (GeoPressure), Rick Lahann (Indiana University), Stephen O’Connor (GeoPressure) and Jamal Hoesni (PRSB) |

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                         Patrick Ravaut, Jaffis Jaafar and Emile Renoux (Total) | Fitting Sumandak Stratigraphy into Sabah Regional Chronostratigraphic Framework  
                         Tongku Mohd Syazwan bin Tongku Hassan, Hamzah Bin Harun and Othman Ali Bin Mahmoud (PCSB) |

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<tr>
<th>Time</th>
<th>GEOPHYSICS Session 3</th>
<th>GEOLOGY Session 4</th>
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<tr>
<td>1:00 – 2:00 pm</td>
<td>LUNCH (sponsored by Mubadala Oil and Gas) Conference Halls 2 and 3</td>
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<tr>
<th>Time</th>
<th>Geophysics Paper 4</th>
<th>Geology Paper 4</th>
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| 2:00-2:25 pm | Unmasking the Crest, Imaging below Shallow Gas Using Prestack Q Depth Migration, Iront Barat Field, Malaysia  
                         Joseph Reilly, Raffaella Montelli Muhammad Firdaus Mohd Fuad, Lee Wansteeker, and George McKinley (ExxonMobil) | Updating Reservoir Models; Auditing, Updating and Rebuilding  
                         Stephen Tyson (UNSW) |

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<tr>
<th>Time</th>
<th>Geophysics Paper 5</th>
<th>Geology Paper 5</th>
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| 2:25 – 2:50 pm | The Importance of Including Overburden and Survey Illumination Effects in Reservoir Seismic Simulation  
                         Asmund Drottning, Isabelle Lecomte and Mike Branston (NORSAR) | Contrasting Dolomite Textures of Miocene Carbonate Platforms in Central Luconia, Sarawak, Malaysia  
                         Ruliaysyah and Bernard J. Pierson (UFP) |

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<tr>
<th>Time</th>
<th>Geophysics Paper 6</th>
<th>Geology Paper 6</th>
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| 2:50 – 3:15 pm | 3-D Tomographic Q Inversion for Compensating Attenuation Anomalies  
                         Kofeng Xin and Barry Hung (CGGVeritas) | Fractured Basement Characterization From Multi-Attributes Guided Integrated Continuous Fracture Modeling And Discrete Fracture Network Modeling  
                         M. Lefranc, A. Carrillat and A. Carnegie (Schlumberger) |
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<tr>
<th>Time</th>
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<tr>
<td>3:15 – 3:40 pm</td>
<td>Geophysics Paper 7&lt;br&gt;Removing Non-Stationary Artifacts from Seismic Velocity Data Sets by M-Factorial Kriging&lt;br&gt;Cédric Magnéron (Estimages), Jacques Doraïsmo and Matthieu Bourges (Geovariances)</td>
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<td>Geology Paper 7&lt;br&gt;Spatial Variability in The Belait Formation: Impact On Reservoir Characterization And Management Considerations&lt;br&gt;E. Padmanabhan (Curtin)</td>
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<td>3:40 – 4:00 pm</td>
<td><strong>TEA BREAK (sponsored by Murphy)</strong> Exhibition Hall Foyer at Level 3</td>
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<td><strong>GEOPHYSICS Session 5</strong>&lt;br&gt;Conference Hall 1&lt;br&gt;Theme: Seismic Interpretation&lt;br&gt;Session Chairmen: Realy Md Nor (PCSB) and Tony Weatherall (CGOVeritas)</td>
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<td><strong>GEOLOGY Session 6</strong>&lt;br&gt;Barquet Hall&lt;br&gt;Theme: New Play Type&lt;br&gt;Session Chairmen: Robert Wong Hin Fatt (PETRONAS) and Lawrence Bernstein (Telisman)</td>
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<tr>
<td>4:00 – 4:25 pm</td>
<td>Geophysics Paper 8&lt;br&gt;Integrating Geophysical Technologies for 4D Seismic Pressure-Saturation Analysis in Angsi Field&lt;br&gt;Shuhodah Basaharudin, Saltiah M Sahai, Haziqah Othman, Saltiah Isa, Dr MK Sengupta and M Firdaus A Halim (PRSB)</td>
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<td>Geology Paper 8&lt;br&gt;In the Quest of Open Fractures in the Crystalline Basement of the Malay and Penyu Basins&lt;br&gt;H.D. Tja (Orogenic), Zuhaini Mohamad, Ariffin Suhaid Mat Soad, Ahmad Ridhwan Abd Rahim, Jusmilah Baharom (EnergyQuest), Mazlan Md Tahir, Sahrul Jamil, Nurul Fiziyana Ismail and Azani Abdul Manaf (PMU)</td>
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<td>Geology Paper 9&lt;br&gt;Delineation Of Stratigraphic Prospect From The Integrated Analysis Of Geological Model. Well And 3d Seismic Attributes – A Case History From Temana Field, Sarawak, Malaysia&lt;br&gt;Amit Roy, M Al-Amin B Abd Mutalib,Ravi Kant Pathak (PCSB)</td>
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<tr>
<td>4:50 – 5:15 pm</td>
<td>Geophysics Paper 10&lt;br&gt;CSEM Survey in Deepwater Sarawak: Challenge and Learning Continues&lt;br&gt;Nurul Saadah, Sandeep K. Chandola, Fatma Nazihah, Lee Poh Kin, Teyallen (PCSB), Lim Toon Hoong, Lars Lorenz, Syarina Azura Mohamad and Tan Kian Wei (EMGS)</td>
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<td>Geology Paper 10&lt;br&gt;Occurrence of Hydrodynamic Play in Malaysia&lt;br&gt;Robert Wong, Azani Manaf, Meor Syazwan Meor M Ayub, Mohd Irwani Sadi, Mohd Farizanudin Jaaper and Nurman Nusral (PMU)</td>
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<td>6:00 pm</td>
<td><strong>ICEBREAKER (sponsored by PGS)</strong> Exhibition Hall Foyer at Level 3</td>
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<td>10:15 – 10:45 am</td>
<td>COFFEE BREAK (sponsored by TOTAL)</td>
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## PETROLEUM GEOLOGY CONFERENCE & EXHIBITION 2009
Kuala Lumpur Convention Center, 29 – 30 March 2010

