AAPG EXPLORER

SEPTEMBER 2012

A New Perspective

Kurdistan proves itself a region of surprises

See page 44

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS AN INTERNATIONAL ORGANIZATION

Vol. 33, No. 9
September 2012

AAPG EXPLORER

PRESIDENT'S COLUMN

Changing Times, Changing Needs

By TED BEAUMONT

An average of four dry holes are drilled through a giant field before the discovery is recognized, according to AAPG Sidney Powers Medalist Robert M. Sneider.

Are the same statistics true for discovering and developing an unconventional resource play?

Testing an unconventional resource play concept is much different than testing a conventional play concept. Conventional plays can be tested by purchasing a relatively small acreage block – in the United States 1,280 acres might be sufficient. Conventional well tests in the United States usually are vertical, and depending on depth could cost $500,000 to $4 million to drill and complete. Four million dollars would be a very inexpensive test for an unconventional resource play.

Wells to test unconventional resource plays are usually horizontal and have multiple hydraulic fracturing stages. They can cost many millions of dollars. Well costs depend on where they are, how deep they are and how many hydraulic fracturing stages they require. One company reported that recent Bakken development wells cost an average of $8 million, with an average recovery of 660,000 BOE. Also, unconventional resource plays require large lease blocks to make the effort worthwhile – 10,000 to 100,000 acres is not uncommon.

The high well and land costs might tempt one to think that drilling a single well with enough science is enough to prove or disprove an unconventional resource play concept – but history doesn't bear that out. That also assumes engineering plays a minor role.


BEAUMONT

As a result of the shale gas play our basic concepts of the reservoir have changed forever.

The Barnett Shale play took 20 years to get off the ground. Mitchell Energy had the patience to drill many dry or marginal test wells before the play was successful.

Many AAPG members, especially those working U.S. basins, are searching for unconventional resource plays. They must gather enough data to convince their management or an investor to buy their play concept.

How much data is necessary?

What is overkill?

Those questions are important, because it takes money – and just as importantly, time – to gather all the data. One has to ask questions such as:

Do we need 3-D data? How much 3-D data?

Do we need source rock data? What kind of source rock data, i.e. richness maturity, mineralogy?

Some questions might be difficult to answer without drilling a test well, which is why more than one well usually is necessary.

* * *

These are interesting times. Not many people 10 years ago thought that we would consider a rock with nanodarcies of permeability a reservoir, but now we do. I heard an engineering professor from a major university say that as a result of the shale gas play our basic concepts of the reservoir have changed forever.

AAPG also is changing. The AAPG (you and I) is endeavoring to create new publications, BULLETIN articles, short courses and workshops that supply members with data, technology and concepts from all over the world that we can apply to our area of interest.

One example of a new AAPG project is the Unconventional Resources Technology Conference, or URTeC, created by former AAPG Executive Director Rick Fritz. It will help give

See **President**, next page

Videos Now Online for AAPG Officer Candidates

Video statements from all AAPG Executive Committee officer candidates, most filmed during the recent Leadership Conference in Tulsa, are now available online at www.aapg.org.

The candidates were filmed responding to the statement, "Why I accepted the invitation to stand for AAPG office."

Biographies and individual information for candidates also remains available online.

Ballots for the election will open in spring 2013. The person voted president-elect will serve in that capacity for one year and will be AAPG president for 2014-15.

The slate is:

President-Elect

❒ **Randi S. Martinsen**, University of Wyoming, Laramie, Wyo.

❒ **Kay L. Pitts**, Aera Energy, Bakersfield, Calif.

Vice President-Regions

❒ **István Bérczi**, MOL Hungarian Oil and Gas, Budapest, Hungary.

❒ **John G. Kaldi**, Australian School of Petroleum, University of Adelaide, Adelaide, Australia.

Secretary

❒ **Richard W. Ball**, Chevron Upstream, Southern Africa SBU, Houston.

❒ **Sigrunn Johnsen**, independent consultant with ProTeamAS, Stavanger, Norway.

Editor

❒ **Colin P. North**, University of Aberdeen, Aberdeen, Scotland.

❒ **Michael Sweet**, ExxonMobil Production, Houston.

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TABLE of CONTENTS

REGULAR DEPARTMENTS

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Photo courtesy of Switch Energy Project

ON THE COVER:

The canyons of Rawanduz in the Kurdistan Region of Iraq provide breathtaking beauty that is a bit surprising to those new to the area – and for geologists and geoscientists who arrived there for exploration, the region held even more surprises. And all were good. A story on the drilling of Kurdistan's Shaikan-1, one of the world's largest oil discoveries of the last decade, can be found in this month's Historical Highlights, page 44.

On this page, past AAPG president Scott Tinker (center) visits a geothermal pool in Iceland to film a scene in his movie "Switch," which has a big commercial roll-out set in September. See story, page 50.

Vol. 33, No. 9

The AAPG EXPLORER (ISSN 0195-2986) is published monthly for members by the American Association of Petroleum Geologists, 1444 S. Boulder Ave., P.O. Box 979, Tulsa, Okla. 74101-3604, (918) 584-2555. e-mail address: postmaster@aapg.org. Periodicals Postage Paid at Tulsa, OK and at additional mailing offices. POSTMASTER: Please send address changes to AAPG EXPLORER, P.O. Box 979, Tulsa, Okla. 74101. Canada Publication Agreement Number 40063731 Return undeliverable Canadian address to: Station A, P.O. Box 54 • Windsor, ON N9A 6J5 • E-mail: returnsIL@imex.pb.com

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Earth Science Week Focuses on Careers

"Discovering Careers in the Geosciences" is the theme of Earth Science Week 2012, which is an annual event that promotes scientific understanding of our planet.

A poster promoting activities being held Oct. 14-20 is inserted in U.S. addresses of this issue at page 11.

The theme of ESW 2012 aims to boost awareness about the geosciences and the many exciting career and job opportunities in the field.

Among the events are three national contests, including:

- A photography contest for students, geologists and the general public, with the images representing "Earth Science is a Big Job." Entries must be composed of original, unpublished material, and capture how Earth scientists work in the community.
- A visual arts contest, "Imagine Me, An Earth Scientist!" is open to students in grades K-5. Use artwork to imagine yourself as an Earth scientist! What would you study? How would you gather information? And what tools would you use?
- Students in grades 6 through 9 can participate in the essay contest addressing the idea of "Geoscientists Working Together."

Submissions will be judged by a panel of geoscientists on creativity, relevance and focus on the topic. Selected winners will be awarded for their submissions. For details, go online to www.earthsciweek.org/contests/index.html.

The ESW program, launched by the American Geological Institute in 1998, encourages a "grass roots" effort for the geosciences community to publicize the event, distribute teaching materials and provide guidance for those interested in participating in ESW.

Earth Science Week is organized annually by AGI with support from the AAPG Foundation, the U.S. Geological Survey, U.S. Department of Energy, NASA, the U.S. National Park Service, ExxonMobil, ESRI and others.

President
from previous page

members critical information they need for creating or evaluating resource plays.

The conference is a joint project of AAPG, SPE and SEG, and will be held in August 2013 in Denver (see related story, page 49). It is the first of its kind among the three societies and is designed to provide a true interdisciplinary program on current potential resource plays in the United States and around the world.

A call for papers has been issued for the inaugural URTeC – with a Nov. 15 deadline – for those who might want to be involved as a presenter.

The three technical program co-chairs are AAPG Honorary Member and past president Steve Sonnenberg, with the Colorado School of Mines; AAPG member Ken Beeney, with Devon Energy; and Luis Baez, with BG Group.

Make plans to attend now.

* * *

What do you think?

What new publications, short courses or workshops do you want?

Please let AAPG know. Also, please share your ideas with the rest of AAPG by presenting and publishing papers.

You can publish your ideas in the flagship of AAPG, the BULLETIN, or in AAPG's widely read online journal, *Search and Discovery*.

In doing so, you're keeping both science and AAPG alive and vital in the world's energy future.

Ted Beaumont

Be Alert for Check Fraud Schemers

NOTE: The name and images of AAPG and other reputable organizations, including SPE, are being used by criminals to commit fraud.

AAPG officials recently were alerted to the scheme in which numerous fraudulent checks have been sent to individuals with the names of the organizations, including AAPG, as payer. The individual was then asked to deposit the check and forward the funds to another person.

Members and the public should be aware that in no case would AAPG ask anyone to forward funds to another person; all should be vigilant for potential fraudulent activities.

AAPG is working with federal authorities on this matter and has taken appropriate action with the banking community to mitigate the criminal activity.

If you receive an unexpected check from AAPG and are asked in turn to send money to another person, please contact the AAPG accounting department at (800) 364-2274.

Global insights focuses on Asia Pacific

Singapore ICE Has World-Class Program

By VERN STEFANIC, EXPLORER Managing Editor

A world-class technical program that promises to address the world's rapidly changing and intensifying demands for energy is about to move from the planning stage onto the main stage.

"Asia-Pacific Resources: Fueling the Future" is the theme for the AAPG International Conference and Exhibition, which will be held Sept. 16-19 at the Marina Bay Sands Expo and Convention Center in Singapore.

The meeting marks the first time AAPG has turned to Singapore for its annual ICE event. The last time the Asia-Pacific region hosted an ICE was the 2006 meeting in Perth, Australia, which was the highest-attended ICE in the event's 24-year history.

Organizers, recognizing the growing impact of unconventional development in the region and throughout the world, have focused on providing a program that is responsive to the world's current reality of demand and potential.

For example, the meeting's first technical event will be a plenary session (see related story, page 16) titled "The Unconventional Resources Energy Revolution – Is Asia Pacific Next?"

"The 2012 ICE is happening in the right region at the right time," said general chair Richard Lorentz, with Kris Energy in Singapore. "The unconventional theme addresses a big question – can Asia follow the success of the North American story?"

Singapore's Marina Bay Sands Expo and Convention Center will be the site of the upcoming AAPG International Conference and Exhibition, set Sept. 16-19.

The plenary session, which will be moderated by past AAPG president Scott Tinker, will discuss and debate accelerating Asia-Pacific's shale gas, shale liquids and coalbed methane plays.

But Lorentz is quick to point out that the conference draws on not only the Asia-Pacific region, but from all over the world for insights into "evaluating our approaches to the core elements of petroleum systems – from frontier basins to mature petroleum provinces."

Right Place, Right Time

Meeting in Singapore, itself, further emphasizes the theme and intent of the meeting.

"Things have really picked up since the financial crisis of the late 1990s, and once you visit Singapore you can feel the increase of activity," Lorentz said. "Companies want to be active in Asia – this is perfect timing for an AAPG ICE where the depth and breadth of our technical program will address the current issues in an Asia-Pacific context.

"Asia is the most populous continent in the world with one of the highest levels of economic growth, which is likely to continue over the next couple of decades," he continued. "The growth is fueling higher energy demand, whether it be conventional, unconventional or alternative sources in this resource-rich region.

"Gas will continue to be a big and increasing part of the energy mix in Asia," he added. "And there is a move now to unconventionals."

Another plus is the ICE locale: the new Marina Bay Sands Expo and Convention Center, located in the heart of Singapore.

"The fantastic site gives the delegates the opportunity to really see and taste

See **Singapore**, page 8

The 2012 AAPG International Conference and Exhibition in Singapore marks the fifth time the Asia-Pacific Region has provided the setting.

Previous ICE meetings in the Region (and their total attendance) were:

- Perth (2006) – 2,626
- Bali (2000) – 1,861
- Kuala Lumpur (1994) – 1,113
- Sydney (1992) – 1,012

The Merlion is the mascot and national personification of Singapore.

Photo courtesy of S. Mulan

The complex and impressive geology surrounding Lake Toba in Sumatra – nearby to Singapore, and the destination of an ICE field trip.

Singapore

from page 6

the city first hand," Lorentz said, "its rich diversity of food and cultures and the wonderful tropical fauna."

The technical program itself comprises 212 oral and 185 poster presentations – "plus an excellent offering of short course and field trips," Lorentz added.

That program is organized around five areas:

- Exploring and Developing Asia-Pacific's Petroleum Provinces.
- Trap, Source, Reservoir and Seal Definition.
- The Past Is the Key to the Future.
- Facing the Future's Challenges Today.
- New Dimensions in Global Unconventional Resources.

Organizers pushed for creative approaches in all areas, with an eye toward offering new perspectives and formats for the presentations.

One result of that initiative: The AAPG Discovery Thinking forum, a regular feature of recent AAPG Annual Conventions and Exhibitions, will make its ICE premiere in Singapore.

The forum will feature five invited speakers who have "made a difference" in the profession and industry, talking not only about global discoveries but the creative thinking and processes that led to their success (see related story, page 18).

Highlights

Other highlights planned for the Singapore ICE include:

- The opening ceremony, set for 5 p.m. Sunday, Sept. 16, will be a fast-moving, colorful and informative opening led by Lorentz and featuring brief remarks from AAPG President **Ted Beaumont** and dignitaries from Singapore.

The multi-media program will conclude with a traditional **Singaporean Lion Dance** – a dazzling, unforgettable blend of artistry and powerful rhythms.

- A special technical session honoring the career and legacy of the late, renowned educator **Charles Hutchison** (see story, page 22).

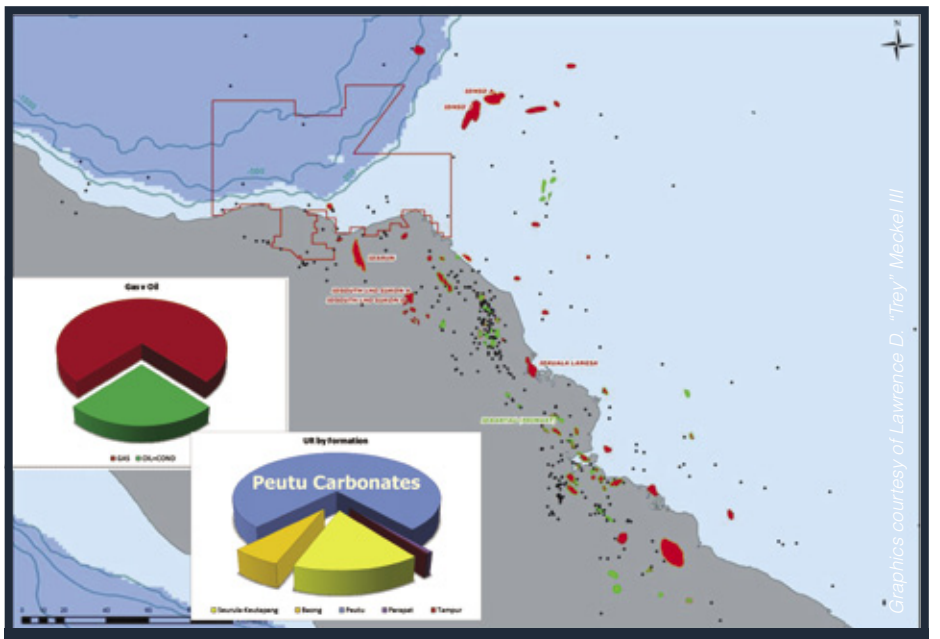
- The large **exhibit hall** will feature the latest in technology, science and data services – and will be the site of the **Icebreaker** to start the meeting as well as the Wednesday "**Sundowner**" reception to mark the conclusion.

- Two ticketed luncheons:

✓ The AAPG/DPA Featured Speaker Luncheon will feature **Scott Tinker**, director for the Bureau of Economic Geology and the State Geologist of Texas, talking about "The Global Energy Transition." It will be held Monday, Sept. 17.

