INDONESIAN PETROLEUM ASSOCIATION
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A non-profit organization established March 1971 by the Steering Committee and Representatives of 28 founding companies

IN THIS ISSUE

30th Annual IPA Convention and Exhibition

His Excellency the President of the Republic of Indonesia, Mr. Susilo Bambang Yudhoyono, addressed attendees of the 30th Annual IPA Convention on August 30, 2005.

from the Editor

This issue is devoted to clastic deposition in Indonesia. We were able to obtain an excellent paper from Drs. Helen Smyth and Robert Hall regarding the Paleogene clastic deposition in East Java. Complementing this paper is a short article from Bernhard Seubert covering the recent IPA Field Trip to the Southern Mountains of Southeast Java.

Nara Nilandaroe sent along a technical note that shares his recent experience studying the fractured carbonates of the Southern Apennines and relates those to the Mesozoic carbonates of Eastern Indonesia.

Our usual group of loyal contributors has once again provided its updates and Pak Edi Setyobudi has given a summary of the 30th IPA Convention and Exhibition.

I regret that this will be the last edition of the IPA Newsletter that I will edit. I have elected to return to the United States and plan to be back in Boston by early December.

I wish to thank those who have contributed to the Newsletter for the past five issues. Your interest in the Association and your efforts to promote the geosciences in Indonesia have been appreciated. A special thanks needs to be extended to Willy Prawiro who not only serves as the Newsletter's printer but has offered much technical advice in trying to make each issue more presentable. The assistance of the IPA Secretariat cannot be overstated. Additionally, I have had the enthusiastic support of my wife, Mary, who carefully read every word of each article and made valuable suggestions.

Lastly, I would like to thank you, the IPA membership, for your helpful comments and I encourage you to continue to support the Newsletter as a contributor and loyal reader.

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30th Annual IPA Convention and Exhibition

Edi Setyobudi[1]

Founded on March 24, 1971, the Indonesian Petroleum Association (IPA) is a non-profit organization that embraces both upstream (exploration and production) and downstream (refining and distribution) aspects of the oil and gas industry in Indonesia. The Association aims to create an environment that allows its members to discuss common concerns, exchange ideas and work toward common goals for the industry. IPA also acts as a partner with relevant government institutions and provides the industrys views on encouraging a favorable environment for investment and competition.

The IPA Annual Convention and Exhibition is currently the industrys largest event in Indonesia. The convention was first introduced in 1972, and the exhibition added in 1994 during the 23rd Convention.

This year the 30th Indonesian Petroleum Association Annual Convention and Exhibition was held in Jakarta from August 30 through September 1, at the Jakarta Convention Center. The convention adopted a special theme entitled The Urgency of Building Competitiveness to Attract Oil and Gas Investment in Indonesia."

More than 1,700 individuals from all parts of the petroleum industry in Indonesia and abroad participated. The IPA convention is globally recognized as a major source of information and exchange of ideas and solutions pertinent to Indonesia's E & P challenges. A record high 96 exhibitors participating in the event occupied more than 2,000 square meters of the available space within the Jakarta Convention Center. The large numbers provide a strong indication of the importance of this event.

On Tuesday, August 30, 2005, The Minister of Energy and Mineral Resources, Mr. Purnomo Yusgiantoro gave the opening address, and His Excellency the President of the Republic of Indonesia, Mr. Susilo Bambang Yudhoyono inaugurated the event. In his speech, the President stressed the government's efforts to improve the investment climate for foreign oil and gas companies in the country.

During the three days, topics of discussion centered on ideas that would help rejuvenate investment in Indonesia in order to attract more investors into the oil and gas sector.

Besides the keynote speaker, Mr. David O'Reilly, Chairman and CEO of Chevron Corporation, several speakers and panelists from the Directorate General Oil and Gas and prominent businessmen offered their views and voiced their commitment toward the industry. Over 100 technical papers covering the latest developments in geoscience, engineering, business, community development, and HSE were presented.

Throughout the convention, the Association stressed the need for current players to be successful in order to attract others from the global investment community.

At the closing ceremony, the best technical paper from each category, best poster and booth were each awarded with an honorable appreciation presented by the Secretary General of the Ministry of Energy and Mineral Resources.

I would like to thank Aditya Mandala (Medco), Taufik Rahardjo (Medco), Suhadi (Schlumberger) and DR. M. Badri (Schlumberger) for their help in putting this article together.

President Susilo Bambang Yudhoyono, Minister Purnomo Yusgiantoro, and Director Kardaya Warnika examine display at the ExxonMobil Booth, while Peter Coleman of ExxonMobil and IPA President, Chris Newton look on.

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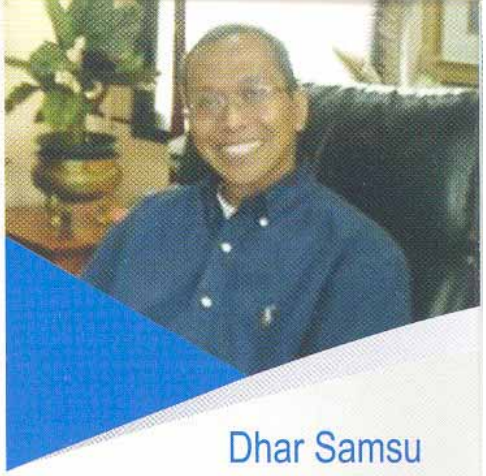
"Three luncheon talks, covering various topics in E&P, were held between July and September."



Dhar Samsu
Luncheon Chairman

Dr. Chris Atkinson of Serica Energy gave the most recent on Tuesday, September 20, 2005 at the Hilton Executive Club. The title of his talk was, "The Bottom of the Food Chain: The Role of Small Independents in the Future of Hydrocarbon Exploration in Indonesia." Chris' fascinating talk offered suggestions for small companies based on his experience as founding partner in Serica Energy Corporation. The Company currently has assets in Indonesia held through a 100% owned subsidiary, Asia Petroleum Development (APD) Corporation. APD operates the Asahan Offshore PSC, Biliton PSC and Glagah Kambuna TAC and is a non-operating partner in the Lematang PSC.

Chris noted that countries like Indonesia are generally labeled mature exploration areas that do not have the reserves necessary to warrant continued investment. However, fortunately for Indonesia, there are some who do see exploration potential. Like IIAPCO in the 1960s, it is the smaller independents working in the country today that no doubt will play a significant role in finding new reserves. As production declines, Indonesia, like many other hydrocarbon rich countries, is faced with the dilemma of how to stimulate increased levels of exploration drilling. The aim of the talk was to provide insight into how small companies can succeed and compete. Additionally, the talk appealed to the Indonesian Government to continue to foster and encourage the activities of the so-called industry "bottom feeders."

On Wednesday, July 20, 2005, the talk, "Using Real Time Data in Production Engineering," was given by Dr. Alistair Brown, Global Practice Director for Production Operations, Landmark Consulting and Services Group. The talk, which was jointly sponsored by IPA and SPE Java Chapter, was held at the Intercontinental Hotel. In the face of data proliferation, Dr. Brown promoted the idea of coordinating solutions found round the world and turning these into actionable information that can support engineers in their real-time decision making processes.

Dr Brown used a case study to share his thoughts on integrated decision making. His process flow begins with an earth model that ultimately funnels through to a, "smart field" with the use of real-time data. Full-scale applicability to Indonesian operations is yet to be determined. On July 21, 2005, Dr. Brown visited the IPA Balikpapan Chapter where he gave the same talk.

An excellent state-of-the-art seismic operation presentation was delivered on Thursday, July 7, 2005 at the Mutiara I, Gran Melia, Jakarta. The "Vorwata Buried OBC Survey – Seismic Operation in Harsh Seabed Conditions of Berau Bay," was given by Albertus Pranoto of BP Indonesia. Pranoto shared information about a recent seismic operation of 4C 3D seismic acquisition using trenched Ocean Bottom Cable in the Berau Bay, Papua, which is part of the Tangguh LNG development project.

Pranoto explained that BP's experience in the area indicated that the traditional OBC survey failed to provide expected high data quality due to considerable seabed noise related to the strong currents and entrained material near the seabed interface. A buried multi-component OBC was proposed as the solution to provide significant improvement in seismic data quality. The ultimate objective in this technique is the improvement in the placement and number of wells for the Vorwata field development.

A buried 4C OBC survey involves cable burial at about 50cm in order to significantly reduce current-induced noise and obtain better geophone coupling. The cables are retrieved and reburied after each swath move. Pranoto explained the importance of careful planning and engagement with contractors (MultiWave/Elnusa) and government authority BP Migas before and during the survey. A pre-survey test is also a necessary requirement. Describing cutting edge technology, the talk attracted a full house. Besides IPA members, there were representatives from Migas and BP Migas.