<table>
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<tr>
<th>Time</th>
<th>Session</th>
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| 10:45 - 11:15 am | **Key Paper 2:** Banquet Hall  
Rapidly integrate R&D into the mainstream workflow and bring software closer to operations through an open software framework.  
Stephen Warner, Geoscience Business Manager Middle East and Asia, Schlumberger Information Solutions |
| 11:15 - 11:40 am | **GEOPHYSICS Session 9** Conference Hall 1  
**Theme:** Seismic Interpretation  
Session Chairman:  
Jamilus Md Yasin (PCSB) and Mr. Robert Dean (PGB)  
**Geophysics Paper 15**  
The Role of Elastic Rock Properties Conditioning for Quantitative Interpretation of Seismic Amplitudes in the Sarawak Basin, Malaysia.  
Noreehan bt Shahud (presenter), Yeshpal Singh and Nurhakimah Mohamud (PCSB) |
| 11:40 - 12:05 pm | **GEOLOGY Session 10** Banquet Hall  
**Theme:** Reservoir Characterisation and Modelling  
Session Chairman:  
Nicole Bianchi (Beicip-Franlab) and Gavin Lindsey (Baker-Huges)  
**Geology Paper 15**  
Construction of Static Model for Structural Complex Area in Deep Water Environment  
Setiyo Pamungkas (PCSB) |
| 12:05 - 12:30 pm | **Geophysics Paper 16**  
Application of Spectral Decomposition and Inversion to Understand the Structural Development of Thrust Belts  
Mirza Naseer Ahmad (LMKR), Shamim Haider and Ramly B Manja (Carigali) |
| 12:30 - 12:55 pm | **Geophysics Paper 17**  
Increasing the Accuracy of Depth Conversion using Hybrid Velocity Modelling: Case Study at South East of Malay Basin  
M Hafizzal Zahir, Ang Chin Tee, Salbiah M Sahad, Nor Azhar Ibrahim, Boshara M Arshin and M Faizal Rahim (PRSB) |
| 1:00 - 2:00 pm | **Geophysics Paper 18**  
Hydrocarbon Exploration in a Tertiary Stratigraphy of the Offshore, Nile Delta Basin, Egypt  
Mohamed Ibrahim (PICL), Ganbal R. Gaafar (PETRONAS), Eslam Esmaiel, and Ayman Hassan (PICL)  
**Geology Paper 18**  
Successful Application of Thin Bed Petrophysical Evaluation Workflow in Deep-Water Turbidite Environment: Case Studies from Fields Offshore Malaysia.  
Budi Priyatno Kantaatmadja, Azizul Mah Hassan (PMU), Mohd Nor Hisham Mohd Azam, Mohd Abd Rasheed Mohd Abdul Rahman and Richard Leech (Schlumberger)  
**Lunch (sponsored by Shell)**  
Conference Halls 2 and 3 |
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<th>Time</th>
<th>Session 11 - Geophysics</th>
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<td>2:00 – 2:25 pm</td>
<td>Geophysics Paper 19</td>
<td>Geology Paper 18</td>
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<td>Identification and Modelling of Karst Features in a Carbonate Field, Sarawak Basin Malaysia</td>
<td>Geological Modeling of Complex Fluvial Lacustrine System Case Study from Oil Field Central Muglad Basin - Sudan Ahmed Ziada and Musaab Elmahdi (GNPOC and Sudapet)</td>
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<tr>
<td>2:25 – 2:50 pm</td>
<td>Geophysics Paper 20</td>
<td>Geology Paper 19</td>
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<td>The Roles of Coal in Hydrocarbon Exploration in the Malay Basin: The Good, the Bad and the Ugly Deva Ghosh, Samsudin Jirin, Selbiah Isa (PRSB) and Peter Abolins (PCS)</td>
<td>Deepwater Thin-Bed Depositional Settings: A Geological Framework from Nw Sabah Debnath Basu, Francis Kalukal (Schlumberger), M Fardin B M Pushiri and Goh Sing Thu (PMU)</td>
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<td>Over-Under Deghosting Bruno Gratacos (CGG Veritas)</td>
<td>The Major Trends of Palynomorphs Distribution in Three Fluvial Systems, Peninsular Malaysia Azmi M Yakzan, Shamsudin Jirin, Sahriza Salwani Md Shah (PRSB) and R J Morley (PALYNOVA)</td>
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<td>3:15 – 3:40 pm</td>
<td>Geophysics Paper 22</td>
<td>Geology Paper 21</td>
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4:00 – 5:00 pm | Closing Ceremony Banquet Hall |
5:10 – 5:30 pm | Tea Break (sponsored by Nippon Oil) Exhibition Hall Foyer at Level 3 |
Mr. Tan Boon Kong, Chairman of the Working Group on Engineering Geology, Hydrogeology and Environmental Geology delivered the 15th Chairman’s Lecture entitled “Engineering Geology - 3 Recent (2009) Case Studies”. The lecture was attended by some geologists and geotechnical engineers from the academics, public and corporate sectors.