✓ The EMD/DEG Luncheon will feature licensed water well driller **John V. Fontana** talking about "Water Well 'Problems' In Areas of Unconventional Resource Development: Appearances Are Deceiving and Solutions Are Many." It will be held Tuesday, Sept. 18.

- The movie "**Switch**," featuring Tinker – and which focuses on the question, "What will it really take to make the transition from oil and coal to alternative energy sources?" – will be screened at a special ICE event Monday night, Sept. 17 (see related story, page 50). EE



Location map of wells and fields of North Sumatra.

North Sumatra Basin a bona fide frontier

'Climates Change' Makes Deep NSB a Target

By LOUISE S. DURHAM, EXPLORER Correspondent

The North Sumatra Basin (NSB) is a world-class petroleum province that has been churning out hydrocarbons since the first discovery occurred onshore in 1885.

This was the first significant oil discovery in all of southeast Asia.

From a geographic perspective, the NSB would extend from the Texas-Mexico border around east to New Orleans, and from Houston out to the continental shelf break.

The NSB historically has been an onshore exploration play for the most part. As a result, the offshore is a relatively immature petroleum province with super-giant potential, according to Jakarta-based AAPG member Lawrence D. "Trey" Meckel III.

"The offshore NSB is remarkably under-explored with only 130 offshore exploration wells drilled through 2011, including less than 10 deepwater wells in the prolific Indonesian part of the basin," Meckel said. "Only four wildcat wells were drilled within the past decade."

Despite the basin's onshore exploration history, there's been little activity in the NSB overall in the past 30 to 40 years, owing principally to political events. Top this off with the horrendous tsunami in 2004 and various earthquakes, and it hasn't been an attractive area for the weak-at-heart.


MECKEL

It's only now that the social and political climate has evolved such that exploration in deeper water to search for oil potential has been green-lighted.

"The perception has been that it's a gas prone basin and not oil prone," Meckel noted. "With gas prices like now and historically, it was not an economic area to explore unless you found enormous gas volumes.

"A real attraction is that Indonesia's domestic market for gas is enormous," he said. "Southeast Asia is booming now in terms of gas demand, so gas is an exciting play, especially considering that natural gas brings a price there that's five to ten times higher than North America.

"The potential for oil only adds to the romance.

"Our studies show oil potential in the basin ranging anywhere from perhaps a few hundred million barrels of reserves up to several billion – this makes the area really exciting.

"All of the plays we're exploring for are proven in the onshore basin, so it's the same story you see around the world," Meckel noted. "You take a proven onshore basin and apply newer technology in terms of drilling, 3-D seismic, the more sophisticated techniques we have now for

See **Meckel**, page 12

Sumatra in Forum Spotlight

Jakarta-based AAPG member Lawrence D. "Trey" Meckel III will present the paper "Exploring a 19th Century Basin in the 21st Century: Seeing the North Sumatra Basin with New Eyes," at the AAPG International Conference and Exhibition in Singapore.

Meckel's talk is part of the Discovery Thinking Forum – the first time this AAPG annual meeting fixture is being presented at the ICE event (see related story, page 18).

Meckel's talk is scheduled at 4 p.m. Tuesday, Sept. 18.

Other forum speakers are:

- Arild Jørstad, exploration geoscientist-Oslo (Norway) area, Lundin.
- AAPG Honorary Member Bernard Duval, associate professor, IFP School, Rueil-Malmaison, France.
- AAPG member Fred Wehr, exploration and development manager, Apache Energy, Houston.
- AAPG member Sam Algar, vice president-Asia Pacific exploration, new ventures and global portfolio, Murphy Oil, Perth, Australia.

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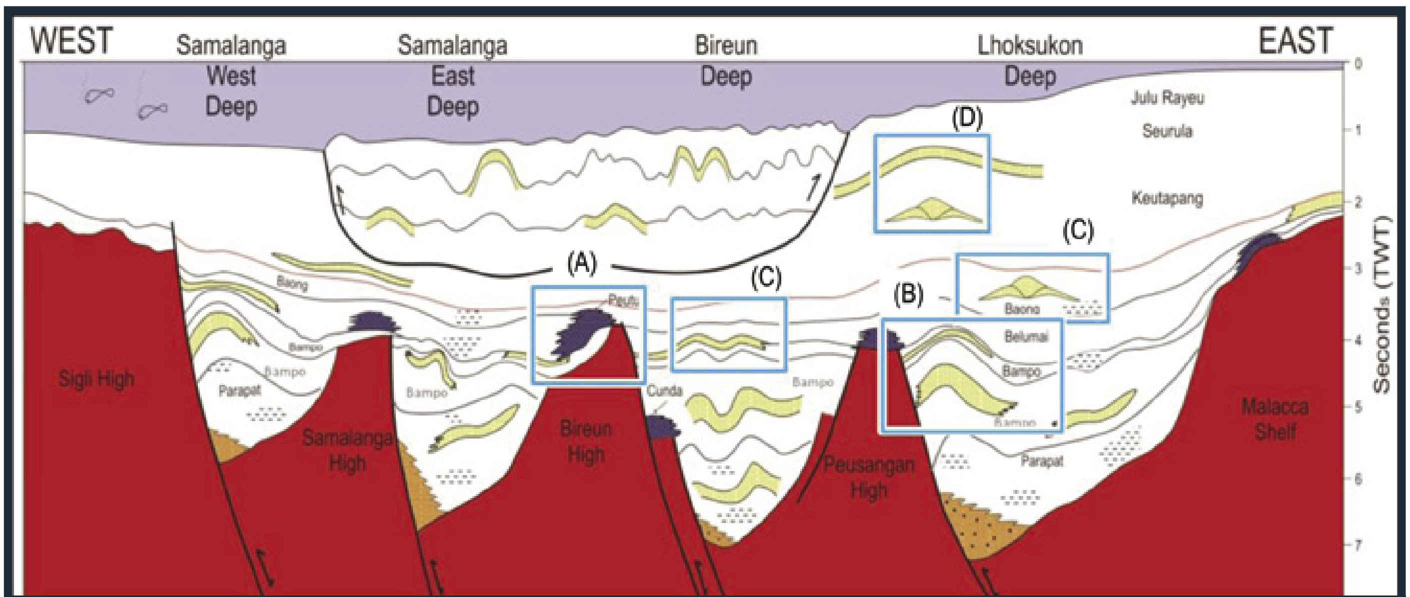

Plays in the offshore North Sumatra Basin.

Meckel

from page 10

understanding the geology and take this into deepwater."

Frontier Exploration

Ironically, given the long history of onshore exploration, the offshore NSB is a bona fide frontier, with fewer than 10 wells total drilled in deepwater and only five of these going down in the last decade.

The dearth of offshore exploration activity and the maturity of the onshore region yields a creaming curve for the basin overall that has remained flat for the past three decades. This comes as no surprise, considering the creaming curve is a diagram that plots oil discovered compared to the amount of exploration that happens.

When a basin is creamed, it's very mature.

The flat-line curve for the NSB, therefore, suggests to some explorers that there is nothing of substance left to be found – overlooking the unexplored offshore area's impact on the curve.

Meckel emphasized that comparison with other prolific basins in Southeast Asia indicates the offshore NSB has significant growth potential.

"This potential has been confirmed by recent exploration efforts, which have highlighted exciting possibilities in at least five plays based on recently acquired and re-processed 3-D seismic surveys in the offshore NSB," he said. "Many of these plays are offshore extensions of proven plays in the onshore NSB."

In effect, the offshore "frontier" has been sitting and waiting for aggressive explorers to apply advanced technology in a basin that could have multiple billions of barrels of reserves left to find, according to Meckel.

The five plays identified are in the Lhokseumawe Production Sharing Contract (PCS), where a high quality 3-D data set recently was acquired. It is located at the southern end of the offshore NSB and is the immediate offshore extension of the onshore NSB.

Traps are clearly visualized on the 3-D seismic data, according to Meckel. Most have a strong element of structural closure, but generally require a stratigraphic trapping component. Certain traps have DHIs associated with them, and existing well data document that gas is omnipresent in the system, indicating the presence of prolific source rocks. Oil also is present.

Meckel employer Zaratex, N.V., will drill three wells in the offshore NSB this year, the most exciting of which likely will spud during the AAPG ICE in Singapore. He noted the potential for as many as two or three follow-on wells in 2013.

The initial well sits in 3,000 feet of water, with TD estimated to be 12,000 feet subsea.

"We're looking for a discovery of both oil and gas in a very large limestone reef," Meckel said.

The targeted horizon is Middle Miocene carbonates, which are found in most of southeast Asia.

"They're the most prolific play in the region," Meckel emphasized. "In the NSB proper, they account for 75 percent of discovered volumes but only 25 percent of fields discovered, meaning 25 percent of the fields are responsible for 75 percent of the volume.

"This is a very prolific and prized potential target," he noted. "We have 13 potential prospective carbonate buildups and estimate average success volumes of one Tcf of gas for each." E

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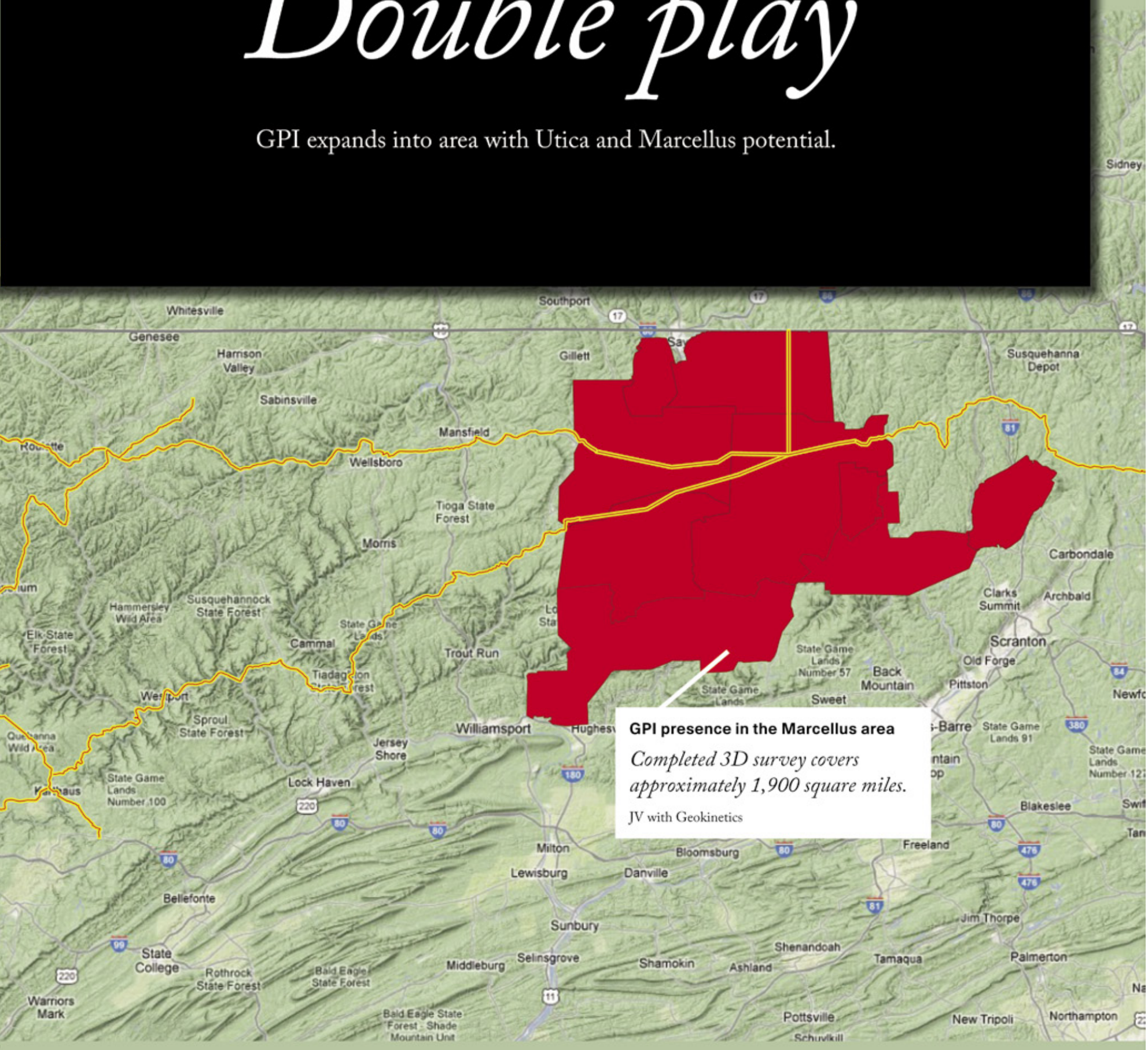


Singapore plenary session

The Whole Planet is Unconventional Now

By LOUISE S. DURHAM, EXPLORER Correspondent

How unconventional is this?

The plenary session at the upcoming AAPG International Conference and Exhibition in Singapore will be the first plenary session in AAPG history to feature unconventional resources.

It's called "The Unconventional Resources Energy Revolution – Is Asia Pacific Next?" And a brief conversation with AAPG member Paul Basinski leaves no doubt that it's THE place to be.

"The unconventionals are going global, and what once were radical ideas are leading to unprecedented volumes and outcomes," said Basinski, who co-chairs the session with Jeff Aldrich, Peter Cockcroft and Neil Fishman. "At the ICE, we'll be talking about technology and other innovative things that will continue to move the needle."


BASINSKI


ALDRICH

"We're now saying this will be the hottest ICE ever," quipped AAPG member Jeff Aldrich at Dart Energy International.

Aldrich and fellow AAPG member Peter Cockcroft also will co-chair a session focusing on Coalbed Methane: A Global Perspective.

The plenary session speakers will address a range of topics focused on the future potential for unconventional resources in the greater Asia-Pacific.

"In Singapore, there's not much now in the way of unconventional resources, so this is a beginning," Basinski noted. "The fact that we have a plenary session concentrating on this shows how potentially significant these resources are if they do go global."

For this to actually happen, he emphasized that it will require an entrepreneurial, get-it-done type of approach and pushing the envelope, the same as in the United States given that there are many different rocks around the world.

"As the shale how-to history book is being written, geoscientists have a unique opportunity to create compelling value," Basinski said, "by energetically pursuing their intuition, focusing on the 'right' questions, taking informed risks and working creatively and collaboratively."

The Golden Age – Now!

This enthusiastic geologist is convinced that unconventional "shale" resources plays are experiencing a Golden Age across America.

"In 10 years, we'll be saying, 'Wow, look … The whole energy balance of the world changed, the way we work changed, our potential energy independence of the U.S. changed and it all happened in a very short period of time on our watch – and it's still going on.

"That's my personal drum, and I'm beating it," he emphasized.

In fact, Basinski will present a paper aptly dubbed "The Golden Age of Shale Exploration" as the first talk in a session titled "Resource Play Characterization: Innovation Meets Pragmatism," which will be presented on Wednesday at ICE.

As the understanding of shale plays in North America evolves and matures, Basinski predicts that material value will be realized from advanced work in various fields, including organic porosity and permeability, non-Darcy flow, nanotechnology and long-term production monitoring.

"As the global shale diaspora unfolds, plays under-represented and less well characterized in North America, including post- and pre-Paleozoic, lacustrine and non-sedimentary hybrids represent potential giant prizes," he said.

The plenary session will be moderated by past AAPG president Scott Tinker. Each of the speakers will have 10-15 minutes of comments, and then the floor will be open to the audience for questions and comments.