Luncheon Talks

EXHIBITIONS, CONFERENCES & FORUMS

DATE	TITLE	LOCATION	CONTACT DETAILS	TELEPHONE/WEBSITE/FAX
Nov 2-4	China International Gas Exhibition & Conference (CIGEC 2005)	Shanghai	Energy Contents & CNPC	http://www.energyasia.com
Nov 14-15	Strategic Energy Investment & Joint Ventures Forum 2005	Hong Kong	IBC Asia Limited	http://www.ibc-asia.com
Nov 21-22	Exploration and Production Technologies in Oil & Gas	Jakarta	Marcus Evans	http://www.marcusevans.com
Nov 29-30	Extended Reach Wells Asia 2005	Kuala Lumpur	IQPC	http://www.iqpc.com.sg
Nov 29-Dec 2	ASCOPE 2005	Manila	Malaysian Exhibition Services Sdn Bhd	http://www.ascope2005.com
Dec 5-6	International Improved Oil Recovery Conference in Asia Pacific (IIORC)	Kuala Lumpur	SPE	http://www.spe.org

TRAINING COURSES AND WORKSHOPS

DATE	TITLE	LOCATION	CONTACT DETAILS	TELEPHONE/WEBSITE/FAX
Nov 7-18	Fundamentals of Pipeline Engineering	Singapore	PETROSKILLS/OGCI	http://www.ogci.com OR www.petroskills.com
Nov 7-11	Production Geology for Other Disciplines	New Delhi	PETROSKILLS/OGCI	http://www.ogci.com OR www.petroskills.com
Nov 14-18	Seismic Survey Design, Data Acquisition and Processing	New Delhi	PETROSKILLS/OGCI	http://www.ogci.com OR www.petroskills.com
Nov 14-18	New Opportunities in Old Fields	Kuala Lumpur	PETROSKILLS/OGCI	http://www.ogci.com OR www.petroskills.com
Nov 15-17	HAZOP (Hazard and Operability Studies)	Kuala Lumpur	IBC Asia Limited	http://www.ibc-asia.com
Nov 21-22	Petroleum Business - From Wellhead to Refinery to Markets	Singapore	Centre for Management Technology (CMT)	http://www.cmtevents.com
Nov 21-25	The Geological Interpretation of Well Logs	Bali	IPA (Malcolm Rider)	http://www.ipa.or.id
Nov 21-25	AVO and Seismic Attributes: Principles and Applications	New Delhi	PETROSKILLS/OGCI	http://www.ogci.com OR www.petroskills.com
Nov 21-25	Wireline Formation Testing and Interpretation	Kuala Lumpur	PETROSKILLS/OGCI	http://www.ogci.com OR www.petroskills.com
Nov 28-Dec 2	Principles of 3D Seismic Interpretation and Applications	New Delhi	PETROSKILLS/OGCI	http://www.ogci.com OR www.petroskills.com
Dec 5-8	Offshore Pipeline Engineering	Kuala Lumpur	IBC Asia Limited	http://www.ibc-asia.com
Dec 5-9	Practical Investment Appraisal and Business Decision Analysis in Petroleum E&P	Bali	IPA (Dr H.L. Ong)	http://www.ipa.or.id
Dec 5-9	Basic Petroleum Technology	Singapore	PETROSKILLS/OGCI	http://www.ogci.com OR www.petroskills.com
Dec 12-13	LNG-Gas Purchase and Transportation Contracts	Kuala Lumpur	IBC Asia Limited	http://www.ibc-asia.com
Dec 14-15	LNG/Gas Pricing and Transportation Tariff	Kuala Lumpur	IBC Asia Limited	http://www.ibc-asia.com
Dec 19-23	Advance Seismic methods for field Exploration & Development	Bali	IPA (Dr Sigit Sukmono)	http://www.ipa.or.id

Courtesy of Simon Crellin @ Deloitte Petroleum Services, Singapore

DRILLING Highlights

July to October 2005

SUMATRA

Exploratory drilling activity in northern Sumatra continued through the period with Sinopec's Batumandi North 1 wildcat in the Binjai PSC. The well was sidetracked and at this time is undergoing testing. The primary target is Belumai Formation clastics, with Baong and Bampo Formation sands as secondary objectives. In the meantime, Serica's exploration of the Kambuna field in the Malacca Strait got off to a flying start with delineation well Kambuna 2. Drilled to TD at 2,427m SS, it intersected 19.5m of net gas-pay sand with no indication of a gas-water contact. A DST, run between 2,218-2,238m SS, flowed at a stabilised rate of 17.5 MMcf/d with over 1,500 bc/d (55^0 API) on a 48/64" choke at a FWP of 2,000 psi. Serica plans to submit a POD for the Kambuna field. The well, located about 1km northwest of the 1986 Bow Valley Kambuna 1 gas/condensate discovery, was targeting Belumai Formation sandstones, which were entered at 2,218m SS.

In the Central Sumatra Basin, exploration continues and three moderate successes were recorded during this reporting period. Meanwhile, Chevron is continuing a drilling programme in the Rokan PSC. In May, Kondur re-entered wildcat MS BY-1ST in the Malacca Strait PSC for testing. In September, Kondur announced that contingent gas resources discovered range between 230-580 Bcf, with a most likely figure of 380 Bcf. Cumulative flow from four zones was quoted as 50 MMcf/d plus more than 1,000 bc/d. The well was suspended and appraisal wells BY-2 and BY-3 will be drilled in early 2006. The well had originally been re-entered in August 2004 with the intention of deepening and testing in order to evaluate the Pematang Brown shale and Pematang Basal Clastics and also to evaluate the Menggala Formation oil shows. Kondur deep pool wildcat Melibur Deep 1 was suspended as an oil well in June. BPMigas approved the conversion of the status of the well to development well MS J-75 in a letter dated 6 July 2005. The well will be produced from the D2B reservoir. Three potential hydrocarbon-bearing zones were identified. The Basement was water wet and flowed 176 bw/d, while zone E-1 also flowed water at 104 b/d. Zone D2B flowed 100 bf/d with 17% water cut, thus oil flow was 83 bo/d. Melibur Deep 1 was targeting Sihapas and Pematang Formation sandstones and fractured Basement on the southern edge of the field, which produces oil from the Sihapas Formation in a faulted anticline from about 300m depth.

Finally in Central Sumatra, the Petroselat exploration tail of development well Selat Panjang 4 in the Selat Panjang PSC was drilled to TD at 3,100m and was tested prior to completion in September. Three DSTs were planned. DST 1, between 2,574-2,576m and 2,590-2,592m, reportedly flowed 8.3 MMcf/d on a 40/64" choke. DST 2, between 2,421-2,422m and 2,436-2,438m, flowed 342 bo/d plus 0.2 MMcf/d on a 20/64" choke. DST 3, between 2,326-2,329m, was reportedly inconclusive but oil was encountered. The development leg of the well targeted the oil producing Sihapas Formation sandstones of the Selat Panjang field, while the deeper exploration tail, with a PTD of 3,250m, targeted Pematang Formation sandstones.

In the South Sumatra Basin, drilling activity is slowly recovering. PetroChina recorded a double success with delineation wells Betara West 2 and Betara Southwest 2, the former flowing 140 bo/d plus 6 MMcf/d from Lower Talang Akar Formation sandstones in a faulted anticline 5km northeast of the August 2004 Betara West 1 oil and gas discovery, and the latter yielding 1,700 bo/d plus 1 MMcf/d, again from Lower Talang Akar Formation sandstones at a location 1km southwest of the February 2005 Betara Southwest 1 oil and gas discovery. Additionally, Medco is currently delineating the Jata oil discovery in Batu Raja Formation carbonates on the Palembang High, while PT Pertamina is drilling Suban Utara 1, targeting Talang Akar Formation sandstones, Batu Raja Formation carbonates and fractured basement at the northern edge of the Suban gas/condensate field.

JAVA

Although drilling rates have dropped off in West Java, PT Pertamina remains active and in August Cipicung 1 flowed minor gas from Batu Raja Formation carbonates to the southwest of the Haurgeulis gas/condensate field.

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In southern Central Java, Lundin wildcat Jati 1 in its Banyumas PSC is being drilled on the Cipari Prospect. Jati 1 is located at Pertamina's Karang Nangka 1 wellsite, some 800m east of BPM's 1938 Cipari 1 wildcat, and has a PTD of 3,231m, targeting Oligocene and Eocene clastics. This is Lundin's first well in the block.

In the East Java Basin "hot spot," exploration drilling has not let up. Lapindo's Tanggulangin 4 in the Brantas PSC was completed as a future gas producer in zones G-20, F-20 and E-10/E-20. The well had been tested with three DSTs run. DST 1 (zone G-30) and DST 2 (zone G-10) were unsuccessful, while DST 3, in zone E-10 between 709-716m, flowed 0.188 MMcf/d through a 32/64" surface choke. The well had been targeting several reservoir zones in Pucangan Formation sandstones. Next door in the Tuban JOA, PT Pertamina/PetroChina delineation well Sukowati 3 was suspended as an oil and gas well in July after the cased hole was perforated between 2,298-2,306m MD, 2,277-2,284m MD and 2,270-2,277m MD and a flow of 4,120 bo/d, 412 bw/d plus 1.24 MMcf/d on a 40/64" choke was reported. The objective Tuban carbonate had been penetrated at 2,146m MD and fair oil shows were observed. Delineation well Sukowati 4 followed. Finally, PT Pertamina/Medco's Sebaya 3, on Madura, was dry.

In the Madura Strait, Santos sidetrack Jeruk 2ST4/ST5, in the Sampang PSC, was suspended as an oil well in September. An open hole DST in the Kujung between 5,027-5,102m MD (4,658-4,719m TVDSS) flowed at a stabilised rate of 3,000 bo/d with a GOR of 450 cf/bbl through a 22/64" choke. The rate was constrained by surface facilities. Santos indicated that a formal reserves estimate will be announced in late 2005 or early 2006.