Mr. Tan, who is a Consultant Engineering Geologist generously shared his findings for the 3 projects he had involved recently. He shared the various factors considered for the option of tunnel or viaduct for a stretch of the proposed Kuala Lumpur Outer Ring Road. He also briefed the audience the soil profile and soil chemistry of the proposed new Kuala Lumpur Low Cost Carrier Terminal. Mr. Tan finally shared some of the results of the engineering geological mapping he had carried out for some of the pinnacles in the Sunway Lagoon Theme Park, Petaling Jaya.
Stratigraphic relationship and correlation of the Paleozoic units of Myanmar and Malaysia

Professor Dr Aye Ko Aung

10th February 2010
Program Geologi, Universiti Kebangsaan Malaysia

A technical talk entitled “Stratigraphic relationship and correlation of the Paleozoic units of Myanmar and Malaysia” had been presented by Prof. Dr Aye Ko Aung (formerly Head of Department of Geology Dagon University, Myanmar) to an audience of around 40 people comprising staff and students from UKM and JMG. The talk was delivered at the Program Geologi, Universiti Kebangsaan Malaysia on 10 February 2010.

Abstract — The Paleozoic unit of Myanmar is closely correlatable with those from Malaysia in aspects of stratigraphy and paleontology. The Latest Cambrian units of the Ngwe Taung Group of Pyin Oo Lwin District and the Molohin Group of southern Shan State both obtaining a prominent assemblage of saukiid trilobites which also occurs in the Machinchang Formation of Malaysia. The Ordovician units of Myanmar in each stage is established as, from lower to upper: the Lokepyin Formation of Arenigian, Wunbye Formation of southern Shan State and “Sitha Formation” of Pyin Oo Lwin township (Llanvirnian-Llandeilian), Nan-on Formation of southern Shan State and Khun Lein Formation of Pyin Oo Lwin township (Caradocian) which are correlatable with the Kakibukit Limestone for the whole Ordovician of Malaysia. The Myanmar Silurian has two formations such as the Nyaungbaw Formation in Pyin Oo Lwin township and the Linwe formation in southern Shan State, both of which yield a variety of species of graptolites which are also recognized in the Silurian unit of Malaysia such as Tanjong Dendang Limestone represented as Lower Detrital Member and Mempelam Limestone (upper Setul Limestone) in Langkawi Island. The Early Devonian sequence of both of Myanmar and Malaysia seems to be the same, consisting of some prominent dacryoconarid tentaculites such as Nowakia acuraria and graptolite species, Monograptus uniformis. The correlation of the Early Devonian (Pragian-Emsian) Zebingyi Formation of Pyin Oo Lwin township in Myanmar and the Mahang Formation in northwest Malaysia is indeed interesting on the occurrences of dacryoconarid tentaculites and graptolites. In the case of Middle Devonian, there is an extensively covered Middle Devonian unit designated as the Maymyo Formation, consisting of the sequence of dolomitic limestone, shale and coralline limestone which have even been recognized as a biostrome previously well known as the “Padaukpin coral reef” and its contemorary unit the “Wetwin Shale” chiefly composed of black and buff shale in cooperated with gypsum and anhydrite precipitation. This sequence ranges from Middle Devonian (Eifelian) to Late Devonian (Frasnian), the latter only is reported from the Singa Formation of Langkawi Island. There may be some equivalent units of Carboniferous and Permian age of Myanmar and Malaysia, indeed the Myanmar Early Carboniferous (Visean) foraminifera are identical with those of the Kuantan area, east Malaysia such as Eosteffella mosquensis. The Permian of Myanmar is recognized by the presence of coralline limestone consisting of rugose coral species of Pavestephphyllum, Ipicyphylum, Waagenophyllum, Lophophyllidium, Polytheicals, and Yatsengia which give the geological range of Artinskian-Tatarian. The age of the Permian corals is testified by the occurrence of fusulinids (Neoschwagerina-Verbeekina) zone.
Headwater capture and drainage re-organization in Asian river systems traced by isotope provenance methods