The plenary session speakers will be:

- Shankari Srinvasan, head of global gas-Europe, Paris, France, IHS CERA.
- Gavin Thompson, head of Asia Pacific gas research, Wood Mackenzie, Beijing, China.
- Nick Davies, chairman, Dart Energy (CBM) International, Singapore.
- AAPG member Brad Lingo, CEO, Drillsearch Energy, Sydney, Australia.

In all, Theme 5 has six oral sessions and three poster sessions to cover the range of unconventional topics of Asia.

Besides the CBM session there are oral sessions on China unconventional resources, the hot topic of laucustrine shales as shale gas reservoirs (both oral and poster), resource play characterization and completion optimization.

DT to make Singapore debut

Discovery Thinking Forum Goes Global

By LOUISE S. DURHAM, EXPLORER Correspondent

AAPG's Discovery Thinking (DT) forum, an event that has become a regular and much-anticipated feature at the AAPG Annual Conference and Exhibition confabs, is breaking out onto the international stage.

"Discovery Thinking is going global," declared AAPG Honorary Member, DPA president and DT proponent Charles Sternbach.

"We're taking it to the first ICE."

He's speaking of the AAPG International Conference and Exhibition, set Sept. 16-19 in Singapore, where the theme for this much-anticipated Discovery Thinking forum is "Asia-Pacific Resources: Fueling the Future."


STERNBACH

> **"You hear about the personal side of the discovery and also see the data."**

Sternbach has co-chaired and planned all five DT forums held to date and will be the chair of the Singapore event.

As such, he has some big shoes to fill.

Ironically, they're his own shoes.

The last Discovery Thinking forum, held earlier this year at the AAPG annual meeting in Long Beach, Calif., was an especially big deal in that it drew in an SRO crowd – a challenging act to follow.

"Discovery Thinking originally started as a 100th anniversary initiative recognizing '100 who have made a difference,'" Sternbach said. "As the forums progressed, we included the personal issues and expanded the time slots to let people bring in a lot of technical information.

"You hear about the personal side of the discovery and also see the data," he emphasized. "We aim for good stories told by those who know the discovery well, so we try to get people close to the action at hand."

Sternbach noted that the AAPG technical program is highly specialized on the latest technology with a plethora of excellent material, but not all that much case study/integration type material.

"That's fundamentally why we've had such a good run with Discovery Thinking, filling the gap in exploration experience, how the technical skills and personal aspects combine," he said.

"I don't think anyone else out there is doing that," he said. "It's one of the strengths that AAPG has."

Numerous geoscientists earn their livelihood via prospect generation and development. To transform the prospect into a discovery entails a high degree of professional skills and craftsmanship.

Sternbach said the forums cut right to the heart of this effort, talking about how these things happen, how they affect personal fortunes, investors, companies who hire, among others.

"Geologists and geoscientists are integrators, and that's where these forums have had a lot of interest," he said. "We appeal to that aspect and do it better than anyone because of the geoscientists' right brain-left brain thing."

Here, There and Everywhere

Even though the Singapore ICE forum presentations are focused principally on Asia, attendees will hear the details from other regions, too, such as Lundin Petroleum's giant Johan Sverdrup field discovery in the Norwegian North Sea.

"Although not in Asia, it's a giant discovery, and it's timely," Sternbach emphasized. "This will be the first time in a global forum that a giant discovery will be discussed by those who made it happen."

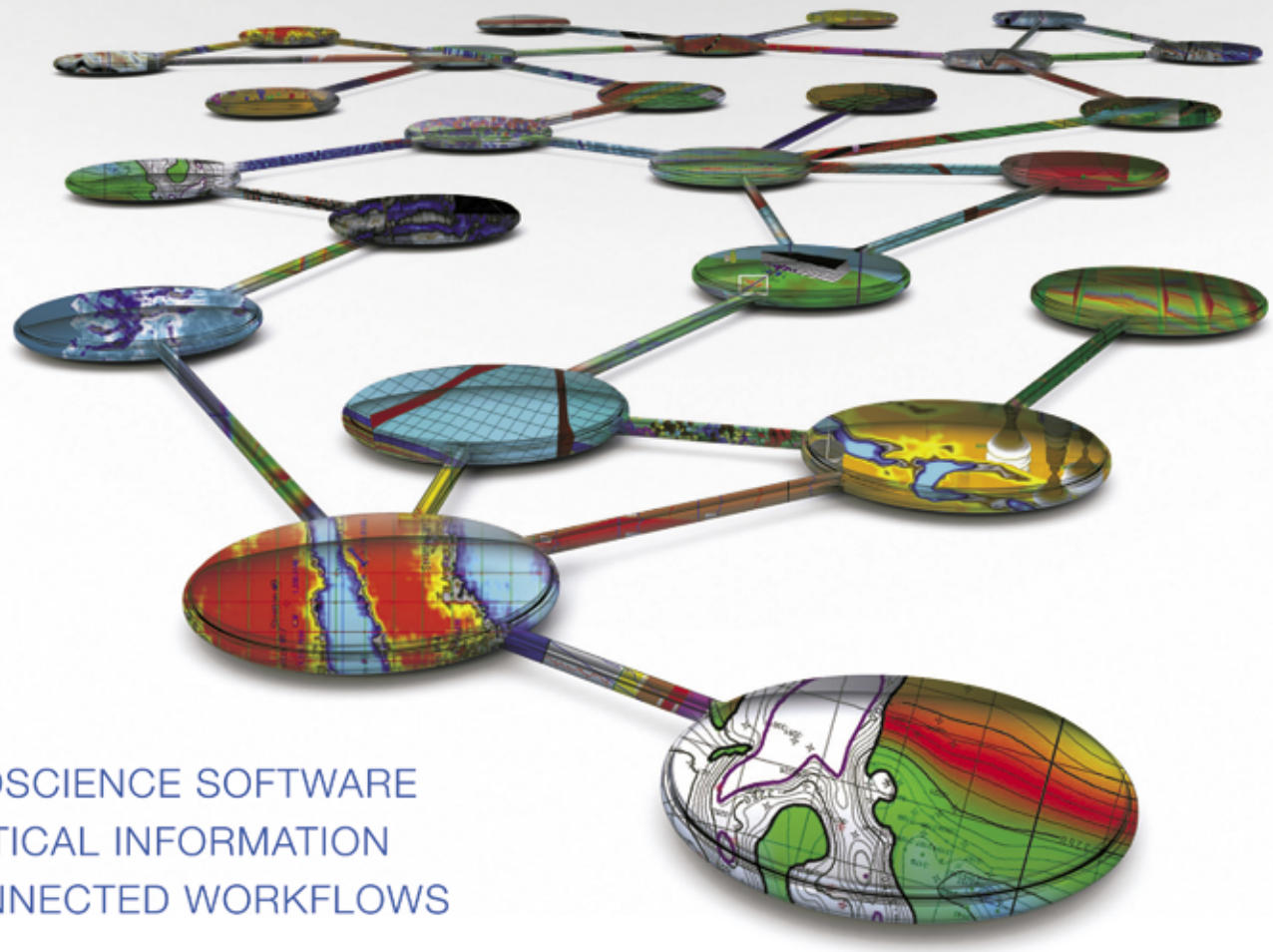
Specifically, the Singapore forum will feature five invited speakers, each of whom have "made a difference" outside the United States and North America. The common bond for the speakers isn't geography or even geology, but the way they creatively overcame great challenges in both business and geological aspects to find success.

Topics to be discussed will include philosophy of exploration, stories from remarkable careers, professional insights and colorful anecdotes, and lessons learned on the path to success.

This year's program features:

- Arild Jørstad, exploration geoscientist-Oslo (Norway) area, Lundin, who will

See **Discovery**, page 21



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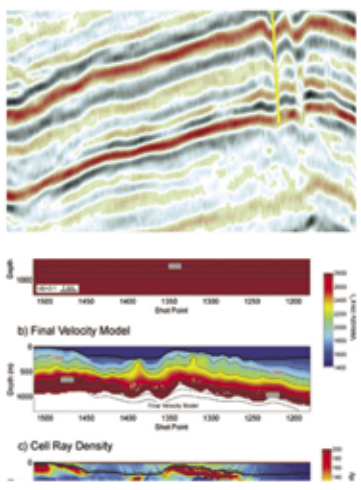

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Unconventionals still being counted

World Conventional Resource Report Updated

By LOUISE S. DURHAM, EXPLORER Correspondent

Once again, the U.S. Geological Survey is proving itself to be a mighty busy place – and not just for the geology of the United States.

This time, its cadre of geoscientists and others who provide a seemingly endless supply of reports of high interest to the oil and gas industry, heads of state, various organizations and geoscientists around the world has tackled a big international target.


GAUTIER

"An Estimate of Undiscovered Conventional Oil and Gas Resources of the World, 2012," is a new report that is part of the USGS World Petroleum Resources Project.

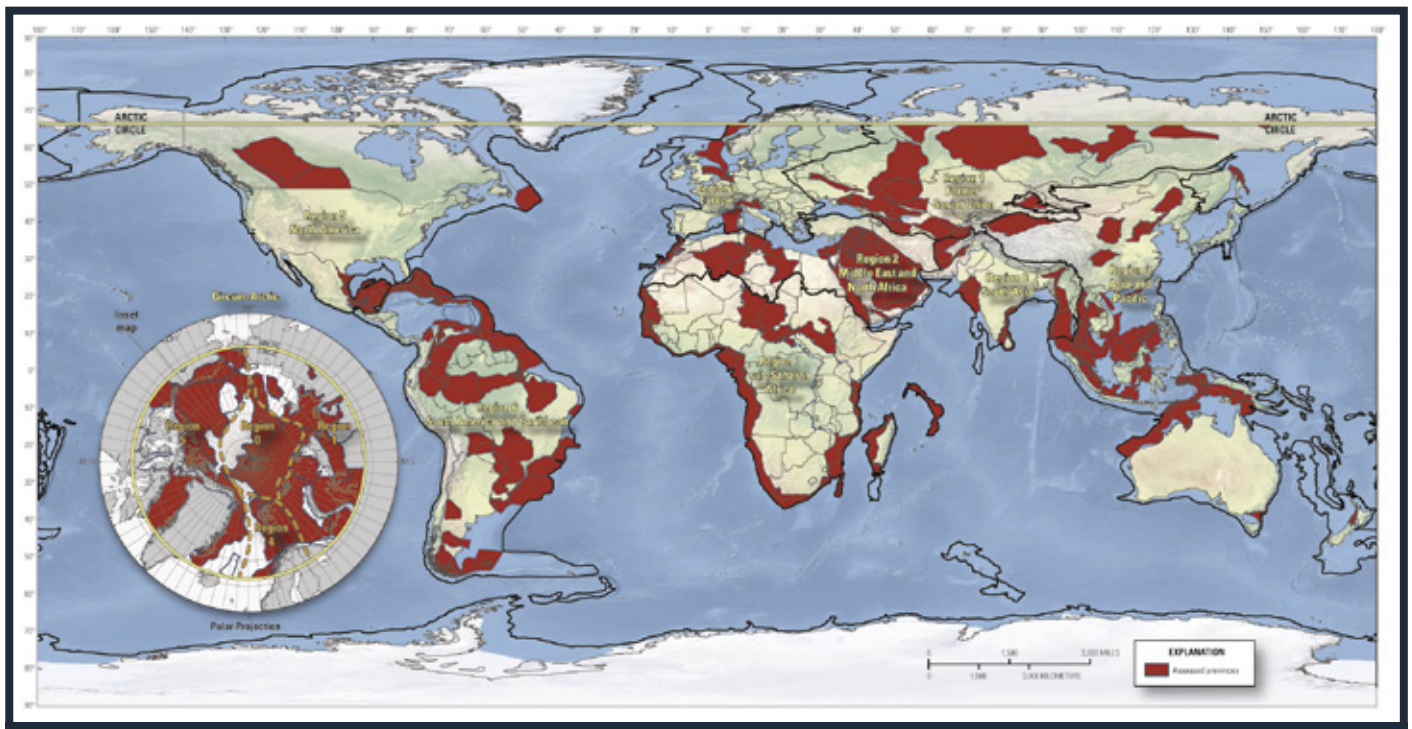
It represents their first assessment of the world since the last report released in 2000.

By definition, the study covered a lot of territory, also yielding some big numbers.

The agency estimated mean volumes of 565 billion barrels of undiscovered conventional oil, 5,606 trillion cubic feet of undiscovered conventional natural gas and 166,668 million barrels of natural gas liquids in 171 priority geologic provinces of the world – exclusive of the United States.

A geology-based assessment methodology was used for the assessment.

Before you get a tad peeved wondering why there's no focus on the attention-grabbing stars of the moment – such as unconventionals – be patient.



Locations of 171 geologic provinces (red areas) of the world assessed in this study. Inset map shows assessed provinces of the Arctic in a polar projection; Arctic is defined as provinces above the Arctic Circle (yellow line). Arctic provinces are included in Regions 0, 1, 4 and 5.

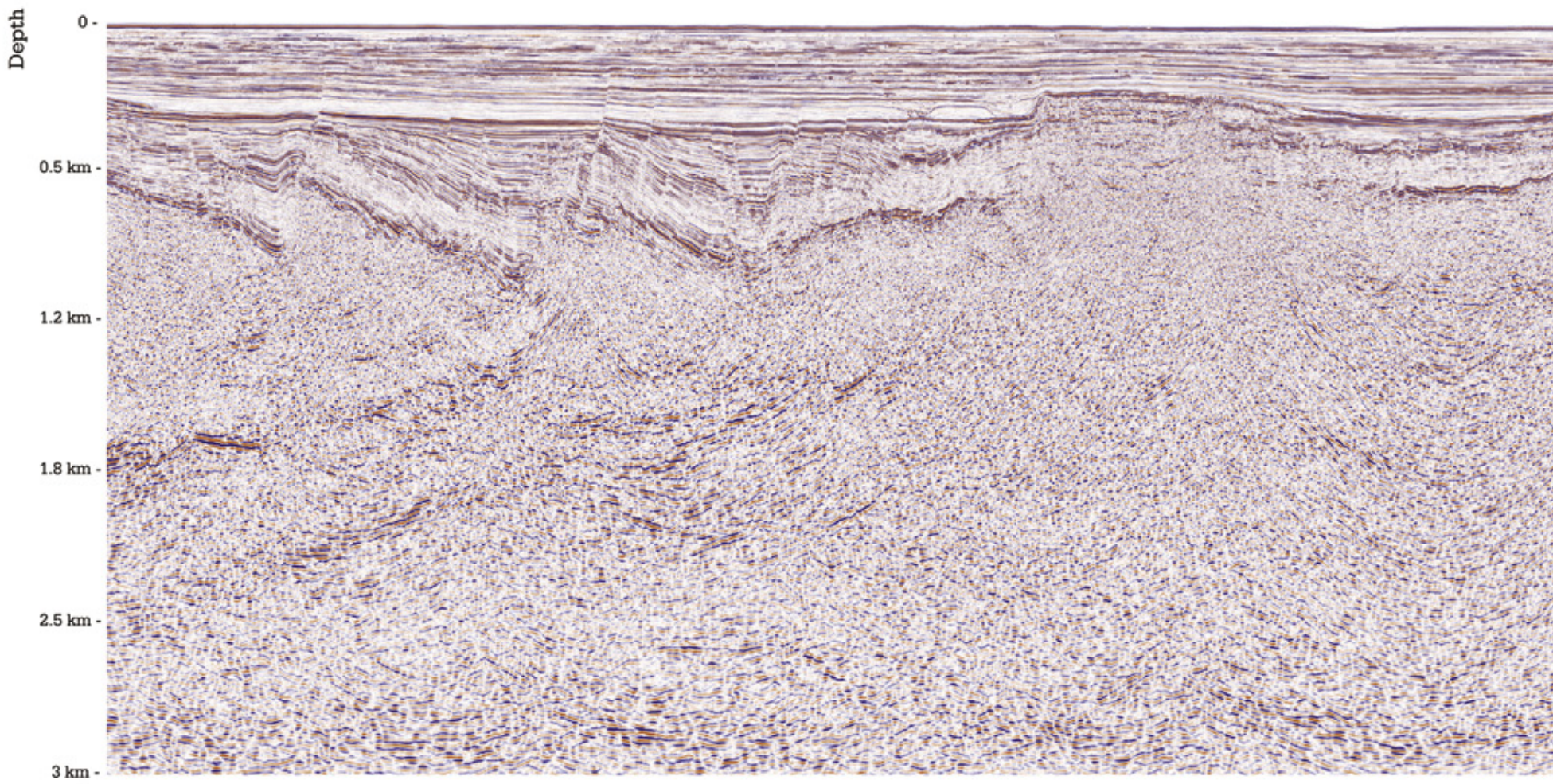
The agency reported that unconventional resource assessments – heavy oil, tar sands, shale gas, shale oil, tight gas, coalbed gas – for priority areas of the world are being wrapped up in an ongoing, separate USGS study.