NATUNA SEA

Exploratory drilling in the Natuna Sea was limited to a single wildcat (Layur 1, dry) by ConocoPhillips. Activity in the area should resume with drilling programmes planned by Premier and Genting, the latter having completed extensive 3D seismic coverage of its West Natuna Sea acreage during this reporting period.

MAKASSAR STRAIT/OFFSHORE TARAKAN

There is no activity to report in the deepwater Makassar Strait, as the primary operator in the region, Unocal, has temporarily called a hiatus in exploratory drilling. Operations are expected to resume in both the Makassar Strait and offshore Tarakan Basin in the near future.

PAPUA

PetroChina and the PT Pertamina/PetroChina JOB continued to explore Kais Formation carbonate build-up culminations onshore Papua in the Salawati Basin. They recently completed Anak 1 (oil), Bisa 1 (dry), East N-1 (oil) and Klais 1 (dry), with several other wells either undergoing testing or awaiting test programmes. PT Pertamina is currently drilling the Wakamuk 2 appraisal.

OUTLOOK

As the year ends, it is clear that the anticipated increase in drilling activity did not occur. However, the marked increase in drilling seen in the August-September period may prove a turning point. Totals for 2005 are about 10 wells (or 14%) less than in 2004 but still far above the lows of 2003.

In closing, I would like to thank the IPA and its staff for a great conference.

First Technical Paper

Provenance of Cenozoic Sediments of East Java

Helen Smyth[1], Robert Hall[2]

Java is located on the edge of the Eurasian Plate at the margin of Sundaland. Since the Middle Eocene, there has been subduction of the Indo-Australian Plate beneath the Eurasian Plate along the Java Trench. As a result, Java is essentially a volcanic island containing the products of ancient and modern arc activity (Figure 1). Since van Bemmelen's work (1949), Java has been divided into zones running parallel to the length of the island. We subdivide East Java into four zones. The Southern Mountains Zone is an Eocene-Miocene volcanic arc built on Mesozoic basement; Eocene to Miocene deposits include volcanic, volcaniclastic, siliciclastic and carbonate rocks. The present volcanic arc has been active since the Late Miocene, and runs along the centre of the island. The Kendeng Zone, north of the Southern Mountains Volcanic Arc, was the main Eocene to Miocene depocentre in East Java and contains thick sequences of volcanogenic and pelagic sediments; it is now a fold and thrust

Figure 1: *Digital elevation model of East Java showing the locations of Oligo-Miocene volcanic centres.*

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belt. The Rembang Zone includes Eocene to Pliocene shelf-edge deposits such as shallow marine clastic sediments and extensive carbonates. This study of onshore East Java was based on fieldwork and focused on the basement and Eocene to Miocene rocks exposed at the surface (Smyth et al., 2003; 2005).

Stratigraphy

The well-exposed Cenozoic rocks of the Southern Mountains are subdivided into three synthems and were the subject of an IPA post-convention fieldtrip in September 2005 (Figure 2). A synthem is an unconformity-bounded package of rocks; we use this term instead of 'sequence' because the latter term has become so strongly associated with seismic interpretation and we have no seismic data for the Southern Mountains.

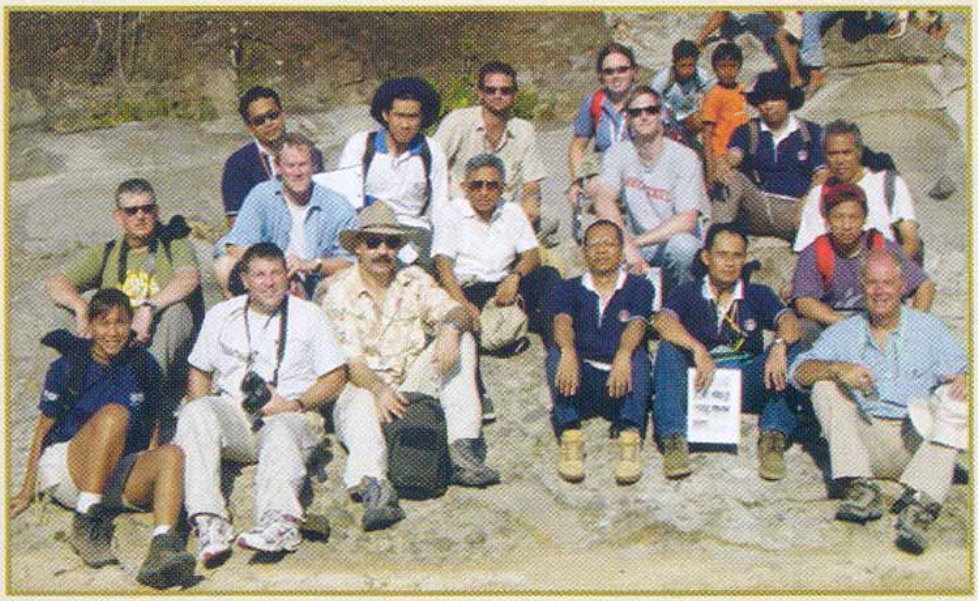


Figure 2: *IPA Fieldtrip to the Southern Mountains of East Java, September 2005. The location is the Lower Miocene Nglanggran Formation near Purwantoro.*

Sedimentation commenced in the Early Cenozoic above an angular unconformity (Figure 3) and Synthem One includes more than 1000m of Eocene to Lower Oligocene rocks. The oldest exposed rocks are terrestrial conglomerates and sandstones that contain no volcanic material and were derived solely from reworking of older basement lithologies. However, the amount of contemporaneous volcanic material increases rapidly up-section as the basement contribution decreases, and the section becomes fully marine. Synthem Two includes Upper Oligocene to Lower Miocene, mainly terrestrial, volcanic rocks of the Southern Mountains Volcanic Arc. There are at least 2000m of volcanic breccias. Volcaniclastic sandstones, pumice and thick ashes and individual volcanic centres can be identified (Figure 1). Synthem Three consists of more than 500m of reworked volcaniclastic sediments and extensive carbonates. It records a period

of reworking of the extinct Southern Mountains Volcanic Arc during the Middle Miocene, which was a period of widespread carbonate development in the Southern Mountains.

Volcanic Activity

There is no evidence of arc volcanism prior to the Middle Eocene, but sediments of Middle Eocene age contain volcanic quartz, ash and pumice, indicating initiation

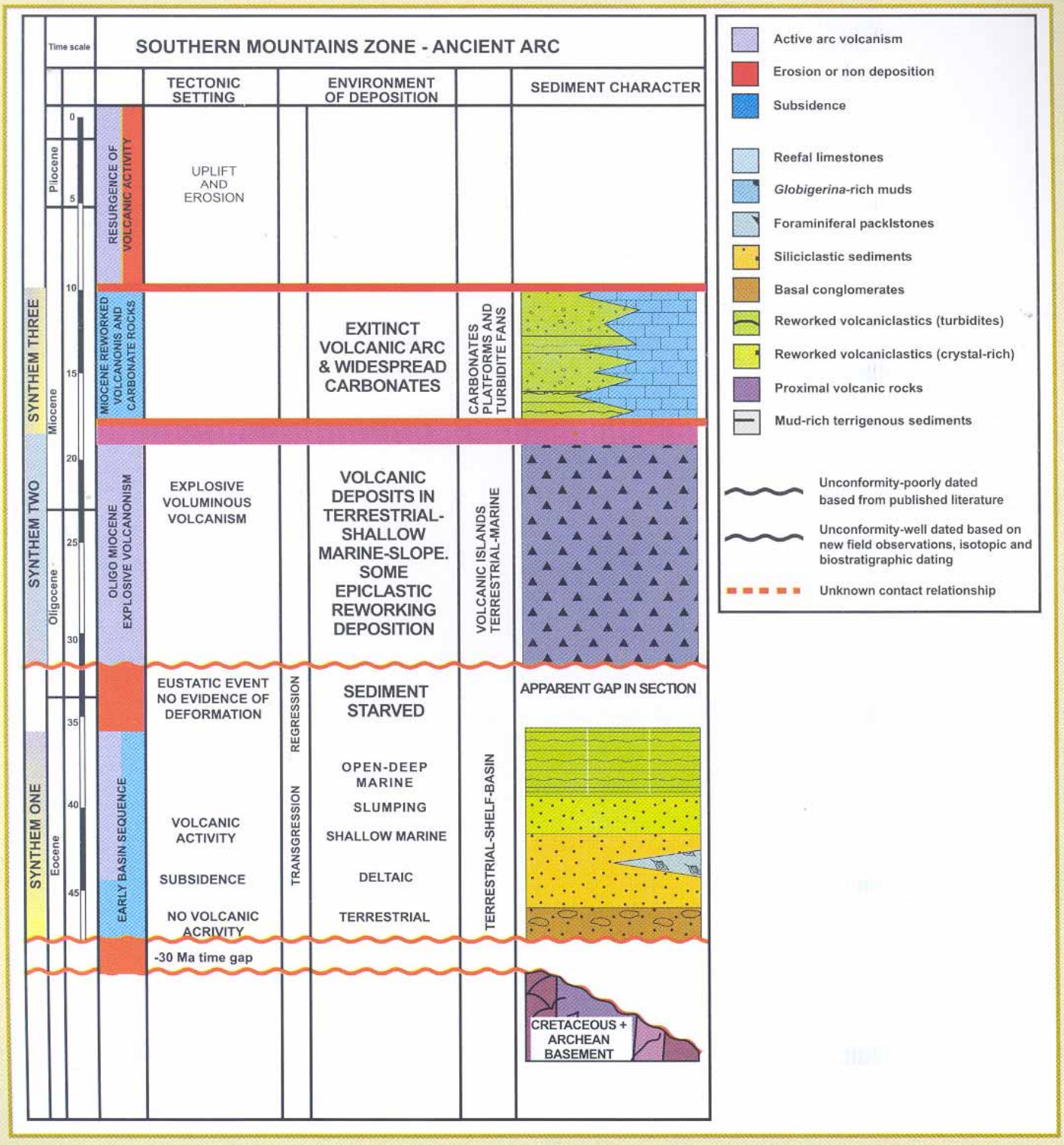


Figure 3: *Summary of the stratigraphy, environment of deposition and tectonic evolution of the Southern Mountains.*