PETER CLIFT
Kilgour Professor in the Department of Geology & Petroleum
Geology, University of Aberdeen, United Kingdom

11th March 2010
Department of Geology, University of Malaya

Abstract —The Indus River was formed immediately following the India-Asia collision and is know to have undergone major re-organization and headwater capture events since that time. In this study we used U-Pb dating of zircon grains and Pb isotopes in K-feldspar grains to see how the river has evolved during the Holocene in response to a strengthening and then weakening monsoon. Our data show that the Sutlej and Beas River used to flow much further SE on the edge of the Thar Desert but switched away to the north into the modern Punjab around 4-5 ka, probably contributing to the collapse of the Indus Valley Civilization. Our data also show that zircon grains take ca. 5 ky to travel from the Himalaya to the Indus delta and that reworking of older sediments in the foreland have dominated the delta sediment budget since ca. 5 ka. U-Pb zircon dating of zircons and Ar-Ar dating of micas in the Red River system shows that the present river has been close to its present state in Vietnam since the Late Miocene, implying surface uplift and drainage capture much earlier, likely starting in the Oligocene in SE Tibet. Ar-Ar ages indicate that the Lo River is the most important net contributor to the modern Red River delta. However, this contrasts with zircon U-Pb data indicating that the upper reaches of the Red River dominate that mineral group. We suggest that the mis-match reflects the rapid transport of mica relative to zircon in the river and the fact that the Red River is not in equilibrium. We hypothesize that the zircons were eroded >8 ka under a regime of stronger monsoon that enhanced erosion in the northern drainage basin, while modern erosion is focused in the south, especially in the Song Chay Massif.”
The talk on “Professional Code of Conduct” was delivered by Dato’ Paduka Ir Hj Keizrul Abdullah, Immediate Past President of IEM and formerly Director-General of the Drainage and Irrigation Department, on 31st March 2010 at University of Malaya. The speaker touched on a wide range of topics, beginning with some historical background on the formation of professional bodies, Registration of Engineers Act, regulations on do’s and don’ts, penalties for breaches of the Code, legal vs ethical, etc. Several examples were presented as illustrations. Though the talk was based on the scenario for engineers, it is also highly relevant to the case of geologists, especially in view of the recent Registration of Geologists Act. Interesting discussions followed the talk, which was very educational and illuminating, to say the least.

Tan Boon Kong
Chairman, Working Group on Engineering Geology, Hydrogeology & Environmental Geology
KEAHLIAN  MEMBERSHIP

1. Mohd Nor Afifi bin Mohd Roselly
2. Nor Ridhwah bt Abdol Malek
3. Nur Izatul Qistina bt Rokbi
4. Brendawati bt Ismail
5. Ong Hock Kim
6. Mohammed Ismael Abu Shariah
7. Sawsan Kamel Shariah
8. Suhaïlah bt Haron
9. Muah Fawwaz bin Zainal Abedin
10. Chin Chun Ping
11. Arif Aizat bin Mohd Hilmi
12. Muhammad Junaidi bin Zahidun
13. Mohd Ramzi Zhafri bin Ramli
14. Zuhidayati bt Zainal Abidin
15. Mohd Nazaruddin Mokhri
16. Kenny Lim Hock Beng
17. Oh Danny Beng Teck
18. Nurul Syafiqah bt Abdollah
19. Nurul Iman bt Saiful Bahari
20. Faris bin Mohamed Zulkifli
21. Heng Fook Jin
22. Lee Hui Choo
23. Mohd Hisyamuddin bin Ahmad Kamil
24. Mohd Hafiz Mad Rani
25. Kong Chai Chen
26. Nadine Levone Charles
27. Jiang Yuchen

PERTUKARAN ALAMAT  CHANGE OF ADDRESS

1. Chong Foo Shin, 153 Adira, 8 Persiaran Residen, Desa Park City, 52200 Kuala Lumpur
2. Rushdi Mohd Yusoff, No. 5, Jalan Pinggiran USJ 1/14, Taman Pinggiran USJ 47610 Subang Jaya
3. Onn Mohd Sidi, No. 13, Jalan Casa Mekar 1, Taman Casa Mekar, Sg. Merab, 43000 Kajang
4. Dominique Dodge-Wan, P.M.B. No. 665, Locked Bag 12, 98000 Miri
Fifty nine entries were received for the GSM 2009 Photo Competition. Judging was conducted at University of Malaya on 25th March, 2010. Entries were received from professional geologists, educators, students (including a secondary school student), and the general public. Photographs were displayed at PGCE 2010.