The fact sheet released for the 2012 undiscovered conventional resources study noted that approximately 75 percent of the undiscovered conventional oil in the world occurs in four regions:

- South American and the Caribbean.
- Sub-Saharan Africa.
- Middle East and North Africa.
- Arctic provinces of North America.

Besides the top four, significant undiscovered conventional gas resources remain in all of the world regions.

Continued on next page



Continued from previous page

New and Improved

It clearly was time for the new study, according to assessment team member and AAPG member Don Gautier, a USGS research geologist in Menlo Park, Calif.

"There are two or three dimensions of difference between this and the earlier study that are worthy of note," he emphasized.

"A number of basins are included that were not in the 2000 study, and the entire Arctic is included in a systematic way that was not the case in the 2000 study," Gautier noted. "There's just a lot more detail in terms of what is covered.

"In many of the basins assessed previously, there were changes in estimated numbers and sizes of undiscovered accumulations," he said. "The biggest changes are in the estimated numbers of undiscovered accumulations, and that is in part a methodological difference."

Gautier noted that since the 2000 study was completed the USGS developed a set of global analogs.

"We classified all of the world's known petroleum basins geologically and looked particularly at the density of fields, how many fields per unit area," he said. "In recent assessments, we looked at these areas in terms of whether the earlier estimates of numbers of accumulations are reasonable in light of what the global exploration experience has been.

"In some cases, the numbers of anticipated fields seemed too high compared to their area, so we modified those field densities somewhat," he said. "That explains why there's a smaller number of oil fields estimated in some areas."

The 2000 study used data from 1996. Needless to say, there has been significant exploration in the intervening years.

For example, Gautier noted there has been quite a lot of exploratory drilling in the sub-Arctic part of the West Siberian basin, yet not much oil was found there. This has the effect of modifying the assessment.

He noted other things that play into the changes:

- Drilling history in the intervening years.
- Addition of a number of new basins not included previously.
- Methodology refinement.

A Separate Piece

Given the importance of reserves growth in existing fields, a separate study was undertaken by the USGS to back up this new conventional resources world study. It's the Assessment of Potential Additions to Conventional Oil and Gas Resources of the World (Outside the United States) from Reserve Growth, 2012.

"The future of conventional petroleum is two basic pots," Gautier noted. "It's the yet-to-find conventional fields and it's also the addition to reserves in those fields already found – both of these are very significant volumes of resources.

"You don't want to talk just undiscovered conventional and not think about the fact that there's a lot of oil remaining in these existing fields," he emphasized. "There's quite a lot of conventional oil out there, and that's not even mentioning the various unconventional resources."

Gautier noted the reserves growth estimate was done from a statistical point of view. The methodology did include detailed analysis of geology and engineering practices observed in developed fields.

Owing to the lack of data for many fields outside the United States, data acquired from U.S. fields experiencing reserve growth were used as analogs in the study.

"We looked at how the big fields have grown in North America and then applied those kinds of growth functions to worldwide oil fields that haven't grown so much," he said, "and estimated how much might be added.

"The basic idea he added, "is, ok, if the world's fields are developed in a way similar to those in North America, then what might we reasonably expect in terms of reserves additions to those existing fields?"

Reserve growth was estimated for fields outside the United States reporting original-in-place oil or gas volumes of 500 million boe or greater.

The mean estimated were 665 billion barrels of crude, 1,429 Tcf of natural gas and 16 billion barrels of natural gas liquids.

Discovery
from page 18

discuss "The New Giant Johan Sverdrup Discovery, Norway."

- AAPG Honorary Member Bernard Duval, associate professor, IFP School, Rueil-Malmaison, France, who will discuss "Creative Thinking Led to 40 Years of Success in Mahakam, Indonesia."
- AAPG member Fred Wehr, exploration and development manager, Apache Energy, Houston, who will discuss "Two Deep Mungaroo Gas Discoveries in the Carnarvon Basin, Australia – Context and Implications for Further Prospectivity."
- AAPG award-winning member Lawrence D. "Trey" Meckel III, exploration manager and chief geologist based in Denver, who will discuss "Exploring A 19th Century Basin in the 21st Century: Seeing the North Sumatra Basin With New Eyes." (See related story, page 10.)
- AAPG member Sam Algar, vice president-Asia Pacific exploration, new ventures and global portfolio, Murphy Oil, Perth, Australia, who will discuss "Deepwater NW Borneo: Big Oil From 'Gas-Prone' Source Rocks and Leaking Traps."

Back to the Future

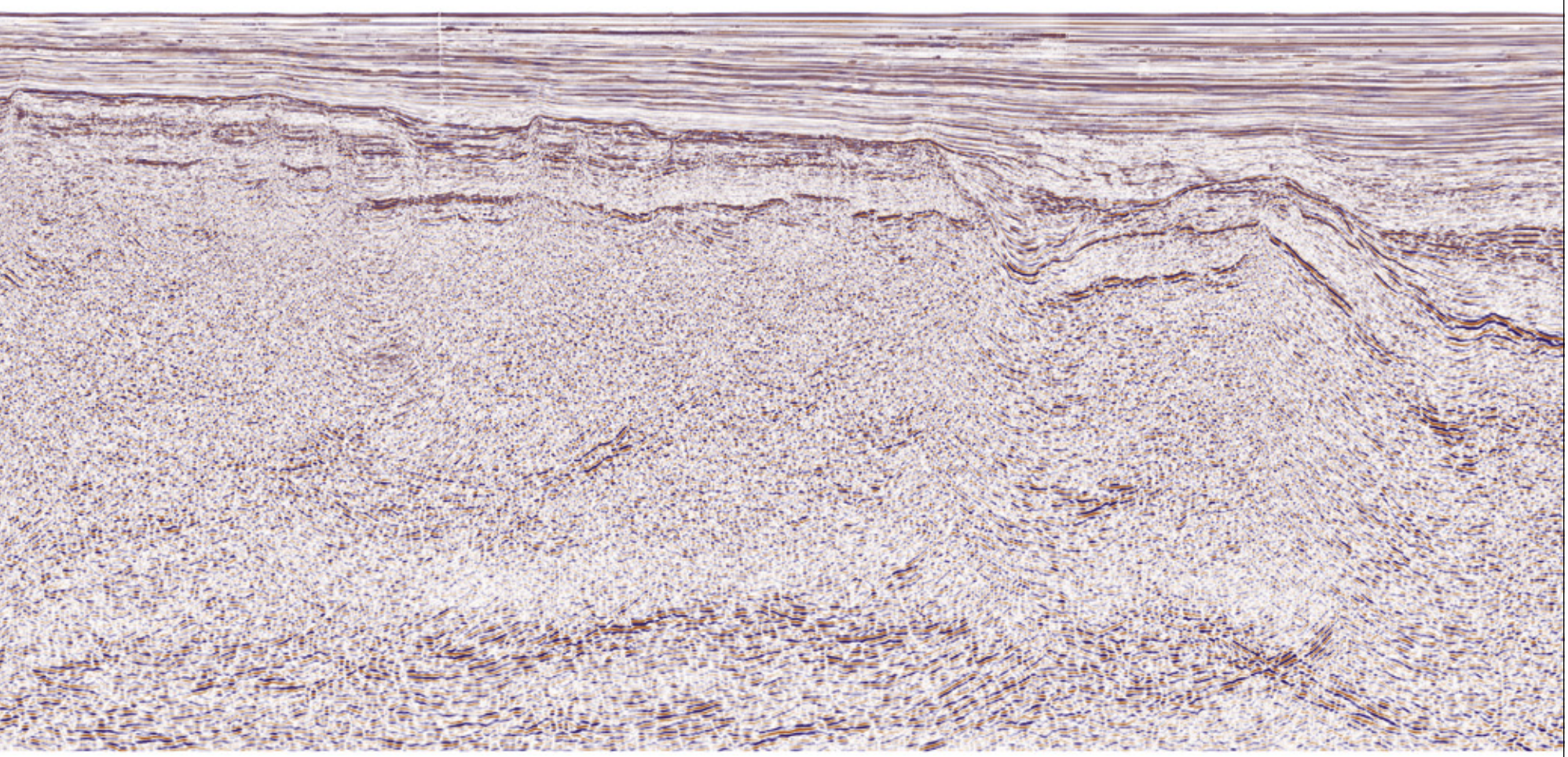
Sternbach is always eager to make people aware that the Discovery Forum presentations have been recorded since the initial event in 2008. The intent is to have a robust legacy of recorded talks on the *Search and Discovery* segment of the AAPG website.

Information on demand can be a tremendous tool to help both the novice and the expert to learn a subject. For starters, it allows viewers to relax away from the crowded, bustling meeting venues to focus completely on the material that interests them.

Making the talks available online can serve a particularly important role at this time when so many veterans of the industry prepare to retire and a new generation of geoscientists filters in.

The online access enables an in-depth look at exploration, at the user's convenience, by the very people who took the project all the way from a concept to actual well production.

"As technology advances," Sternbach noted, "and a new wave of young geoscientists enter our profession, we see continued interest in forums such as this as a way to mentor future discoverers."



'An important connector ...'

Prof Was Student and Booster for SE Asia

By DAVID BROWN, EXPLORER Correspondent

Charles Strachan Hutchison became a highly respected, seminal figure in the study of Southeast Asia's geology.

It's no secret why:

Hutchison was the right person in the right place at the right time, studying the region as a new understanding of its geology developed.

He assisted his colleagues, mentored students and younger geologists and served as a driving force in his local geological society and other associations.

Most of all, Hutchison advanced the science. He published a number of important books, other monographs, studies and papers, all serving as foundations for further work and understanding.

In September, Charles Hutchison will be commemorated in two special oral sessions with a theme of Borneo-Sundaland at the AAPG International Conference and Exhibition in Singapore: the "Hutchison Memorial Session-Southeast Asia Regional Tectonics" and the "Hutchison Memorial Session-Tectonics of Borneo."

Session co-chairs are AAPG members Christopher Morley of PTT Exploration and Production Public Co. in Bangkok, Thailand and Robert Hall of the Royal Holloway University of London in Surrey, England.

Hall is a professor in the university's Department of Earth Sciences Southeast Asia Research Group. He remembered Hutchison, who died in October 2011, as someone who had "strong views about many things."

"He was a great encourager of people to be interested in the region," Hall said, "and he had been there a long time."

> **"He was truly a gentleman and scholar in the best tradition ... eager to foster young talent in Malaysia and to facilitate links between University of Malaya and research institutes globally."**

His Scottish Influence

Born in Fraserburgh, Aberdeenshire in the United Kingdom in April 1933, Hutchison earned his degree with first-class honors in geology from the University of Aberdeen in 1955.

He worked in the petroleum industry in the West Indies for two years, then took an assistant lectureship in the new geology department at the University of Malaya in Singapore.

The Malay Peninsula would be his home base for the remainder of his life.

In 1960, Hutchison moved to Kuala Lumpur and played a key role in establishing the geology department at the University of Malaya in Kuala Lumpur.

Peter Clift is a professor of petroleum geology at Louisiana State University in Baton Rouge, La., and emeritus professor in the Department of Geology and Petroleum Geology at the University of Aberdeen. He recalled Hutchison returning to Scotland for a visit.

"I did once have the pleasure of hosting him in Aberdeen during one of his visits back to his mother country, and it was good to see him share his enthusiasm for the geology of Southeast Asia with a new generation of Scottish students," Clift said.

"Although, it was also clear that Malaysia had now become his adopted home and the place he felt most at home and happy in," he added.

Hutchison had a special interest in granites and mineralization in Southeast Asia, and "particularly the Gondwana fragments that were assembled there in the Mesozoic," Hall said. He theorized the interest might have grown out of Hutchison's Scottish background.

"He came from the University of Aberdeen, and Aberdeen is situated near the large granite deposits associated with the Caledonian orogeny," he noted.

Spreading Out

Hutchison became a full professor of applied geology at the University of Malaya in 1977 and served as head of the geology department from 1978-82. The 1970s and '80s brought the beginnings of his most notable work.

He co-edited with D.J. Gobbett "Geology of the Malay Peninsula" (1973) and authored "Laboratory Handbook of Petrographic Techniques" (1974), "Economic Deposits and Their Tectonic Setting" (1983) and "Geological Evolution of Southeast Asia" (first edition 1989).

Plate tectonics gave Hutchison and other geologists new insight into the region's geology, according to Hall. Southeast Asia had been simply and commonly – and incorrectly – seen as geologically quiescent, Hall said, despite ample evidence of tectonic movement.