of arc volcanism in the Southern Mountains. After the Middle Eocene, the arc grew in size and its contribution to adjacent basins increased. The volcanic activity in the Southern Mountains was Plinian-type - explosive and extensive. The products range from andesite to rhyolite with an average SiO_2 content of 67-wt %. U-Pb SHRIMP dating of zircons indicate that volcanism occurred between 42 and 18 Ma. The location of the oldest volcanic centres is not known because of the paucity of Eocene outcrops, but the Oligo-Miocene volcanoes formed an east-west oriented arc (Figure 1). Towards the end of the Early Miocene, volcanic activity cumulated in a climactic phase of eruptions. This is recorded in the Batu Agung Escarpment near Yogyakarta where the Semilir and Nglanggran Formations are exposed over a large area. The Semilir Formation is a thick accumulation of dacitic air-fall, pyroclastic flow and surge deposits formed by explosive eruptions. The Nglanggran Formation is a series of andesitic volcanic breccias possibly generated by sector or caldera collapse. Detailed fieldwork and U-Pb SHRIMP dating indicates that these formations were deposited in a very short time interval at 20 ± 1 Ma. They are distributed over an area greater than 800km^2, range in thickness from 100m to more than 1100m, and their volume is estimated to be at least 300 km^3. The scale of the deposits is similar to those around the central caldera of Toba suggesting eruptions of similar magnitude. The ash-fall from this Plinian event would have covered much of Java, the Java Sea, and other parts of SE Asia. The

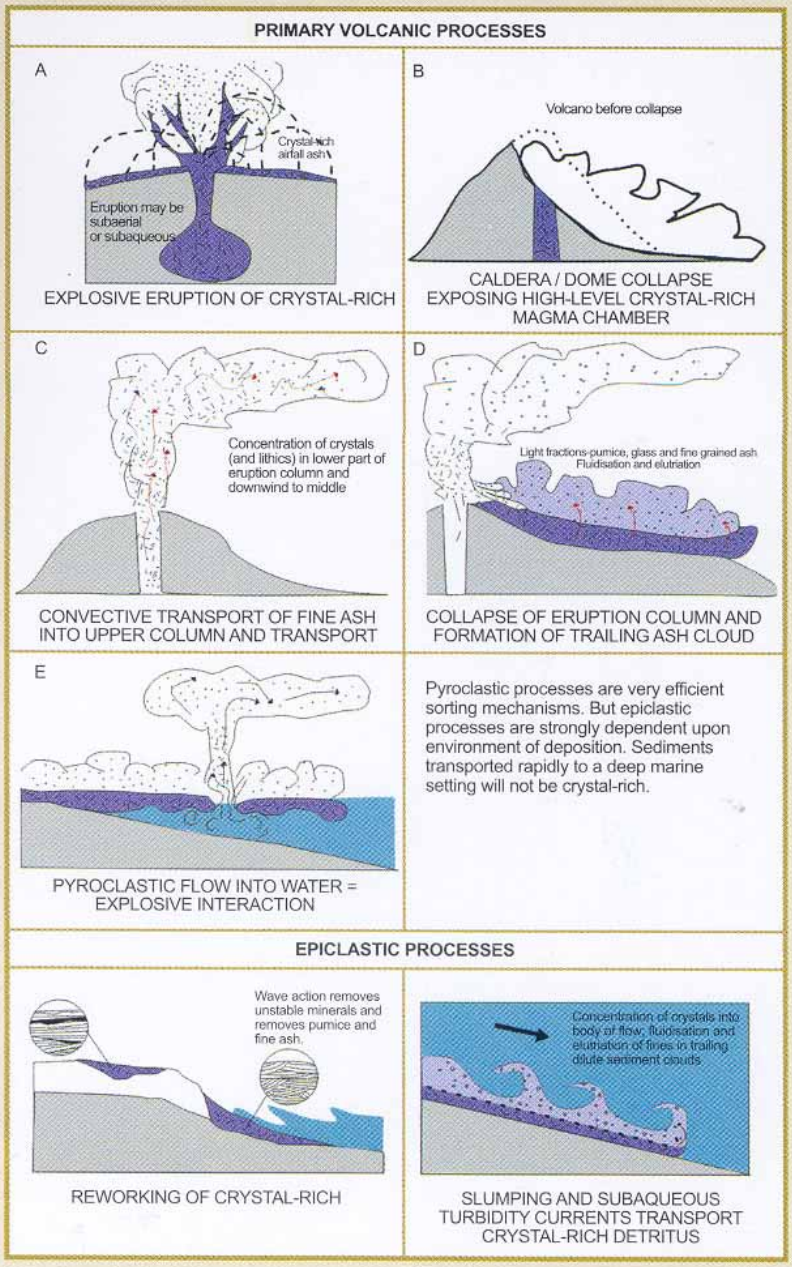


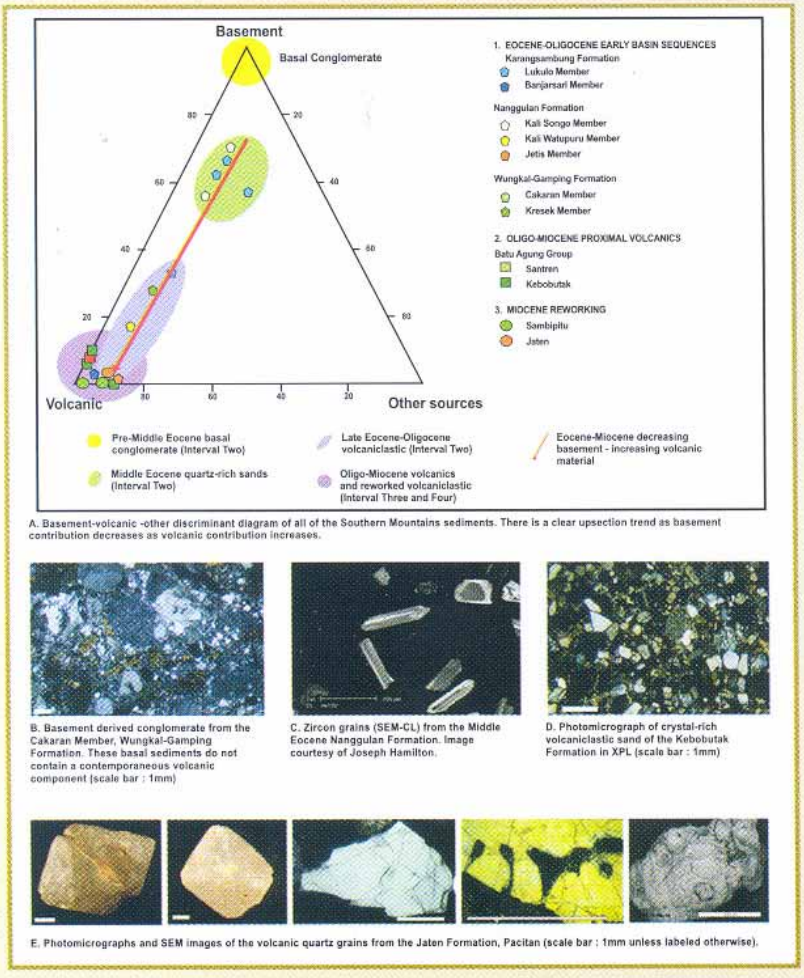
Figure 4: *Producing a crystal-rich volcaniclastic deposit by primary volcanic and epiclastic mechanisms (adapted from Cas and Wright, 1987).*

explosive eruptive process leads to very efficient sorting and transportation (Figure 4). Volcanic crystals such as quartz and zircon, and volcanic clays would have distributed over a wide area by fallout from the eruption cloud and grain size would have decreased systematically with distance from the centre. Epiclastic reworking of pyroclastic flows and ash falls would have produced well-sorted quartz-rich sands such as those well known from East Java.

There was a lull in volcanic activity during the Middle Miocene. The largely extinct arc provided abundant sediment. The lull was followed by a Late Miocene resumption in volcanic activity some 50 km to the north of the Southern Mountains Arc, along the axis of the modern day arc. The volcanoes of the modern arc are much more basic than those of the ancient arc with an average SiO_2 content of 55-wt %.