JUDGES
Prof. Dr. Harry Doust, University of Malaya and Vrije Universiteit, Netherlands
Prof. Dr. John Kuna Raj, University of Malaya
Prof. Dr. Charles S. Hutchison, University of Malaya
Prof. Dr. Lee Chai Peng, University of Malaya

RESULTS

FIRST PRIZE – RM1000
Joanes bin Muda (JMG Sabah)
Stepped Shore Platform
Steeply dipping sandstone/mudstone beds (Tajau member of Kudat Fm.) eroded by waves.
Kudat, Sabah
Canon Ixus 8601s

SECOND PRIZE – RM500
Nur Iskandar Taib (University of Malaya)
The Grand Old Lady
Miri #1, Malaysia’s first oil well. Photographed in infrared.
Miri, Sarawak
Pentax K100D Super, 18-55mm f3.5 lens, Hoya R72 filter. ¼ sec. f11, 40mm, ISO200

THIRD PRIZE – RM300
Chuah Seong Teng (PETRONAS)
Deepware Icnofacies Spiral Pascichnia
Trace fossil observed at the base on sand in Crocker Formation, Sabah
Lok Kawi heights, Kota Kinabalu, Sabah
Nikon D90

CONSOLATION PRIZE – RM100
Ahmad Farhan b. Salman Farsi (Kolej Sultan Abd. Hamid)
“Geopark” at Gunung Keriang
South Western face of Gunung Keriang, showing weathered limestone formation and structure. (The state authority is promoting development of a resort with the geological ambience of the limestone hill.)
Gunung Keriang, Kedah
Canon EOS 50D, EFS 17-55mm, 1/250 sec. f6.3, ISO250

CONSOLATION PRIZE – RM100
Khairul Azlan Mustapha (University of Malaya)
Tight Fold
Tightly folded slate-quartzite
Tanjung Kempit, Endau, Johore
Nikon Coolpix L4

CONSOLATION PRIZE – RM100
Franz L. Kessler (Curtin University, Miri)
Kelalan Clastics at the Baram River
Intensely folded deep marine clastics of the Rajang Group
LONG LAMA, Sarawak
Panasonic Lumix

CONSOLATION PRIZE – RM100
Khairul Azlan Mustapha (University of Malaya)
Wave Erosion
Due to extensively wave erosion on granite surface which form a unique morphology
Kemaman Beach, Trengganu
Nikon Coolpix L4
THE INTERNATIONAL GEOSCIENCE PROGRAMME (IGCP) - formerly International Geological Correlation Programme - is a joint endeavour between the IUGS (International Union of Geological Sciences) and UNESCO (United Nations Educational, Scientific and Cultural Organization).

The objectives of IGCP are met through individual projects. The number of active projects in any given year depends on the current priorities of UNESCO and IUGS, the availability of funds, the success and progress of existing projects and the quality and merit of newly submitted proposals.

BACKGROUND: The success of the Programme and individual projects is the result of the dedication of project leaders and the enthusiasm, support, and participation of geoscientists from around the world. Projects often build upon existing activities within participating countries, and attract additional funds from governmental and other agencies.

Project proposers should identify the societal relevance of their work, address the challenge of capacity-building in developing countries, emphasize education and training, including a focus on under-represented groups (e.g. youth, women, ethnic minorities, etc.).

DURATION: IGCP projects are approved for a period not exceeding five years. Individual projects are reviewed annually after the second year and may be terminated if performing poorly as identified during a review.

FINANCIAL SUPPORT: The annual allocation of support for each project depends upon its quality and, for an already funded project, upon its performance during the previous year. The financial support provided annually by IUGS and UNESCO for IGCP projects covers part of the costs of organizing and managing research (not to the research itself), meetings and workshops related to the project, as well as to facilitate participation by scientists from developing countries. In general, IGCP funds cannot be used for items such as data gathering (e.g., field and laboratory expenses). Moreover, the allocated sum should not be used exclusively to cover the travel expenses of project leaders. These limited funds provide 'seed money' to assist in the acquisition of additional funds from other sources. Past experience indicates that successful IGCP projects are able to secure significant additional funding from other sources. The actual amount of funding provided annually to IGCP projects reflects the collective decisions of UNESCO and IUGS.

EVALUATION: IGCP projects must successfully meet the following criteria:

• focus on high-quality science relevant to the scientific objectives of the IGCP;
• meet a need of international importance and societal relevance;
• emphasize interdisciplinary cooperation;
• constitute international participation including scientists from developing countries;
• demonstrate potential for both long-term and short-term geoscientific and/or societal benefits;
• explicitly acknowledge the sponsorship of UNESCO, IUGS, and IGCP; and,
• promote global geoscience visibility. For example, through the publication of scientific results using internationally recognized journals or other media

UNESCO and IUGS jointly appoint members to the IGCP Scientific Board. Individual IGCP proposals and Annual Reports are assigned to thematically appropriate members of the Scientific Board for initial evaluation of their scientific merit and relevance to IGCP objectives. Select members of the IGCP Scientific Board collectively consider the initial evaluations and prioritize applications for funding.
TOPICS FOR IGCP PROJECT PROPOSALS

IGCP welcomes proposals on the following topics:

• GEOSCIENCE OF THE WATER CYCLE
  Life on Earth depends on water and its sustainable use is crucial for continued human existence. Earth’s water resources include surface/ground water, ocean water, and ice. The study of Earth’s water involves understanding and managing both surface and groundwater systems, including sources, contamination, vulnerability and history of water systems.