"Up until plate tectonics came along,

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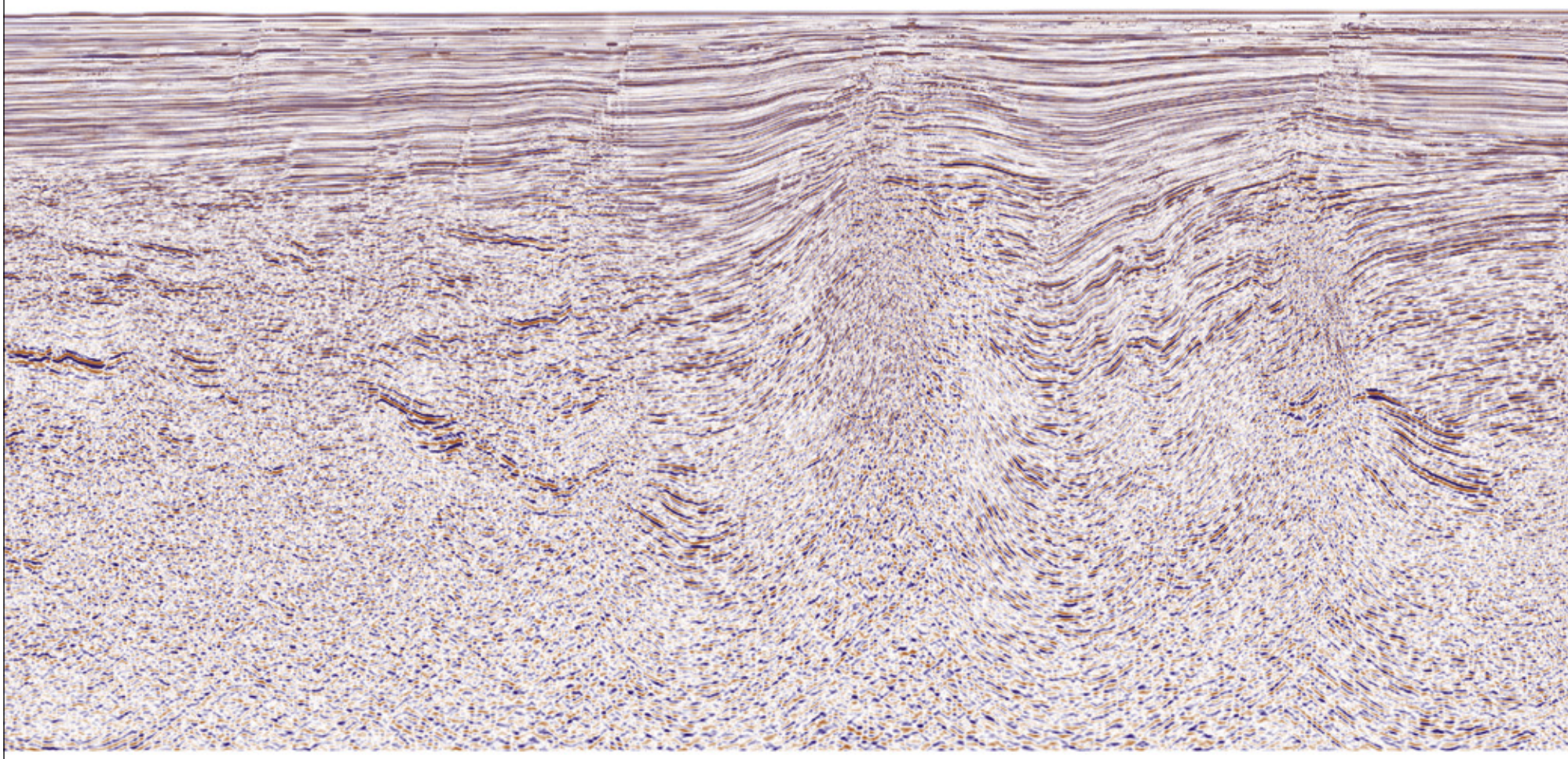


Continued from previous page

it's my impression that people saw these strange phenomena and didn't really know what it all meant," he said. "Then along came plate tectonics and it all began to make sense."

Hutchison was a founding member of the Geological Society of Malaysia in the 1960s, serving as its president in1969-70. The society awarded him honorary membership in 1986 for distinguished service to the geoscience community and for promoting interest in the geosciences in Malaysia.

"He was a very active person who helped keep the Geological Society of Malaysia running. You could always rely on him to ask a few questions and to have something to say," Hall said. "He was one of those people you need."

Generous to colleagues and eager to gain scientific advances, Hutchison is remembered as both a facilitator and proselytizer for Southeast Asia geological studies.

"He was truly a gentleman and scholar in the best tradition. He was very much eager to foster young talent in Malaysia and to facilitate links between University of Malaya and research institutes globally," Clift said.

"Thanks to Charles, I was able to develop a network of friends in Malaysia through his multiple introductions, often over an excellent curry dinner near the university or at the university with tea and biscuits before a seminar," he recalled.

A Pivotal Position

Hutchison was highly regarded not only for advancing fundamental geological understanding but also for his contributions to petroleum geology and economic mineralogy.

"He was an important connector between academia and industry because of his high standing in both communities," Clift said.

"There were not many people who had seen as much geology in Southeast Asia as Charles, and I found him a hugely helpful colleague who was happy to share his experiences and advance the science," he added.

In addition to his research and teaching at the University of Malaya, Hutchison taught courses on geology and tectonics as a visiting professor at the University of Brunei Darussalam and Chulalongkorn University in Bangkok.

He was affiliated with the Earth Sciences and Resources Institute of the University of South Carolina, responsible for developing training programs throughout the wider Southeast Asian region.

He also served as co-coordinator for the Studies in East Asian Tectonics and Resources Transects of the Committee for Co-ordination of Joint Prospecting for Mineral Resources in Asian Offshore Areas from 1988-91.

Hutchison continued as professor of applied geology at the University of Malaya until 1992. His career as a scholar and researcher included more than a hundred papers published in refereed journals, and he kept publishing long after he retired from active teaching.

"It was especially good that he was able to publish a number of his scientific ideas after retirement, when he had more time to devote to writing and thinking," Clift said.

The Write Stuff

AAPG awarded Hutchison a Special Commendation in 1994 in recognition of his outstanding contributions to geological research, regional synthesis, tectonic analysis and understanding of Southeast Asian hydrocarbon and mineral deposits.

"The things that Charles was best known for outside of Southeast Asia were probably his books," Hall said.

He ranked Hutchison's 1989 volume on the region's geological evolution as one of the three essential works about Southeast Asian geology.

"Charles's was the book that covered the interior of Southeast Asia and the older

See **Hutchison**, page 26

ICE Sessions Named to Honor Hutchison

The two oral sessions honoring Charles S. Hutchison at the AAPG International Conference and Exhibition in Singapore are more than a nice gesture for a respected geological pioneer.

They include some of the most anticipated presentations of the conference.

"We tried to find some things that were broadly in areas that Charles was interested in. One of those was Borneo, the South China margins on the south side of the South China Sea," said AAPG member Robert Hall, co-chair for the sessions.

The interest is driven by offshore oil discoveries and continued drilling in the region, especially offshore Borneo. Successful wells have been drilled north of Brunei and the Malaysian state of Sabah.

Last year Petronas reported a major offshore oil find about 100 kilometers northwest of Kota Kinabalu, and a Shell joint venture made a significant deepwater oil discovery offshore Brunei.


HUTCHISON

Wednesday's (Sept. 19) oral sessions will include presentations by each of the co-chairs, Hall and Christopher Morley of PTTEP.

Hall will present "Mesozoic-Cenozoic Reconstructions of Western Australia Breakup and SE Asian Growth" in the morning session and "Contraction and Extension in Northern Borneo: Subduction Rollback-Driven" in the afternoon session.

The afternoon paper has serious buzz.

"I like to think it's both as an area of interest to the hydrocarbon community but also because we don't really understand that area as well as we might expect to, having gone into the deeper water," Hall said.

Morley, also an AAPG member, will present "Impact of Late Cretaceous-Early Palaeogene Tectonics on Hydrocarbon-Bearing Basins of Mainland Southeast Asia."

Other papers in the Hutchison sessions will examine evolution of the South China Sea area, the Borneo wedge and thrust-fold belt, basin evolution in Brunei, regional tectonics and the accretion and dispersion of southeastern Sundaland.

– DAVID BROWN

Straight talk in Singapore

Lecturer to Give Advice (Be Prepared to Duck)

By BARRY FRIEDMAN, EXPLORER Correspondent

AAPG member Ian Longley, a 28-year veteran of the petroleum industry, is straight-talking when it comes to discussing the DNA of most geologists.

"Some are idiots that were born into money or got lucky. Most are clever and hard working. Either trait alone is not enough."


LONGLEY

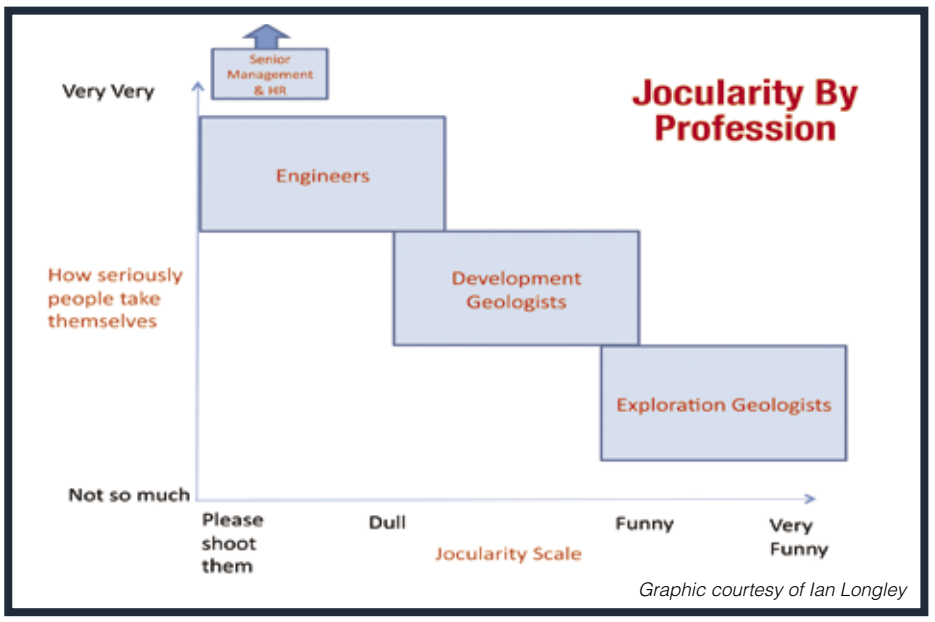
Longley will talk about "The Secrets of a Successful Geological Career in Modern Western Oil Companies," this year's special lecture at the AAPG International Conference and Exhibition in Singapore.

He is co-owner of GIS-Pax, a GIS software company in Perth, Australia, and at the Singapore ICE he'll also be teaching his short course on "The Petroleum Geology of Southeast Asia."

He partnered with and later inherited the course from Exxon veteran Richard Murphy. Longley has further developed and refined his course based on his experience in working all the major petroleum basins in Southeast Asia.

As for his special lecture, well … those expecting a sterile, corporate view of that topic from him, guess again.

"It will be advice on how to survive management fads, engineers and human resource departments," he said, "which are the source of much pain for working geologists in western companies."



Graphic courtesy of Ian Longley

That's right. Longley, a geologist who's had huge life experiences both inside and outside the industry, may annoy, offend, irk and embarrass just about everyone in the room.

In fact, he has a flow chart (see figure) on how to actually do that – and the tools you need, namely, a sense of humor, because as the chart shows, the higher up you go on the geologic food chart, the fewer laughs you'll find.

That's something that Longley both mocks and deconstructs. And that may be part of the "secret" of his special paper.

The Epiphany

You may ask, how does a man who held senior positions at both Woodside and Oil Search as well as with Shell in Houston, arrive at a point in his career where he loves the profession, just not always the professionals in it?

Longley says his epiphany occurred at about the midway point in his career, when a very senior executive at the company where he was then employed told him the future of the company was in the Gulf of Mexico.

Longley said it wasn't so much that the Gulf was a bad idea – he believed it to be, in fact, "a fantastic basin with amazing geology" – but the CEO wanted to do it "on the cheap, with half a team and half the data in the world's most competitive arena!"

"I managed amazingly not to laugh, nor shout profanities at him," Longley recalled. "I think I stared off into the middle distance knowing at that instant that such self-control meant that in my early 40s my adolescence was finally over and that I would have no further career progression, nor a clubby life with an executive pension plan."

See **Longley**, page 26

AAPG member Ian Longley will give the AAPG-DPA special lecture, "The Secrets of a Successful Geological Career in Modern Western Oil Companies," at 5:30 p.m. Tuesday, Sept. 18, at the AAPG International Conference and Exhibition in Singapore.

Longley also will be leading a pre-conference short course titled "The Petroleum Geology of Southeast Asia" Sept. 13-16 in Singapore.

For more information go online to www.aapg.org/singapore2012.

Longley
from page 24

Making matters worse was the fact that the executive "had partnered with a group I thought was from the shallow end of the Jurassic gene pool."

That moment sparked a new perspective on both his career and life – and that might be why a lecture like this, as "silly" (his word) and subversive as it seems to be, is worth doing.

Initially, he wanted to do a presentation titled "Are All CEOs Tossers?" but thought that might end his career rather than just limit it.

Also, in his short course he'll have the chance to talk about his software program called "Player," which is an advanced GIS Play tool. Seeing a major gap in what geologists needed to be successful and what was available on the market, Longley and his partner, Tom Giles (a GIS expert), formed their own company and developed the Player software.

Player automatically spots well results and prospect locations and makes available summary statistics for play-specific discovery size, success rates and failure analysis, and is currently Rose &Associates recommended Play software solution.

Longley has sold the software to more than 18 companies internationally, of which many have made it their tool-of-choice for their global play analysis work.

"This guarantees that prospect chance and volume assessments can be examined within the perspective of the play," he said. "And I get to talk about it to a trapped audience."

Lighten Up, Already!

If you haven't guessed by now, Longley is equal parts funny, acerbic, impatient and a serious geoscientist.

And seriously, much of his experience will be on display during the short course, in which participants will get an overview of the overall geotectonic development of Southeast Asia and the geology of the major hydrocarbon occurrences – the major sources of information in the region.

Participants also will get a chance to enhance their ability to do independent work in the regional geology of Southeast Asia.

"The course covers the geological evolution of the entire region," he said, "and the petroleum geology, exploration history and future potential of all of the major hydrocarbon-bearing basins."

But much of his perspective also comes from the fact that he knows he is lucky to be talking about anything, considering he has survived skin cancer, thyroid cancer and a shark attack.

Of that last event, he recalls it as if it happened not last decade, but last weekend.

"It was very unusual, as it was the first fatal attack in Perth since the 1920s," he says of the events of November 2000, "and it happened right in front of the landmark cafe in Perth called the Blue Duck."

One person died in the attack – Kenneth Crew, a father of three.

"(I was) Just lucky," he says, which is all he says about it.

(In fact, the details of which, he doesn't reveal – he simply points others to "Google" the story.)

Ask Longley about the business of geology, though, and it's clear the industry and its future matter to him – and matters that the best people are in place to do the job.

And that, he says, is getting increasingly frustrating to attain.

"My most recent epiphany is realizing that overpaid gas marketers and commercial people know absolutely nothing about the future value of gas," he said, "and never get held to account for their historical predictions."

He says it would be much better if they all picked a different career.

So, is there, in fact, a secret (or list of them) to success as an exploration geologist?

If there had been a rock nearby, he might have thrown it at me.

"It's always about getting the rocks right first."

But ask him again, though, if there's one thing he would recommend to young geologists or even old ones, and he has an answer:

"Life's too short," says the man who has beaten a shark once and cancer twice.

"My best suggestion is to not take things – especially yourself – too seriously."

Hutchison
from page 23

rocks up to Indochina. He published a lot on the Malay Peninsula, being based in Singapore and later KL," Hall said.

In his later period, Hutchison's published works included "South-East Asian Oil, Gas, Coal and Mineral Deposits" (1996) and "Geology of North-West Borneo: Sarawak, Brunei and Sabah" (2005).

The Borneo book is also considered a classic study.

"Charles was a pioneer in understanding the geology of Southeast Asia and was one of the first people to try to properly integrate the on- and offshore geology, especially Borneo, where few Western geologists had ever worked, let alone published," Clift noted.

"His book on the topic is an essential part of any library on the area," he said.

Hutchison was an elected fellow of several professional societies, including AAPG, the Institution of Mining and Metallurgy of London, the Mineralogical Society of America and The Geological Society of London.

He was appointed professor emeritus in geology at the University of Malaya in August 2004, and continued as visiting senior research fellow from May 2009 until his death in October 2011.

Known for his generosity and his insight as a geologist, Hutchison also is remembered for his willingness to share credit and accept fault. He dedicated "Geological Evolution of Southeast Asia" to his fellow professors at the University of Malaya.