Mineralogy of East Java rocks

Study of the light and heavy minerals in sedimentary and igneous rocks has provided new insights into the origin and provenance of the quartz-rich sandstones of East Java and the character of the underlying crust. U-Pb SHRIMP dating of zircons in collaboration with Joseph Hamilton (formerly of CSIRO, Australia), Pete Kinny (Curtin University of Technology, Australia) and April Pickard (University of Western Australia) has been particularly useful.



A. Basement-volcanic -other discriminant diagram of all of the Southern Mountains sediments. There is a clear upsection trend as basement contribution decreases as volcanic contribution increases.

B. Basement derived conglomerate from the Cakaran Member, Wungkal-Gamping Formation. These basal sediments do not contain a contemporaneous volcanic component (scale bar : 1mm)

C. Zircon grains (SEM-CL) from the Middle Eocene Nanggulan Formation. Image courtesy of Joseph Hamilton.

D. Photomicrograph of crystal-rich volcaniclastic sand of the Kebobutak Formation in XPL (scale bar : 1mm)

E. Photomicrographs and SEM images of the volcanic quartz grains from the Jaten Formation, Pacitan (scale bar : 1mm unless labeled otherwise).

Figure 5: *Some details of the provenance of the Southern Mountains sediments.*

Quartz-Rich Sandstones of Volcanic Provenance

Several sandstones of Early Miocene age are purely volcanic in origin. They are well sorted and are apparently compositionally mature. But quartz grains are commonly very angular, and the presence of bipyramidal crystals, embayed and skeletal grains, melt inclusions and quartz shards (Figure 5), volcanic zircons and

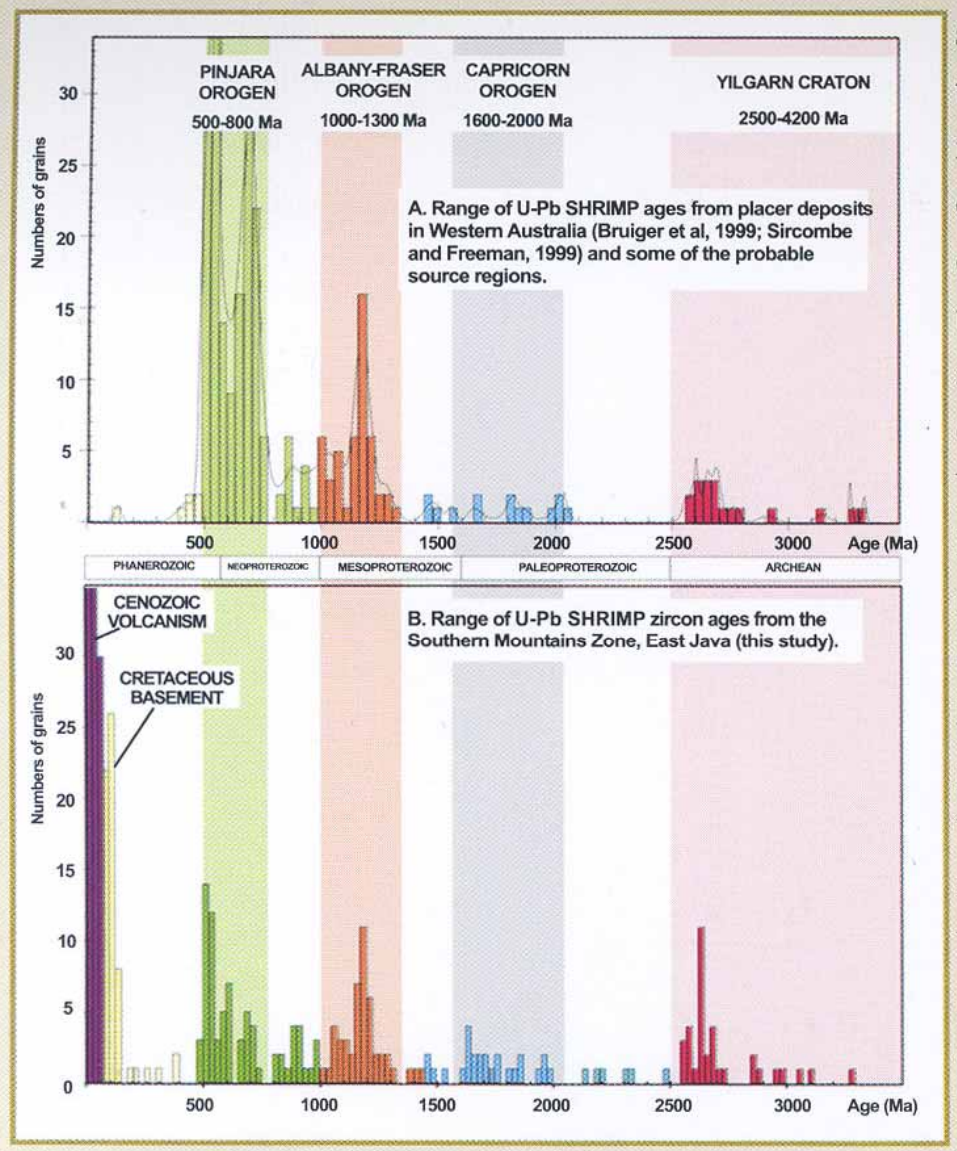


Figure 6: *Detrital zircon ages from placer deposits in Western Australia (Bruiger et al, 1999; Sircombe and Freeman, 1999) compared to the ages obtained from East Java.*

smectite clays indicate that these rocks are not the result of reworking and erosion of basement continental rocks but rather the product of volcanic activity and subsequent epiclastic sorting (Figure 4). Volcanic zircons have an Early Miocene age. The massive Early Miocene eruptions in the Southern Mountains resulted in the production of thick and widespread dacitic and rhyolitic ash deposits that would have provided an abundant, easily eroded source of quartz.

Rich Sandstones of Mixed Provenance

Many of the quartz-rich Eocene and Miocene sandstones, located in the north and west of the study area, contain a volcanic component, indicated by the character of quartz grains, elongate volcanic zircons and smectite clays, accompanied by metamorphic debris. These sandstones were previously interpreted to be the product of erosion of Sundaland (e.g. Ardhana, 1993; Sharaf et al., 2005), but U-Pb SHRIMP dating of zircons suggests that this is not the case. They contain Early Miocene and Cretaceous zircons. Most potential Sundaland source areas are overlain by Cenozoic sedimentary rocks and could not have supplied quartz to East Java. The nearest possible source region is the Schwaner Mountains of SW Kalimantan and heavy mineral studies by Marco van Hattum (2005) of the SE Asia Research Group in Sabah show that the Cretaceous Schwaner granites were elevated and supplied sediment to northern Borneo between the Eocene and Early Miocene. The Schwaner Mountains-derived material has a

distinctive zircon age profile with an age range of 78 to 89 Ma quite unlike the zircon ages of East Java rocks. The East Java sandstones also contain Cretaceous zircons but their ages are similar to those of zircons separated from quartz-rich sands in the Karangsambung region suggesting explosive volcanic activity distributed ash containing newly-formed Miocene zircons from acid melts and unmelted Cretaceous zircons derived from the local basement. The lack of Cretaceous zircons similar in age to those of the Schwaner Mountains also suggests that the Karimunjawa Arch formed a major drainage divide between Sundaland and East Java between the Eocene and Early Miocene.

Older Basement

Zircons in East Java include those with Cenozoic ages recording volcanic activity in the Southern Mountains Arc, and Cretaceous zircons derived from the local basement. In addition, in rocks from the Southern Mountains west of Yogyakarta there are zircons with Cambrian to Archean ages. The range of ages suggests that magmatic rocks have sampled material of Gondwana origin beneath East Java but there are no rocks exposed, or known from the subsurface, that could account for these ages. Granitic rocks are known from SW Kalimantan, the Malay Peninsula, the Malay Tin Belt, and Sumatra, but none of these are known to contain or intrude Archean age material. However, the range of ages is very similar to those of zircons from the Perth Basin, Western Australia (Figure 6) derived from the ancient orogens of Western Australia (Bruiger et al, 1999; Cawood and Nemchin, 2000; Sircombe and Freeman, 1999). These similarities strongly suggest that the zircons in the Southern Mountains were derived from a continental fragment beneath East Java, which originated from Western Australia. The basement of East Java is, therefore, interpreted to be varied, including metamorphosed terranes of accreted arc and ophiolitic material in the north and west, and Archaean continental material beneath the Southern Mountains.

Conclusions

Subduction began south of Java along the Java Trench during the Middle Eocene and arc volcanism continued until the Early Miocene (42 to 18 Ma). Volcanic activity was explosive, reflecting melting of underlying continental crust that probably formed part of a fragment of Australian origin, which collided with the Java margin in the Late Cretaceous. Volcanic activity in the Southern Mountains Arc culminated in a massive eruptive phase at around 20 Ma. This event generated widespread air-fall ash deposits, which contained significant proportions of quartz. Much of this

quartz was reworked into the quartz-rich sandstones of East Java. Following a Middle Miocene lull in activity, there was resumption of arc activity some 50 km to the north during the Late Miocene. There is little evidence of sediment derived from continental Sundaland and this implies the presence of a major drainage divide between Sundaland and East Java between the Middle Eocene and Early Miocene, probably the Karimunjawa Arch.

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IPA Field Trip
Southern Mountains, SE Java

September 1-6, 2005

Bernhard Seubert[1]

Java, East Java in particular, is back on the radar screen for new venture geologists. While most of the traditional acreage around Cepu and in the Madura Strait remains under contract, the southern margin of the basin presents opportunities.