• GEOHAZARDS: MITIGATING THE RISKS
  Geohazards include earthquakes, volcanic activity, landslides, tsunamis, floods, meteorite impacts and the health hazards of geologic materials. Geohazards can range from local events such as a debris slide or coastal erosion to events that threaten humankind (e.g., supervolcano eruption or meteorite impact). Earth scientists undertake research to better understand such hazards and contribute to risk reduction.

• EARTH RESOURCES: SUSTAINING OUR SOCIETY
  Earth resources include minerals, hydrocarbons, geothermal energy, air, and water. The future well-being of society depends on sustainable use of these resources. The environmentally responsible exploitation of these resources is a challenge for geoscience research. The progress of technological development is equally bound to this premise.

• GLOBAL CHANGE AND EVOLUTION OF LIFE: EVIDENCE FROM THE GEOLOGICAL RECORD
  Changes in the Earth’s climate and of life on Earth are preserved in the rock record. Ice and dust records, terrestrial and ocean sediments, and sequences of fossil plant and animal assemblages all comprise parts of this record. Life has impacted Earth’s atmosphere, oceans, and land surface. Several major extinctions have punctuated Earth’s history, associated with dramatic environmental and ecosystem change. Past environmental lessons shed light on present and future challenges.

• THE DEEP EARTH: HOW IT CONTROLS OUR ENVIRONMENT
  The Earth’s surface, including our habitable environment, is a product of, and controlled by deep Earth processes. The study of this environment (ranging from changes in the Earth’s magnetic field to plate tectonics) using for example, geophysical and geodynamical techniques, enhances our understanding of the working of System Earth.

• OTHER TOPICS
  Other relevant topics in fundamental and applied geosciences will also be considered.

The IGCP encourages submission of project proposals in all aspects of the geosciences, provided they meet the requirements outlined above (“Evaluation” part of Section 2 - Operational Policy).

PROJECT PROPOSALS

IGCP project proposals may be submitted by individual scientists or by a group of scientists using the application forms available through the Secretariat office website. The IGCP Scientific Board is ready to advise project leaders, regarding the scientific quality, content, scope, viability, budget and relevance of potential project proposals (e.g., advice regarding the inclusion of other qualified scientists, bridging to other initiatives, outputs, etc.).

Assessments of proposals for new IGCP projects (and the Annual Reports of ongoing projects) are conducted once a year by selected representatives of the IGCP Scientific Board, usually during the first half of February. Assessments are based upon the criteria and objectives of IGCP (e.g. the scientific potential and feasibility of proposals, adherence to the overall goals of IGCP, qualifications of the proposers, scientific progress of the projects, significance of their results, adherence to an approved budget and so on). Projects are ranked into one of three funding levels: high, medium, or low.

The deadline for submission and receipt of new project proposals to the IGCP Secretariat is 15 October 2010.

Each project leader must include a letter of endorsement from his or her respective IGCP or IUGS National Committee. The IGCP Secretariat will promptly inform proponents of the decisions regarding individual proposals.


Additional information on IGCP Projects may be downloaded (in either pdf or Word format) under the “Related links” heading from the title “IGCP Guidelines and proposal form 2009”

IGCP CONTACT:
Dr. Margarete Patzak
Programme Specialist; Deputy Secretary,
International Geoscience Programme (IGCP)
UNESCO
A career talk entitled “A Future with Schlumberger” had been organized by the AAPG Student Chapter University of Malaya on the 27th February 2010 at the Geology Department University of Malaya. The talk started on 8.00am and ended on 2.00pm. Four speakers and a VIP from Schlumberger attended the event. The speakers were Mrs. Rashima Rashli, Miss Michelle Khor, Mr Jim Liang and Mrs. Amis Ahmad and the participated VIP was Mrs Lee Chin Na. The event was also participated by geology students from UM and UKM as well as engineering students from UM and overall 100 students had turned up for the event.

The main objective of this career talk was to expose the students to their future working environment besides enhancing their knowledge about their opportunities in the oil and gas industry. The students were also brief about the job opportunities besides the training and development provided by Schlumberger for their employee. This event too includes a resume and CV hand in session as the students will have the chance to hand in their CV and resume if they were interested in undergoing an internship programme or apply for a job in Schlumberger. An exhibition was also held in the museum to give exposure to the students about Schlumberger.