In the book's preface, he wrote:

"I have always taught my students that every aspect of geology involves interpretation. From thin sections to hand specimens, to maps, and thence to regions there is an increasing order of interpretation.

"This book is, therefore, a personal interpretation of the region. Although it has greatly benefited from and has been influenced by numerous discussions with colleagues, the mistakes are mine alone."

Graphic courtesy of U.S. Geological Survey

Map showing the assessed areas in the Polish part of the Polish-Ukrainian Foredeep Basin. The area in green represents the Polish Foredeep Lower Paleozoic oil assessment unit; the area in red represents the Polish Foredeep Lower Paleozoic gas assessment unit.

Pole Shales Estimated

By LOUISE S. DURHAM, EXPLORER Correspondent

The potential for highly needed gas supplies produced from shales in Poland has made news headlines for some time now – and now additional data have been added to the discussion.

Some of the most recent findings aren't necessarily the kind of information industry wants to hear.

Owing to the intense interest in the productive potential of the shales, various groups have engaged in geologic studies of shale beds and what they might or might not produce, both in Poland and other European areas.

Using a performance-based geological assessment methodology, the U.S. Geological Survey assessed potential technically recoverable shale gas and shale oil resources in the Devonian and Silurian-age shales in the Polish part of the Polish-Ukrainian Foredeep basin.

Resources in the Ukrainian part of the basin will be considered in a subsequent assessment, according the agency.

"The Potential for Technically Recoverable Unconventional Gas and Oil Resources in the Polish-Ukrainian Foredeep, Poland 2012," is part of a USGS project to evaluate the potential for unconventional oil and gas resources in priority geological provinces worldwide.

The estimated resources in the Polish assessment area that are recoverable with existing technology range from 0-4,086 Bcf of gas (0-4 Tcf) – mean estimate 1,345 Bcf (1.3 Tcf); 0-172 MMbo – mean estimate 62 MMbo; 0-368 MMbngl – mean estimate 106 MMbgnl.

The Polish Geological Institute has zeroed in on recoverable natural gas volumes of 346 billion cubic meters up to 768 billion cubic meters, or about 14 Tcf and 30 Tcf, respectively.

Glass Half-Empty or Half-Full?

In stark contrast to both of these conclusions, an EIA-funded study on world shale gas recoverable resources, performed by Advanced Resources International, estimated 187 Tcf of gas for the Silurian trend across Poland, or about three orders of magnitude higher than the USGS.

"We just finished the Poland study," noted USGS assessment team participant and AAPG member Don Gautier. "It has been regarded as the most prospective thing in all of Europe for unconventional resources.

"In our view, there's essentially nothing there," he said. "If we're right, it has a lot of consequences both economic and political."

At the end of the day, actions do tend to speak louder than words.

ExxonMobil created quite a stir recently when it exited Poland after drilling only a couple of non-commercial wells that apparently suggested to the organization that it was not the place to be.

Still, it ain't over 'til it's over, and the glass-half-full folks will be encouraged because Chevron and ConocoPhillips reportedly will continue to operate their shale licenses, and some large independents are said to have accumulated substantial acreage.

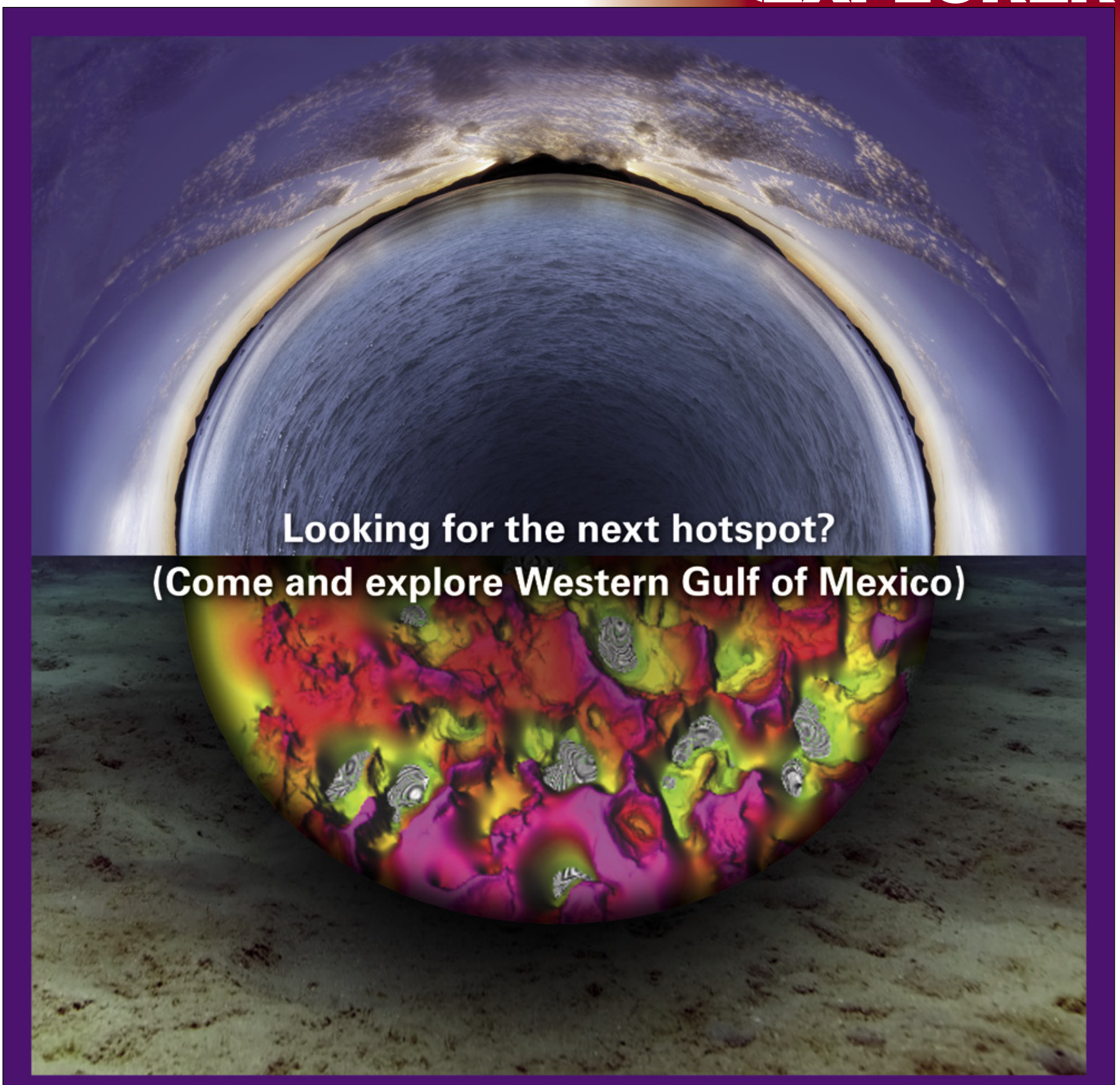
According to the USGS, potentially productive organic-rich Ordovician and Silurian-age shales occur beneath the European Plain surface in a band 20-200 kilometers wide that extends from beneath the Baltic Sea northwest of Gdansk southeastward across Poland near Warsaw and Lublin and into western Ukraine.

For the USGS assessment, shale geologic attributes were inferred from core and well log data collected in 56 pre-1990 wells that were analyzed and interpreted by the Polish Geological Institute.

Data and samples from wells drilled since 2008 to test shale gas and shale oil potential were not available to the USGS.

Shale gas and oil accumulations in the United States were used as analogs in the assessment. Analog data included:

- Mean EURs from populations of shale and shale oil wells.
- Mean drainage areas of directionally drilled wells.
- Ranges of average well success ratios.



Detecting P-waves

Earthquake Warning System Coming

By BARRY FRIEDMAN, EXPLORER Correspondent

I feel the earth move under my feet …
– Carole King

Considering they both sneak up on you, earthquakes and love have at least one thing in common.

Clearly, both need early detection systems.

Efforts have been made for at least one of them to have it.

Richard Allen, the director of the Berkeley Seismological Laboratory at the University of California, Berkeley, is the man behind an Earthquake Early Warning System (EEWS), which will give residents of California precious extra time to prepare for such an event, thus saving their lives.

Some people believe the system can predict earthquakes – and that is absolutely not true.

"This is a very exciting time for earthquake early warning in the United States," he said.

His system – at present, just available to other scientists – will employ seismometers across California that will rapidly detect movements of earthquakes, predict their severity and then issue warnings to those residents who will momentarily – and we mean momentarily – be affected.

The hope is that there will be fewer injuries and death from broken windows, falling ceilings and flying books for individuals – and a less crippled infrastructure for the state.

Specifically, the system will detect the first pulses of energy to reach the surface – the P-wave, or compressional wave, which is the seismic body wave that shakes the ground back and forth in the same direction the wave is moving.

These waves do not carry much energy – but what they do carry, is information, which can be translated into a prediction of the much larger, much more powerful S-waves that come next, shaking the ground back and forth perpendicular to the direction the wave is moving.

Allen says, the more advanced the warning, the less the panic:

"We don't want people to start running out of buildings."

'Roll' Models

The concept, while fascinating, is not altogether new.

"There are several early warning systems throughout the world," says Serdar Kuyuk, a post-doctoral Research Fellow at Berkeley, who is working with Allen on the project, "mainly in Japan, Taiwan, Mexico, Istanbul, Italy, Romania." Kuyuk, in fact, has spent the past four years in Japan studying its early warning systems and says they work – even if they don't all work the same way.

"As a general concept," he says, "all systems in the world aim to put seismometers closer to the faults, however, this is not always possible," he said. "Like Japan, most disastrous earthquakes occur offshore. Fortunately almost all earthquakes are inland events in California."

The Californian system, as mentioned, already is operational, but until now has been in something of a Beta mode.

"We have about 35 users," he said, "mainly scientists and test user groups. Our system is not publicly available at the moment."

That's changing, Allen says, and that's exciting.

"We now have the funding to build a prototype system and will be able to fully evaluate what a full public system could do for the West Coast," Allen said. "Our initial studies have been very encouraging, but now we will be able to start delivering the alerts to a small group of test users and get feedback from the user perspective."

The hope is that with more state and federal funding, the entire system

See **EEWS**, page 32

EEWS
from page 30

can be upgraded, which will include sophisticated seismometers that can process the new data.

"Current networks in the United States are not designed for EEW purposes," Allen said, "because the loggers are not up-to-date and produce high telemetry delays."

The cost of upgrading the entire California system, Kuyuk estimates, is around $80 million.

Predictions? No!

But even if all the money were allocated and the system worked perfectly, Kuyuk wants to make something clear.

"One of the misconceptions about Earthquake Early Warning Systems is that some people believe it is a prediction of earthquakes," he commented. "This is absolutely not true. (See the accompanying story on this page.)

"If there is a word to explain what EEWS does," he says, emphasizing the system's basic operation, "it is 'forecasting.' EEWS uses priory released energy (information) to forecast or to estimate the later disastrous secondary energy."

For the state, in practical terms, the system would provide enough of a warning for transportation, utility grids, nuclear facilities and schools to take precautionary measures and not designed to give homeowners more time to secure the china or cover up the big screen Panasonic. Further, early warning measures are useless at the quake's origin because the tremors radiate out almost simultaneously and too quickly to be effective.

To put this another way, Kuyuk said, "Prediction is not possible."

But the warnings – anywhere from seconds for those closest to the epicenter to as much as a half hour for those hundreds of miles away – will be huge.

It may not be perfect, may not sound like a lot of time, but, as Allen says, it will give those in the quake's path more time to react.

"You want to get under a sturdy table before things start falling off the wall."

Smart words … whether it's the earth or love that starts to rumble.

Fish Are Flopping And Atlas Shrugs

The Greeks thought earthquakes occurred when Atlas, who held the Earth on his shoulders, literally shrugged.

An ancient Indian tribe in southern Mexico believed they happened when a giant jaguar brushed up against the pillars of the world.

Some ancient Japanese culture believe they were the result of a giant catfish flopping around inside Earth.

And some popes in the 18th century thought they were God's retribution for humanity's lack of faith.

Earthquakes – the myths surrounding why they occur are as fanciful as the myths surrounding who can predict them.

Here are a few of those:

Myth 1: **Animals can predict quakes**.

Various studies, including those by California Geology, indicate that as far back as 373 BC, weasels, rats, snakes and centipedes knew days before a destructive earthquake occurred, but the evidence is anecdotal at best and the rodents aren't talking.

Myth 2: **There are people who can sense an earthquake is about to happen**.

True. But these people have about a 50 percent failure rate.

Myth 3: **Earthquakes develop in one kind of weather**.

Aristotle thought so and said they were caused by winds trapped in subterranean caves.

He was wrong.

Earthquakes occur about equally in cold weather, hot weather and rainy weather.

Myth 4: **The ground opens up during an earthquake**.

While shallow crevasses can form during earthquake-induced landslides, faults do not open up during an earthquake and swallow up suburban families in mini vans. Movement occurs along the plane of a fault, not perpendicular to it. If it were that way, the friction needed to cause a quake wouldn't exist.

Myth 5: **The position of the moon is a precursor**.

Not only is there no significant correlation between the position of the moon and earthquakes, the position of the rest of the planets also have scant little to do with plate tectonics here on earth.

Myth 6: **California eventually will break off into the ocean**.

It won't. And the reason is, most of the motion between the Pacific and North American plates is horizontal, not vertical.

It is true, however, that Los Angeles is ever-so-gradually creeping northward and someday will be a suburb of San Francisco! You don't even want to think about property values when it gets there.

Myth 7: **We are having more earthquakes**.

Throughout the past century, the number of earthquakes of magnitude 7.0 or greater have remained pretty constant. In fact, data indicate in the past decade the number of quakes actually has decreased.

Worldwide, according to the U.S. Geological Survey's National Earthquake Information Center, there were 22,235 earthquakes in 2011– or about 61 a day.