Scientists like to package their hypotheses into questions. "Is there another universe?" "Is there life after death?" "Is there quartz sand in southeast Java?" These hypotheses are then verified or rejected by experiment or observation. A third possible answer to a proposed hypothesis, one outside the usual binary yes-or-no, is, "Does it matter, anyway?" Let's start from here.

Picture 1: *The participants of the field trip on Prigi Beach, East Java. Front row, from left to right: Wu Peikang (Cnooc), Prof. Robert Hall and Dr Helen Smyth the trip leaders (London University), Rhys Schneider (Chevron), Parvita Siregar (Eni), Aris Widarmayana, Agus Muharam and Mac Sarwadhamana (all three from ExxonMobil). Back row from left to right: Keith Parris (Freeport), Reno Faisal (Cnooc), Andrew Fields (Freeport), Sugeng Hartono (PetroChina), Paul Warren (Freeport), Apziarief Rahman (Medco), Marhadi (Chevron), Bernhard Seubert (PetroPEP).*

[1] PT. PetroPEP, Geoscience Consulting, phone 021-739 2170, email sales@petropep.de

What if it could be proved that there are a few quartz grains and a little bit of the right kerogen somewhere on the south coast of East Java, would it matter? The few grains might ultimately lead to more grains, sandstone and a reservoir. This might open the way to exploration, discovery and oil production at a time when it's most needed.

Picture 2: *Large slump feature exposed by a recent landslide. Aris Widarmayana of ExxonMobil serves as scale bar.*

Over the years, remarkably little has been published about the geology of southeast Java. Researchers like Rein van Bemmelen and his followers have bypassed the area. Even today, students of earth sciences prefer to roam the dry hills of Karang Sambung rather than Pacitan. Helen Smyth's PhD thesis, the essence of which she presented at the 2003 IPA convention, and this year's field trip to the Southern Mountains aim to fill this gap. The questions addressed in the field were two: "Can there be reservoir-quality quartz sand in the region and if so, what is its origin?" and "Is there a source rock in the system?"

By the second day of the excursion, it became clear that quartz sands can originate from volcanics, like those observed in the hills of Pacitan, as long as they are rhyolitic or of a related chemical composition. Relying on zircons to time the various magmatic events, leads one to challenge some long-held geological concepts. For example, the Ngrayong sand, a prolific reservoir further north, may not have come from Kalimantan but rather it may have originated locally from volcanic

events in the south of the basin. If so, might it be possible that an entirely unknown reservoir sweet spot could be found on the southern margin of the East Javanese basins? Zircon analyses have also uncovered the presence of Archean age material in the volcanics of the Southern Mountains. Speculation suggests that this is stuff from the Australian craton subducted under Java as continental fragments and spewed up by the Tertiary volcanoes.

Among the participants in this trip, were a remarkable percentage of mining and mineral geologists whose presence in the volcanic terrane was helpful. Geophysicists and new venture geologists completed the group.

The itinerary was fast paced. Every stop and every outcrop had a clear point and followed a consistent choreography; from older rocks to younger, from interesting locations to even more spectacular ones, from the well-established concepts to the contentious ones. Participants, led by Robert Hall and Helen Smyth, were able to gather first-hand evidence. Sample bags were filled with handpicked crystals of bipyramidal quartz grains and Nummulites. The climax of one field day was carbonaceous material, clearly a potential source for oil or gas. Although the vitrinite reflectance data at this location indicated that it was never deeply buried, it was left to the imagination whether there could be a mature source somewhere deeper in the subsurface.

Which brings us back to the key question. "Could there be a petroleum system in southeast Java?" A possible answer could be, "Yes, there are several, almost firm indications which seem to hint at a possible interpretation that may lead to the conclusion that a petroleum system could exist in the studied area while other observations seem to contradict this interpretation." Before clarity prevails, more zircon grains will have to be dated, more forams will need to be found and identified and gravity or seismic reconnaissance lines recorded and interpreted. At the moment, with nothing definitive, there will be no "Pacitan-1." Perhaps some day soon.

In summary, this was an excellent field trip. Helen Smyth and Robert Hall presented the field trip material in a very clear and consistent fashion, building on the latest regional concepts. They were patient partners in many good discussions. The guidebook is an outstanding document with excellent graphics and complete with GPS data.

The IPA should be commended for organizing this program.

Relationship Between Facies and Fracturing
A Comparison of Fractured Carbonate Reservoirs on Seram Island, Indonesia and Southern Italy

Nara Nilandaroe[1]

Introduction

In July 2005, Murphy and Longley provided the IPA with an excellent summary of carbonate development in SE Asia. Their discussion of platform carbonates was, however, confined to those formed during the Cenozoic. This work deals exclusively with the only Mesozoic platform carbonate on production in Indonesia.

The Jurassic Manusela Carbonate is a producing fractured reservoir in KUFPEC's Oseil Field, Seram Island, Eastern Indonesia.

Understanding of fracture development and in particular the relationship between fractures and sedimentary facies is fundamental for the proper reservoir description of low matrix-porosity fractured carbonates. The use of field analogues, the integration between outcrop and subsurface data, and the regional geological history are key elements in that learning process.

The American Association of Petroleum Geologist (AAPG) sponsored a field seminar in southern Italy in May 2005 (Figure 1). The field seminar was conducted over the fold and thrust structures of the Southern Apennines. This area is considered a viable field analogue for the fractured reservoir of the Oseil Field, based on the similarities of the reservoir and tectonic settings.

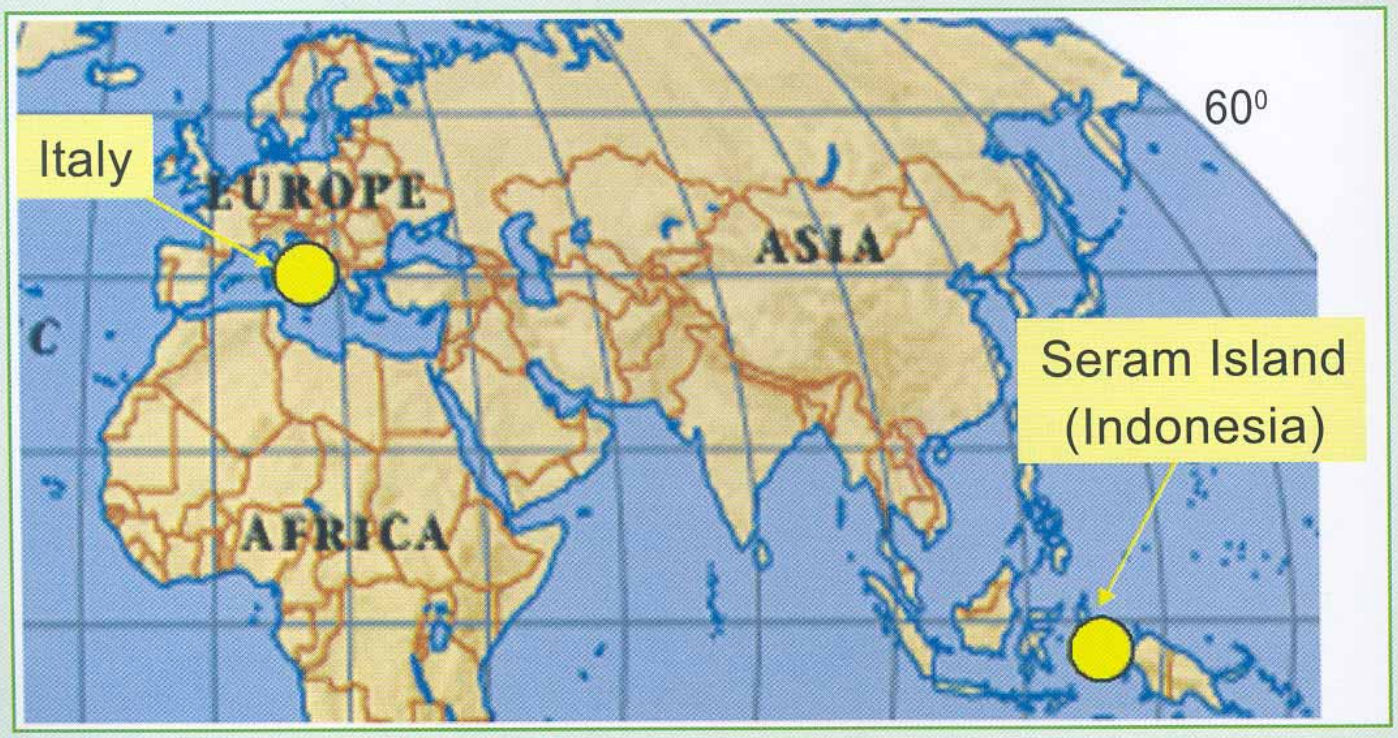

Figure 1: *Seram Island is located 14,000 km from southern Italy.*

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This note briefly summarizes results of a comparison between fractured reservoirs on Seram Island and those in southern Italy. The geology of southern Italy provides well-defined descriptions of fracture development and its relationship with lithofacies.

Similar Tectonic Settings

Seram and southern Italy show similarities in their tectonic settings with fold and thrust belts (Figure 2 and 3) produced by plate collisions at tectonic margins. All fractures that were observed were assumed to be products of the regional tectonics.