The talk started 8:45 a.m, where the Head of Department, Dr Azman Abdul Ghani officiating the ceremony with his welcoming speech. He expressed his gratitude to the organizing committees, participants and also thanks the company that sponsoring the event, Schlumberger for their generosity. His speech was followed by a speech from the President of AAPG 2009/2010, Afikamsyar Jais.

The talk was started off by Mrs. Rashima Rashli and Miss Michelle Khor, which are the geophysicists of Western Geoco. The title of their talk was Seismic Imaging and they’ve explained all the work involved in seismic imaging. A question and answer session was opened after they’ve finish their presentation. The Q&A session was then followed by a morning break for both participants and the VIPs.

After the break, the event continued with the second talk by Mr Jim Liang, the Engineer of Schlumberger. His talk focused on the well engineering design and had attracted the interest of the engineering students. A Q & A session was also opened after he ended his presentation. After the Q & A session ended, the participants assembled in the museum for the exhibition and also to hand their CV’s at the Schlumberger booth. A photography session was also held for a short while. During this session, the participants received door gifts from Schlumberger while the speakers and VIP received t-shirts from the organizing committee. The exhibition and CV collection session was then followed by lunch break.

After the lunch break, the talk continued with the final session by Mrs Amis Ahmad, the human resource (HR) officer of Schlumberger. The title of her talk was Training & Development and Job Opportunities. Her talk was also followed by a Q & A session, thus wrapping the event for the day at 2 pm.
UPCOMING EVENTS

August 2-4, 2010: Volcanioclastic Rocks – Classification, Properties, Genesis and Depositional Settings, Vienna, Austria. Tel: +43 3842 43053-33; Fax: +43 3842 430531; email: training@hoteng.com; website: www.hoteng.com

August 2-6, 2010: Advanced Reservoir Simulation Technologies, Vienna, Austria. Tel: +43 3842 43053-33; Fax: +43 3842 430531; email: training@hoteng.com; website: www.hoteng.com

August 2-6, 2010: Advanced Seismic Stratigraphy: A Sequence – Wavelet Analysis Exploration – Exploitation Workshop, Singapore. Tel: 603 21684751; email: ap-enquiries@petroskills.com

August 5-15, 2010: International Geological Congress, Brisbane, Australia. Contact: Dr. Ian Lambert, Geoscience Australia. Tel: +61 2 62499556; Fax: +61 2 62499983; email: ian.lambert@ga.gov.au;

August 27-29, 2010: AAPG 30th Annual Leadership Days, Post Oak Lodge, Tulsa, Oklahoma, USA. Contact: Richard D Fritz, email: tcurry@aapg.com

September 27-28, 2010: Development Geology. Contact: Easwaran Kanason, Petroedge, Tel: +65 67419927; email: easwaran@asiaedge.net

September 27-October 1, 2010: Petroleum Geochemistry: Tools for Effective Exploration and Development, London, UK. Tel: 603 21684751; email: ap-enquiries@petroskills.com

September 27-October 1, 2010: Petroleum Geostatistics – Integrating Data for Reservoir Modelling and Simulation, Vienna, Austria. Tel: +43 3842 43053-33; Fax: +43 3842 430531; email: training@hoteng.com; website: www.hoteng.com

October 10-13, 2010: The Mena Oil and Gas Exhibition and Conference 2010. The 1st International trade show for the oil and gas serving the Mena region, Amman Exhibitions Park, Amman, Jordan. Contact: Nafees Ahmed, Orange Fairs & Events, P.O Box 111164, Dubai; Tel: 00971 4 2988144, 2987730; Fax: 00974 2987886; email: nafees@orangefairs.com; website: www.orangefairs.com

October 10-14, 2010: Integrated Petrophysics for Reservoir Characterisation, Dubai, UAE. Tel: +43 3842 43053-33; Fax: +43 3842 430531; email: training@hoteng.com; website: www.hoteng.com

October 11-15, 2010: Production Geology for Other Disciplines, Kuala Lumpur, Malaysia. Tel: 603 21684751; email: ap-enquiries@petroskills.com

October 11-15, 2010: Deep-water Turbidite Depositional Systems and Reservoirs, London, UK. Tel: 603 21684751; email: ap-enquiries@petroskills.com


October 17-21, 2010: Carbonate and Fracture Petrophysics, Dubai, UAE. Tel: +43 3842 43053-33; Fax: +43 3842 430531; email: training@hoteng.com; website: www.hoteng.com

October 18-22, 2010: Wellsite and Operations Geology, Vienna, Austria. Tel: +43 3842 43053-33; Fax: +43 3842 430531; email: training@hoteng.com; website: www.hoteng.com

October 18-22, 2010: Compressional and Transpressional Structural Styles, London, UK. Tel: 603 21684751; email: ap-enquiries@petroskills.com

October 19-22, 2010: Oils and Fats International Congress 2010 in conjunction with Oils and Fats International Asia 2010: Oils and Fats Industry:
Challenges and Innovative Solutions, Kuala Lumpur, Malaysia. Contact: OFIC 2010 Secretariat c/o MOSTA, C-3A-10, 4th Floor, Block C, Damansara Intan, 47400 Petaling Jaya, Selangor, Malaysia. Tel: 603 71182062/2064; Fax: 603 71182063; email: secretariat@mosta.org.my; website: www.mosta.org.my