– BARRY FRIEDMAN

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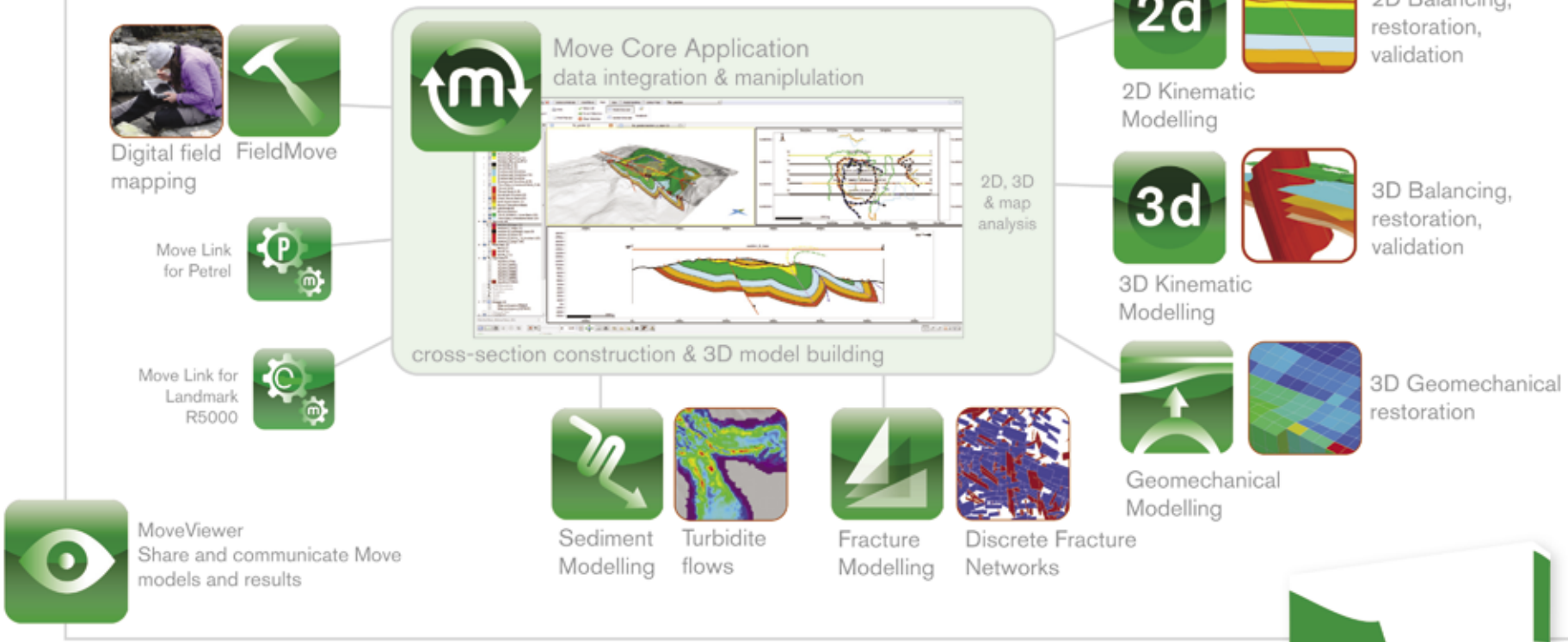

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Yeah, it's easy for you

Grasp of Space and Time Can be Elusive

By DAVID BROWN, EXPLORER Correspondent

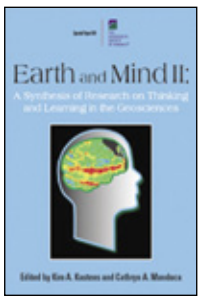
Off the top of your head, not using a calculator:

One billion seconds is equivalent to about how many years? Is it 480 years? 218 years? 106 years? 32 years?

Mastering ideas about time and space isn't easy, especially for young students.


KASTENS

The way geologists have of seeking truth is somewhat different from the way experimental scientists do.



Educators and researchers are struggling to help students understand the concepts of complex three-dimensional space and deep geological time – areas where competence is essential for a geologist.

The Geological Society of America's "Earth and Mind II," published as GSA Special Paper 486 earlier this year, examines geoscience education and the concepts of time, space, systems and field.

In each section, a number of authors provide their thoughts and theories about education and those topics – including a theory that the ability to think about complex space and time might be a talent, something like inherent musical ability or athletic skill.

Kim Kastens and Cathryn Manduca served as editors for the volume.

Manduca is director of the Science Education Resource Center at Carleton College in Northfield, Minn. Kastens, formerly affiliated with the Lamont-Doherty Earth Observatory, recently became principal scientist in charge of science education at Educational Development Center Inc. in Waltham, Mass.

In the book, their work begins with an examination of the scientific and collaborative nature of geology as a profession. The ability to be a geoscientist is, as much as anything, a frame of mind.

"Geoscientists operate in a frame where the geographic, spatial and temporal details are very important. A conversation is unlikely to proceed very far before the geoscientist seeks to make sense of information using this frame," Manduca and Kastens wrote in their introductory paper.

This framework assumes the geologist can work with and make sense of complex ideas about space and time. Helping students think in that frame has been a challenge for educators.

Yes, Geology IS a Science

Another challenge for geoscience teachers is convincing students that geology is actually a science.

As a science, geology stands apart from those sciences grounded in more traditional, experimental methodology, Kastens observed.

"The first thing for both students and educators to realize is that the ways geologists have of seeking truth is somewhat different from the way experimental scientists do," she said.

The scientific method typically involves experimentation using a controlled variable and carefully controlled conditions, with deductions based on multiple outcomes and observations leading to a defensible conclusion or set of conclusions.

Very few of the breakthroughs or major advances in geology – you could say almost none – were made that way, Kastens noted.

Geological interpretation requires a different way of thinking about space, time and reality.

"If students don't realize that's a way to make or reach conclusions," she said, "they can come away thinking, 'This isn't actually a science,' or they don't understand the kind of claims we can make."

Making It Real

And that's not the only challenge faced by geoscience teachers.

Jonna Gentry teaches ninth-grade Earth Science at Green Mountain High School in Lakewood, Colo. She is AAPG's 2012 Earth Science Teacher of the Year.

Gentry might be fighting a different kind of fight than the one described in "Earth and Mind II."

"A lot of our students walk into the classroom and say, 'Well, I don't like Earth science,' even though they've never taken an Earth science class," Gentry said.

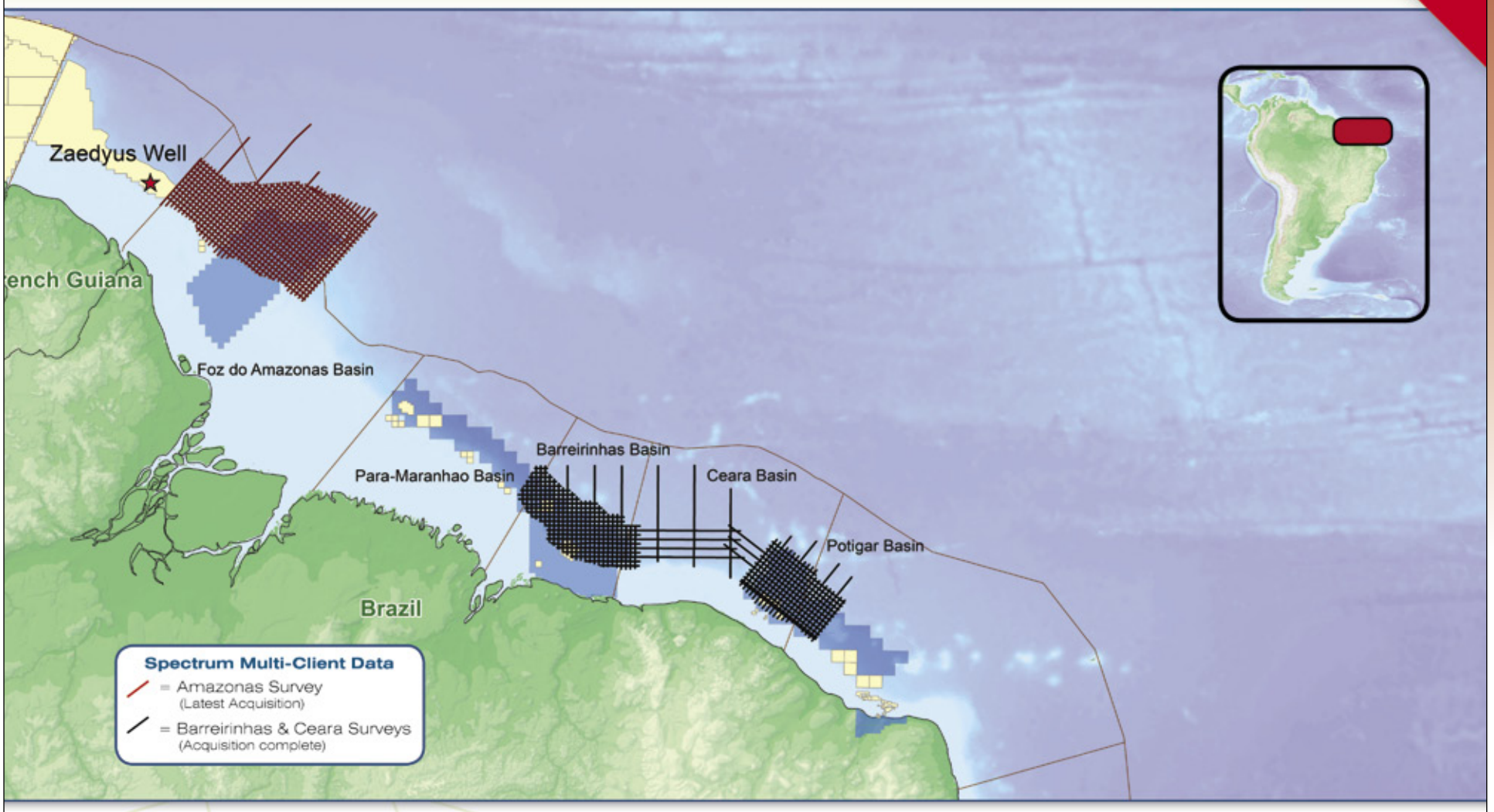
She described the young teens as "natural-born biology students," but said some of them have a pronounced antipathy toward studying geology.

"Astronomy tends to be very fascinating for them. Meteorology is fascinating for them. I don't know where it comes from, but they think rocks are just

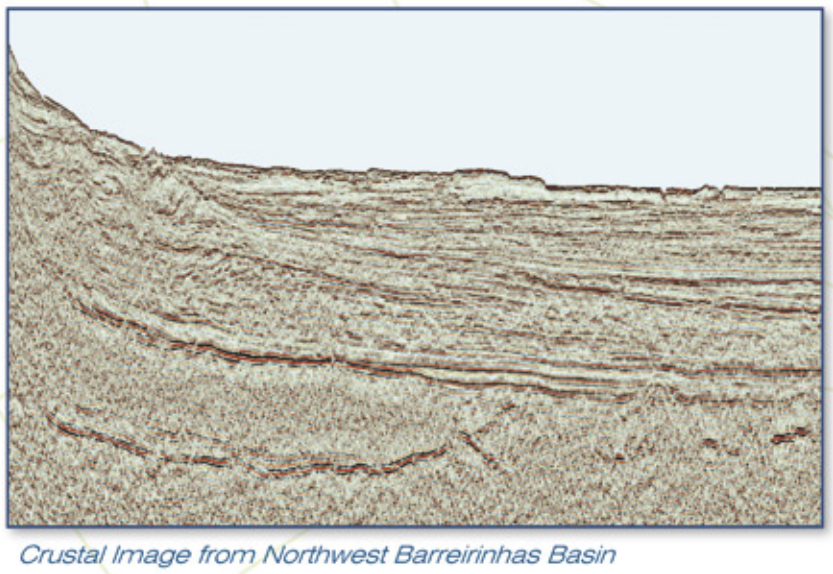
See **GeoStudents**, page 38

Equatorial Margins Brazil

Multi-Client Seismic - Amazonas, Ceara and Barreirinhas Basins



Spectrum Multi-Client seismic coverage offshore northern Brazil



Crustal Image from Northwest Barreirinhas Basin

Spectrum is active in three basins along the Equatorial Margins of Brazil. Acquisition is complete on the Ceara and Barreirinhas programs and has commenced on the Amazonas program.

Final PSTM data is available for the Barreirinhas survey now and will be available for the Ceara program this quarter.

All of these surveys are being acquired with 10,000 m offsets and 13 second record lengths.

Companies participating in Spectrum's new seismic programs will have a competitive advantage in the upcoming Bid Round 11.

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GeoStudents
from page 36

boring," she said.

Despite being literally under their feet, the complex geology of the Earth is an abstraction for most young students. So is the concept of prolonged periods of time that can run into the tens of millions or hundreds of millions of years.

Science teachers seem almost desperate to make these abstractions more concrete.

"We try to use as many manipulatives as possible and as many things kids can touch as possible. We show a lot of PowerPoints – 'This is the way things look in the field,' " Gentry said.

"A lot of it is, 'Can they attach it to something in their lives?' and, 'Why is it important?'" she added.


GENTRY

A very robust finding coming out of that research is a large variability in spatial abilities.

Masters of Space and Time?

Whether or not the ability to think about complex space is a talent, there's little doubt that some people do it better than others. Researchers have studied the way K-12 students think about spatial concepts.

"A very robust finding coming out of that research is that there is a large variability in spatial abilities," Kastens said.

Gentry agrees that spatial skills develop differently in different students, and says she sees the variation in her classroom.

"It's like putting together pieces of a puzzle," she said. "That's what geology is like. Some kids are really good at putting the spatial together, and some kids really struggle with that."

Students in their teens also can have a problem conceptualizing large numbers outside of their normal frame of thinking, like the concept of "one billion" (if you are 32 years old or older, you already have lived more than one billion seconds).

"Billions of years. That's really tough," Gentry said.

Teachers often use spatial concepts to help students understand temporal concepts. For instance, a timeline on paper is a two-dimensional representation of time.

To a professional geologist, the difficulty of teaching these concepts might seem strange.

"Teaching students about the magnitude of geological time using analogies requires overcoming the challenges in aligning spatial and temporal scales. Experts who have succeeded in doing this may find it difficult to understand why students find this hard to do," wrote Ilyse Resnick, Kinnai Atit and Thomas Shipley of Temple University.

Kastens said using spatial analogies to explore concepts of time is a useful tool.

"It's good in that it lets us tap into this wonderful ability the human brain has to do things like, for example, recognize patterns," she said. "By making spatial representations we can have a shared artifact that we can share with other people, and we can save it for use later."

But time and space don't work the same way, so the approach does have some pitfalls.

"The human brain wants to assume that equal space converts to equal time," Kastens noted. "That's drastically untrue."

The Light Comes On

If the hurdles faced by both geoscience teachers and geoscience students seem like too much of a challenge, there is one saving grace. Remember, competence in understanding complex space and deep time is essential for a geologist.

The key word is "competence," not brilliance.

Educators are reaching the conclusion that they can teach almost any student to be competent in thinking about space, time and systems, regardless of inherent levels of ability.

"Many instructors consider spatial abilities to be a divider separating students who can be successful geologists from those who should 'try some other career.' This view is not supported by research," wrote Steven Reynolds of Arizona State University.

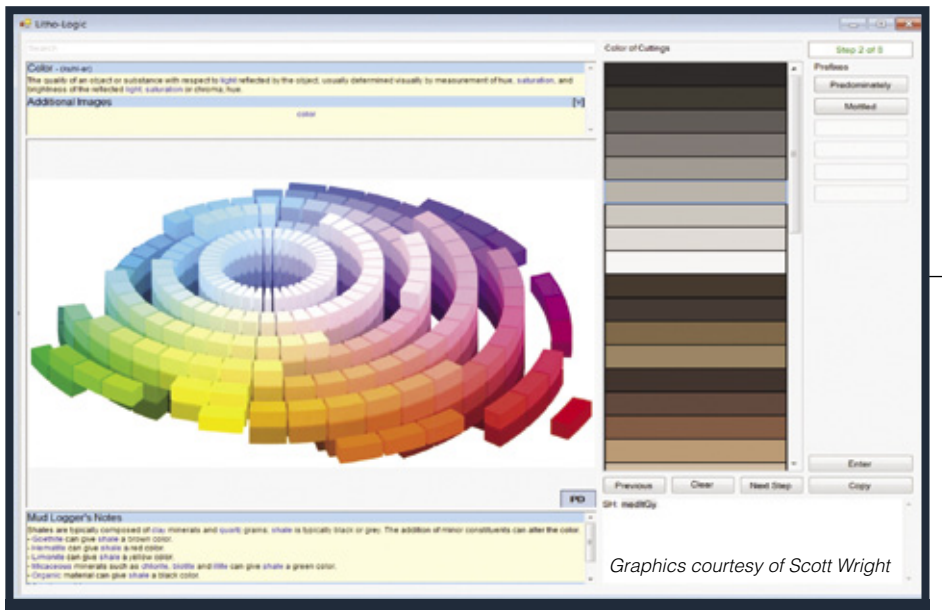
"Any kid can be a good problem solver. Any kid can do critical thinking," Gentry said.