Seram Island is located on thenorthern rim of the Banda Arc within the complex mobile belt between the Australian, Pacific and Eurasian (Sunda) tectonic plates. A Late Miocene collision of microplates within the mobile zone produced the fold and thrust belt that is now exposed on the Island. By the Early Pliocene, continued shortening caused by the collision could no longer be absorbed by imbrication within the thrust belt, and left- lateral strike-slip tectonics became the dominant deformational style.

The Southern Apennines are composed of a pile of nappes derived from the deformation of different Mesozoic-Cenozoic domains and represent the result of the Neogene-Quarternary continental collision between the African and the European plates.

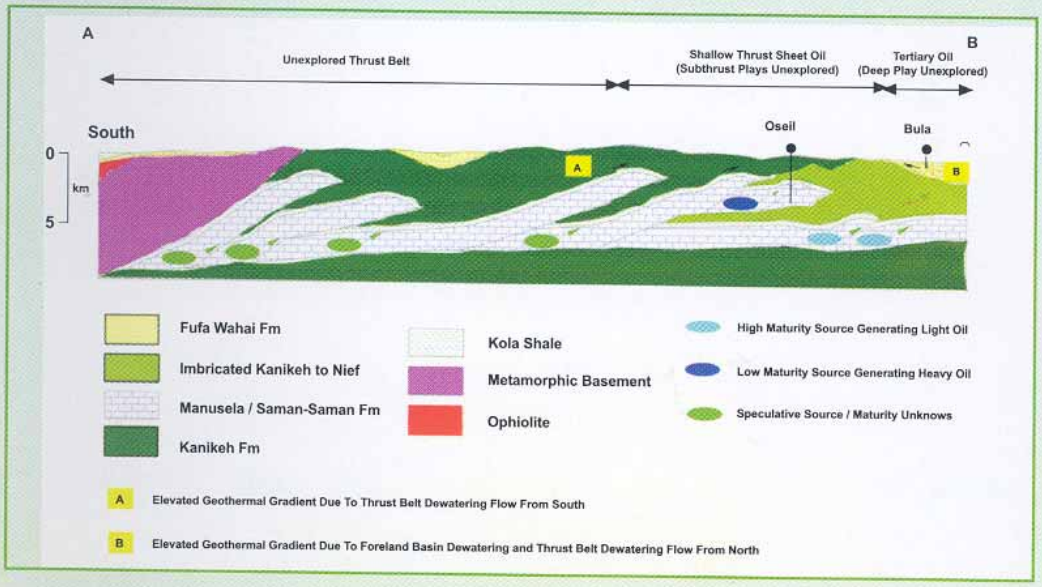


Figure 2 : *Seram Diagrammatic Cross Section*

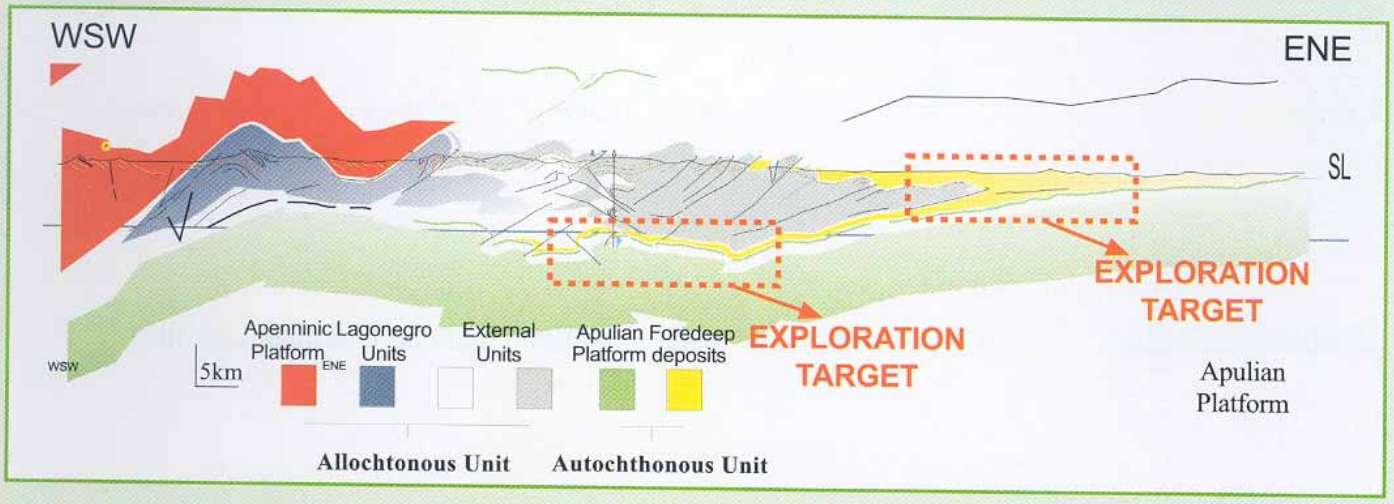


Figure 3: *Schematic relationship between the tectonic units of the Southern Apennine thrust belt (Turrini et al, 2003, in Raffaele et al, 2005)*

Lithofacies and Fracturing Relationship

KUFPEC studies on Seram (Nilandaroe et al, 2000) suggested that there is a relationship between lithofacies and fractures development. Fractures are better developed in the coarser grained facies (oolitic grainstones and sandy carbonates with grain supported mode) than in the muddier facies (matrix supported mode) (Figure 4).

Figure 4: *An example of fracturing in the fine- grained (mud matrix supported) facies and coarse- grained (grain supported) facies. The larger scale fractures are better developed in the coarse-grained facies of the Manusela Formation*

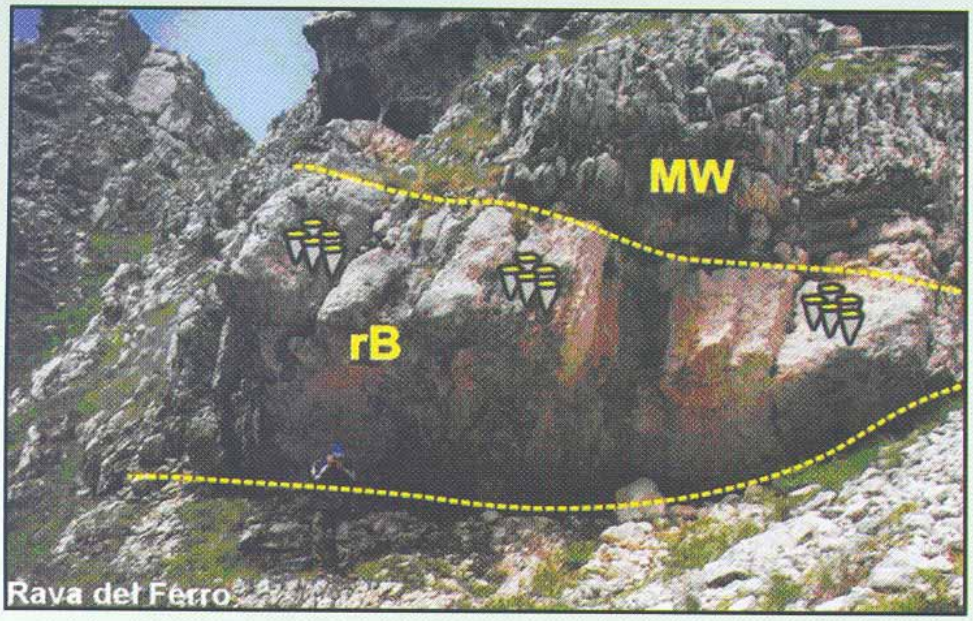


Figure 5: *Rudist bafflestone bank (rB-mud matrix supported) intercalated between peritidal (MW-Mudstone/Wackestone) facies. Note that micro-fractures are better developed in the Mudstone/ Wackstone (MW) facies (Raffaele et al, 2005)*

The AAPG field seminar in southern Italy provided further insight into the relationship between lithofacies and fracture development at various scales. Extensive geological investigation of the Apulian Platform in southern Italy suggests that micro and medium- scale fractures are controlled by lithofacies (Figure 5). The macro and large fractures are apparently less controlled by the lithofacies, than by their proximity to faults.

Large-scale fractures and faults observed during the field seminar suggest that they affect all the facies without any discrimination.

Importance of Understanding Lithofacies and Fracturing Relationship for Reservoir Evaluation

Understanding the lithofacies of a fractured carbonate reservoir is a key element for understanding reservoir behavior. Fracture networks influence reservoir connectivity and they control the fluid-flow paths (Figure 6).