October, 25-29, 2010: Structural Styles in Petroleum Exploration, Kuala Lumpur, Malaysia. Tel: 603 21684751; email: ap-enquiries@petroskills.com

October, 25-29, 2010: Application of Structural Geology in Seismic Interpretation, Kuala Lumpur, Malaysia. Contact: Tel: +65 67419927; email: info@asiaedge.net; website: www.petroedgeasia.net

October, 27-29, 2010: Pore Pressure Prediction: Special Focus – Asia Pacific, Singapore. Contact: AAPG, P.O. Bo 979, Tulsa, Okla 74101-0979, USA; email: education@aapg.org

October 27-29, 2010: Geosciences Technology Workshop (GTW): Pore Pressure and Related Issues: Special Focus – Asia Pacific, Singapore. Contact: Adrienne Pereira, Tel: 65 96536728; email: apereira@aapg.com; website: www.aapg.org

November 1-5, 2010: Production Logging and Reservoir Monitoring, Kuala Lumpur, Malaysia. Tel: +63 3842 43053-33; Fax: +63 3842 430531; email: training@hoteng.com; website: www.hoteng.com

November 1-5, 2010: Seismic Velocities and Depth Conversion, Kuala Lumpur, Malaysia. Tel: 603 21684751; email: ap-enquiries@petroskills.com

November 5-7, 2010: 2nd International Renewable Energy Congress (IREC), 2010, Sousse, Tunisia. Contact: irec@cmrp.net; website: www.irec.cmrp.net

November 7-11, 2010: Introduction to Open Hole Log Analysis, Dubai, UAE. Tel: +971 3 348 2714; Fax: +971 3 348 2715; email: training@hoteng.com; website: www.hoteng.com

November 7-11, 2010: Reservoir Engineering for Non-Reservoir Engineers, Dubai, UAE. Tel: +971 3 3482 43053-33; Fax: +971 3 3482 430531; email: training@hoteng.com; website: www.hoteng.com

November 8-12, 2010: Basin Analysis and Petroleum Systems, Vienna, Austria. Tel: +43 3842 43053-33; Fax: +43 3842 430531; email: training@hoteng.com; website: www.hoteng.com

November 8-12, 2010: Special Core Analysis, Vienna, Austria. Tel: +43 3842 43053-33; Fax: +43 3842 430531; email: training@hoteng.com; website: www.hoteng.com

November 8-12, 2010: Petroleum Geomechanics, Kuala Lumpur, Malaysia. Tel: +63 3842 43053-33; Fax: +63 3842 430531; email: training@hoteng.com; website: www.hoteng.com

November 15-18, 2010: 1st International Congress & Exposition of Oil Field Chemicals – 2010 (OFC-2010), Beijing, China. Contact: Ms Lucy Wang, Organizing Committee of OFC-2010, Dalian BiTeomics, Inc. 26 Gaoneng St., F4 Dalian Hightech Zone, Dalian, LN 116025, China, Tel: 01186 411 84799609 – 801; Fax: 01186 411 84799629; email: lucy@bitconferences.com; website: www.bitpetrobio.com/ofc2010/

November 25-26, 2010: Deepwater Turbidites. Contact: Easwaran Kanason, Petroedge, Tel: +65 67419927; email: easwaran@asiaedge.net

November 29-December 3, 2010: Pore Pressure, Fracture Pressure and Wellbore Stability Management, Vienna, Austria. Tel: +43 3842 43053-33; Fax: +43 3842 430531; email: training@hoteng.com; website: www.hoteng.com

November 29-December 3, 2010: Clastic Exploration and Reservoir Sedimentology. Contact: Easwaran Kanason, Petroedge, Tel: +65 67419927; email: easwaran@asiaedge.net

December 7-10, 2010: The 2nd South Asian Geosciences Conference & Exhibition, India Expo Cente & Mart, Greater Noida, New Delhi. Contact: Tel: 44 207 840 2136; Fax: 44 207 840 2119; email: aridgway@oesallworld.com; website: www.allworldexhibitions.com

December 14-15, 2010: An International Symposium on Forensic Approach to Analysis of Geohazard Problems, Mumbia, India. Contact: Prof. G. L. Sivakumar Babu, Organizing Secretary, Dept. of Civil Engineering, Indian Institute of Science, Bangalore, 560012, India; Tel: 91 80 2293 3124/2360; Fax: 91 80 2360 0404; email: gls@civil.iisc.ernet.in; website: www.civil.iitb.ac.n/~igc2010

January 8-14, 2011: Colloquium of African Geology, University of Johannesburg, South Africa. Contact: Dr Hassina Mourï, Tel: 27 11 559 4706; Fax: 27 11 559 4702; Email: hmouri@uj.ac.za; website: www.cag23.co.za
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