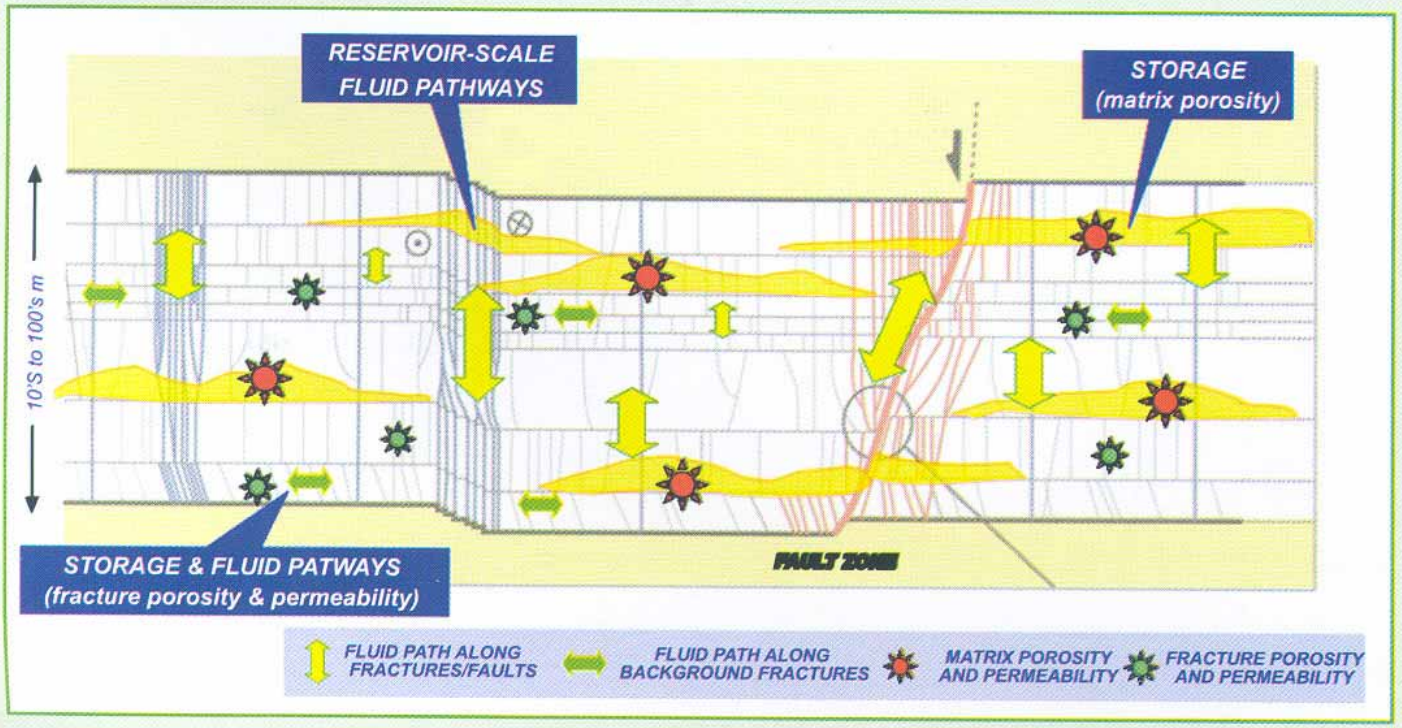


Figure 6: *Schematic diagram representing the relationship between lithofacies, fracture network and reservoir connectivity in the Apulian Carbonate, southern Italy (Raffaele, et al, 2005)*

Summary

Small-scaled fractures, which may provide hydrocarbon storativity in fractured carbonate reservoirs, may be primarily controlled by lithofacies. The large-scaled fractures, however, are apparently controlled by their proximity to faults. An ideal well trajectory might, therefore, be one that penetrates the reservoir through a fault, cutting through the coarser grained facies. Detailed fault and facies mapping is, therefore, important in the design of a fractured carbonate development program.

References

Murphy, R.W. & Longley, I. I. 2005. Carbonates in Southeast Asia. IPA Newsletter July 2005.

CORRECTIONS

In the July 2005 issue, two mistakes were made on page 31 in the article, "Mantle Tomography and Southeast Asian Tectonics."

In paragraph two, the last sentence should read_

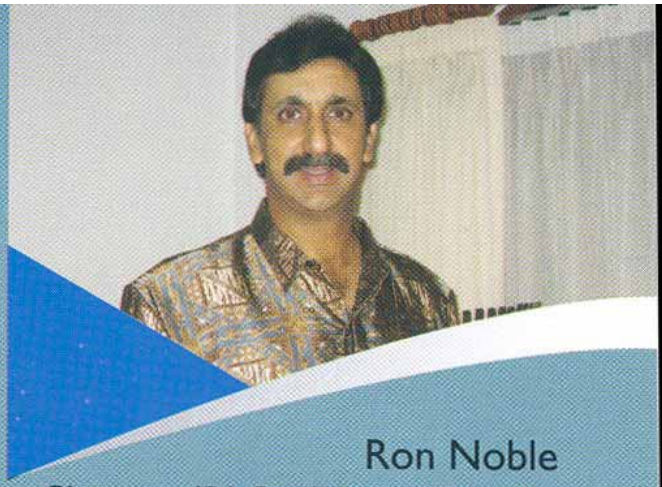
"However, the radially symmetrical Earth model provides the starting point for more complex models produced by seismic tomography."

In paragraph three, the first sentence should read_

"As the number of seismic stations collecting data from earthquakes increased, small deviations in the arrival times predicted by a radially symmetrical Earth model became apparent."

We regret these errors.

CHAIRMAN'S CORNER



Ron Noble
Chairman IPA Professional Division
Anadarko Indonesia Company

Dear IPA Members and Friends,

I was recently in the US and paid more than $3 per gallon to fill up my rental car, a huge increase over the price I paid on my last visit. Closer to home, fuel subsidies on gasoline and kerosene are being scaled back by the Government of Indonesia. A difficult step to take, but an essential one for the long term health of the Indonesian economy. All countries, including the major producers, are dealing with the surge in oil prices, which do not show any signs of retreating in the near future. Consumers are not happy, and economists are fearful of how global markets will react to the increased cost of living.

For us Professionals in the oil patch, it's a different story. It feels like "Boom Time" is upon us again. Most oil companies are seeking to reinvest their increased profits in E&P projects. The effects are being felt across all sectors of the industry, with high demand for drilling rigs, fully utilized seismic vessels and requirements for all types of oilfield services and equipment. Trained and qualified personnel are also in short supply. The decline in college enrollments over the past two decades for geoscience and engineering disciplines are ultimately having the predicted effect.

Many of us have ridden these waves in the past. The general feeling is that we should make the most of it while it lasts, without excessive overreaction to the current upturn. For without doubt, things will change again in some unpredictable way.

It's the nature of our petroleum industry!

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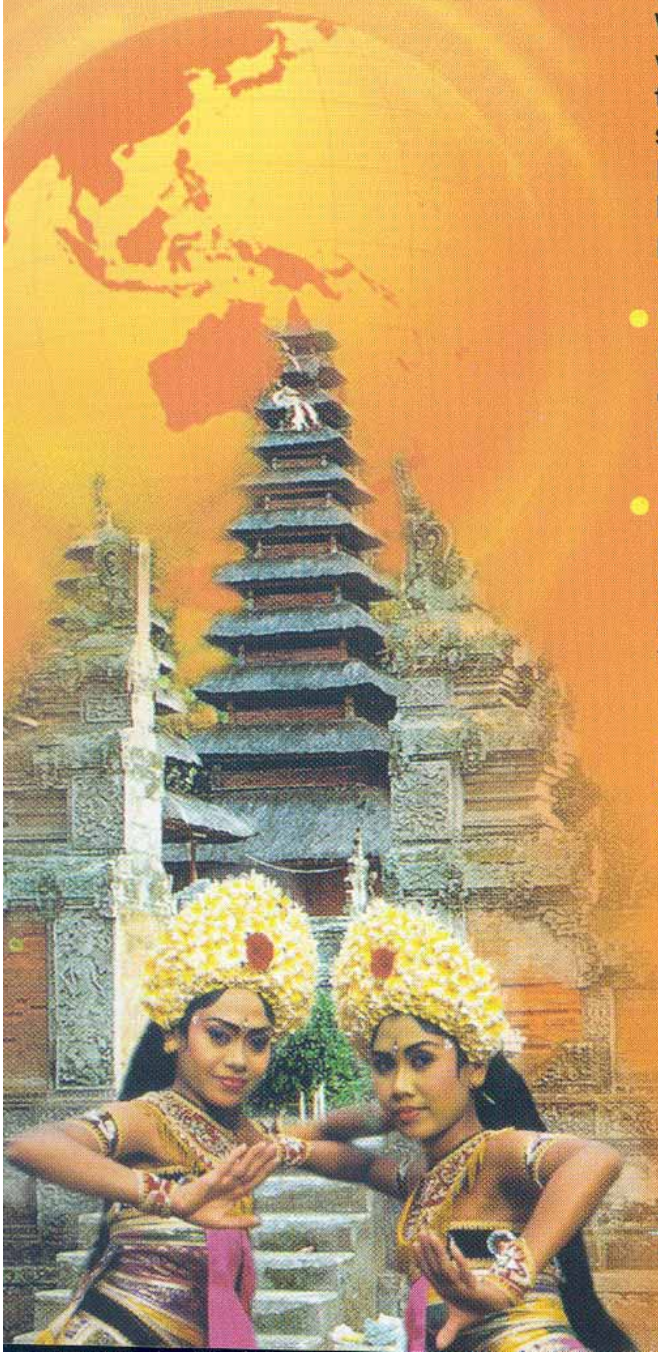

The Bali 2006 International Geosciences Conference and Exhibition will be held on 24-26 July 2006 in Bali Indonesia. With no IPA convention planned for 2006, this conference will be one of the most important geosciences conferences to be held in the region in 2006. The conference is sponsored internationally through the SEG, and in Indonesia through the HAGI, IPA, IATMI and IAGI. With its location in Bali Indonesia, it promises to draw exhibitors, presenters, and delegates from around the world.

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