"It's doable. My colleagues have seen this, too," she added. "We get students who say, 'Oh, now I see what this is about!'"

Geoscience education continues to evolve, and "Earth and Mind II" provides a window on some current thoughts in this area in a collaboration among geoscientists and cognitive scientists.

"It's really timely to have this conversation, because K-12 education is moving aggressively into practices. 'Practices' is the term they are using to talk about ways of thinking. The fancy word is 'epistemology,'" Kastens explained.

"I think this book moved the conversation forward," she said.



Graphics courtesy of Scott Wright

His wonderful world of color: Scott Wright is bringing a new perspective to mud logging.

Frustration leads to solution idea

Standards Raised With Lithology Logic

By KEN MILAM, EXPLORER Correspondent

Scott Wright is a man with a mission: He's out to get more respect for mudloggers.

And some in the industry think this AAPG member is on track to do just that, thanks to a new program he conceived and initiated that aims to set an industry-wide standard for describing well lithology and rock cutting descriptions.

Those who've experienced the work say seeing is believing – which, coincidentally, is one way to describe Wright's creation.

And in Wright's words, it was a development that was at least in part born out of desperation.

Wright, an Oregon native, had spent 15 years in the U.S. Army, including duty on the 2002-03 invasion of Iraq, when he left the service in 2005 and took a job mud logging in southeastern Oklahoma.

WRIGHT

It was there when he quickly became frustrated, and then perplexed, by the lack of standardization in the tasks and interpretations he was expected to perform, especially in the area of lithology.

Establishing an industry-wide standard may seem like a pipe dream, but Wright thought it could be done.

Drawing on his military background, Wright figured the quickest way to get from "here to there" was to develop an interactive checklist of major rock types and properties such as color, size, shape, texture, hardness and secondary constituents like embedded materials and fossils.

He knew he would need help pulling together such a program, so he made a cold call to fellow AAPG member Tim Dean of Terra Domain Consulting, Aledo, Texas, who helped develop geosteering in horizontal drilling.

Together with a team of petrologists from the University of Oklahoma (see accompanying box below), they devised what Wright says is a straightforward, easy-to-use program called "Litho-Logic."

Getting on the Same Page

Wright's team started out by gathering high-resolution microphotographs of various rock types and included industry standard and layman's definitions of the

See **Mudlogger**, page 42

Scott Wright said the Litho-Logic project began about two years ago when he contacted AAPG member Tim Dean for technical help and financial backing.

Wright said he gathered most of the data and took the photographs, and Tim's son, James Dean, built the program.

They hired a team of graduate and post-doctorate students at the University of Oklahoma through award-winning AAPG member Roger Slatt, the Gungoll Family Chair Professor of Petroleum Geology and Geophysics and director of the Institute of Reservoir Characterization, Sarkeys Energy Center.

"We worked at OU for nine to 10 months," Wright said.

The team at OU included AAPG members Tarek Hodairi and Carlos Ceron, plus Mohamed Omar Abouelresh, Grant Heard and Majia Zheng.

Wright can be contacted via email at scott@litho-logic.us.

– KEN MILAM

High-resolution microphotographs of various rock types and cuttings (above examples, bryozoa branching and echinoderms) are part of the effort AAPG member Scott Wright is making to set an industry-wide standard for describing well lithology and rock cutting descriptions.

Mudlogger

from page 40

various qualities.

With "Litho-Logic," the logger then can compare his or her cuttings to the photographs. They then can click on the various qualities in order to prepare a report on the color, size, shape, etc. of the sample.

Conveniently, the program's color bar incorporates standard RGB values, allowing the logger to state the color objectively instead of guessing, Wright said.

In addition to photos, Wright included videos to illustrate mineralogical pore fluid tests. One video, for example, shows a sample being squeezed by tweezers to determine its hardness.

Photos show samples both wet and dry.

Wright apparently sensed that something intended to be an industry "standard" needed to be comprehensive – and apparently he has done just that.

"I was blown away by the amount of work he (Wright) put into it," said AAPG member Norm Hyne, professor of petroleum geology in Continuing Engineering and Science Education at the University of Tulsa – an unabashed fan of Wright's drive to set a standard for describing well lithology.

"The pictures are great," he said.

While wireline logs produce measurements that are absolute and repeatable, "mud logging is very different," Hyne said, because the analysis depends on the individual geologist "and is very subjective.

"What Scott has done is take mud logging to a very high standard that any geologist can use and produce a very high quality log," Hyne said.

Micah Banks, operations manager for Trans Pecos Well Logging said his company has been using the program for about a year.

"We were a little reluctant in the beginning ... (because) the people using it may not be as good as the program makes them appear," Banks said.

"But the idea of normalizing the way we enter data forced us into giving it a try. It's had a very positive impact on how we communicate with our clients," he said.

"If we're running 10 units on one play ... with 20 personnel, we get 20 interpretations on the same formation," Banks said.

With Wright's program, "We get at least 90 percent consistency," he said.

"It makes it a lot more valuable to a geologist watching multiple wells," Banks said.

The American Dream

The tool also is valuable in training personnel, he said.

Trans Pecos is currently working in the Permian Basin, with 20 units in the Delaware Basin and Eastern Shelf, Banks said.

"When he (Wright) brought it in, it was lacking in a couple of areas. They've really been proactive that rock types of region-specific geology are entered in a timely manner," he said.

Wright said the price of $5 per day is "background noise" in the context of the expense of drilling a well.

"I think what I've done is going to help a lot of people ... it's the American dream, using not education but smarts to do something that's good for everybody," Wright said.

"The technology for this has been out there a long time, but people wanted to keep it proprietary. There has to be a standard," he said.

"You just focus on fixing the little things," he added. "Getting simple solutions is so much more simple than people think."

Historical Highlights is an ongoing EXPLORER series that celebrates the "eureka" moments of petroleum geology, the rise of key concepts, the discoveries that made a difference, the perseverance and ingenuity of our colleagues – and/or their luck! – through stories that emphasize the anecdotes, the good yarns and the human interest side of our E&P profession. If you have such a story – and who doesn't? – and you'd like to share it with your fellow AAPG members, contact Hans Krause at historical.highlights@yahoo.com.

Kurdistan Venture Yields World-Class Discovery

By CHRIS GARRETT

It's November 2007, and the news from Iraq is bleak.

The hoped-for peace following the second Gulf War has not materialized and television reports are feeding us a daily diet of bombings, kidnappings and other atrocities.

GARRETT

And then the news comes into the London office that Gulf Keystone Petroleum Ltd., my employer, has secured an interest in two blocks in the Kurdistan Region in northern Iraq, becoming operator of the Shaikan block.

I have to admit that I was less than thrilled at the prospect of visiting the Kurdistan Region, as would inevitably be my fate, as head of Gulf Keystone's operations. At the time I was unable to disassociate the Kurdistan Region from the general news coverage of the wider Iraq.

Despite the assurances of our Kurdish colleagues, I spent the next three weeks worrying about security for our first fact-finding trip to Erbil, the capital of the Kurdistan Region of Iraq.

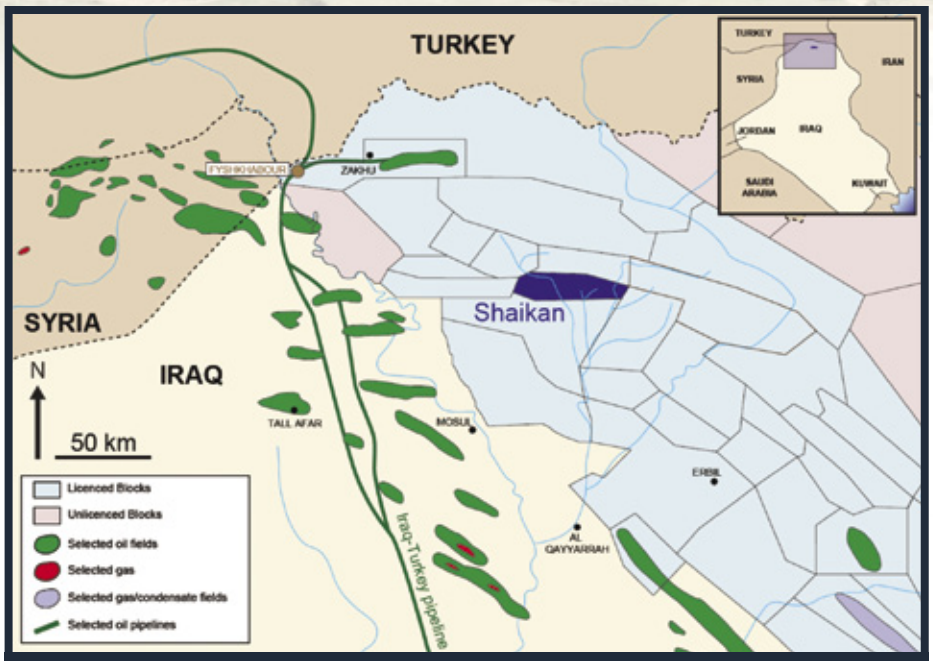
Imagine my surprise and relief to find that Iraq's Kurdistan Region had a totally benign security environment. The Kurds turned out to be pro-western, pro-business and totally in control of their region. That was in December 2007 and has continued to this day.

The Kurdistan Region is an autonomous region in federal Iraq. It borders Syria to the west, Iran to the east and Turkey to the north, where fertile plains meet the Zagros mountains, and is traversed by the Tigris, Greater Zab and Lesser Zab rivers.

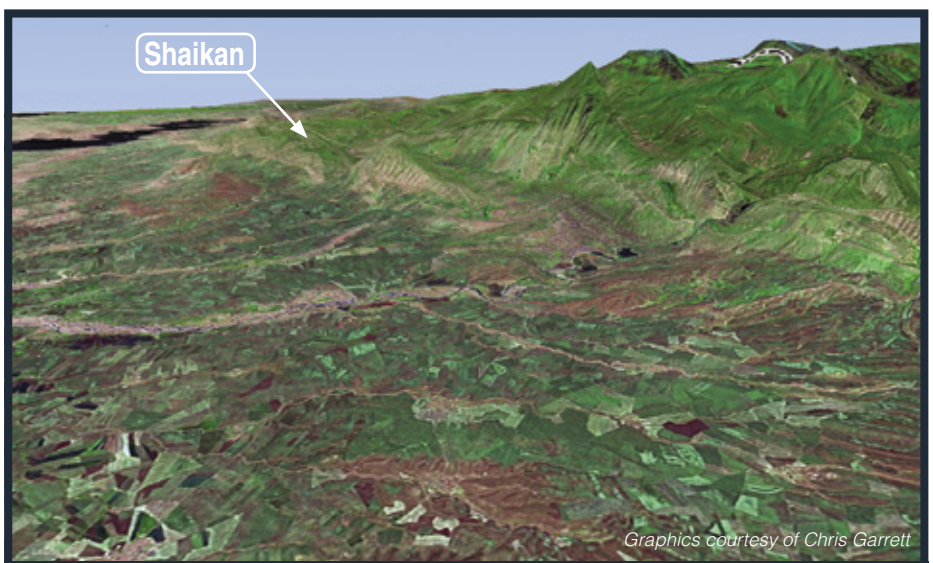
The region covers an area of 40,643 square kilometers and has a population of just under four million. Kurdish, Turkmani, Arabic, Armenian and Assyrian languages are spoken there.

Gulf Keystone at this time was a small independent oil explorer with a share price of about 30 pence and some interests in Algeria – and these new assets in Iraq. Gulf Keystone and a number of other independents signed Production Sharing Contracts with the Kurdistan Regional Government in November 2007.

Notable by their absence, from any of these deals, were the international oil majors. It would appear they had their eyes on the large oilfields in the south of Iraq and were taking seriously the federal Iraq's rhetoric about blacklisting companies operating in the Kurdistan Region.



Shaikan Block in northern Kurdistan. Fields and infrastructure shown are as per 2007.



Topographic satellite image showing the Shaikan anticline at the edge of the Zagros range.

This, of course, left the door open for independents prepared to take the risk. Gulf Keystone could see this was a world-class opportunity and took the plunge.

A Few Challenges to Face

The surface geology suggested that the Shaikan block contained a single elongate east-to-west trending, asymmetrical anticline with two culminations, an eastern and a western one. Gulf Keystone's commitment for the block was to shoot 100 kilometers of 2-D seismic data and to drill a well within the three years.

We started shooting a 170-kilometer 2-D seismic program in April 2008 and completed acquisition later that year. The data was acquired from both vibroseis and dynamite sources.

When processed, we had relatively good data for the vibroseis areas, shot on the low-lying flanks of the anticline with Tertiary, Fars cover and relatively poor data over the anticline's rugged crest, where we had used a dynamite source and where the Tertiary cover is breached.

Despite the poor quality data masking the anticline's crest, it was clear from the flank data that the anticline in the subsurface was broadly a mirror of the surface expression – although there was no evidence of two culminations in the subsurface. Choosing a well site was a compromise between trying to get close to a crestal location and finding a topographic setting, which could be accessed by a rig.

Company instructions were to spud our commitment well during 2008. Gulf Keystone's approach was aggressive: Be one of the first, if not the first, to drill.

We set about finding a rig, along with the other services essential to well drilling. The biggest problem was finding companies that were willing to come to Kurdistan. In the wider world there was no differentiation, in terms of safety, between Iraq in general and the Kurdistan Region. The unremitting bad news about security in central and southern Iraq meant that most international service companies were unwilling to send personnel to the country.

Nevertheless, we did manage to find a new rig, Weatherford's Rig 842, which was brought from Houston to the Shaikan field, entering the region via Turkey. Other essential services were available from either local companies, set up to explore this market niche, or from regional Middle East companies based in the Arabian Gulf.

Most of the large, familiar, western service providers were not to be found. Call-out contracts were not an option, as few companies had a base in the Kurdistan Region – so all services, from mud to well testing, had to be based at the rig-site on a permanent basis.

The Shaikan-1 exploration well, the first ever well to be drilled by Gulf Keystone in the Kurdistan Region, spudded on April 27, 2009.

See **Kurdistan**, page 46

Chris Garrett, vice president of operations for Gulf Keystone Petroleum Ltd., is an AAPG member and a Fellow of the Geological Society. He has spent 12 of his 35 years in the petroleum industry working in the United States and the Middle East. Before joining Gulf Keystone he was with Core Laboratories and Western Geophysical, and latterly with Baker Hughes and Randall & Dewey, where he assumed a number of roles ranging from international exploration and operations management to property and prospect evaluation. He joined Gulf Keystone in 2004 as managing director of the UK entity and operations manager for Algeria. He currently leads all the company's exploration and drilling operations in the Kurdistan Region of Iraq. Garrett was previously interviewed on this subject for a March 2010 EXPLORER article.

Regions and Sections is a regular column in the EXPLORER offering news for and about AAPG's six international Regions and six domestic Sections.

Rocky Mountain, Eastern Section Meetings Set This Month

September will be a busy month for the AAPG Sections – two groups will be holding their annual meetings, both in locales that boast geologic industry history and plenty of entertainment opportunities.

Rocky Mountain Section Annual Meeting

Colorado Gov. John Hickenlooper, a former oilman and current member of AAPG, will be the All-Convention luncheon speaker at this year's Rocky Mountain Section meeting, set Sept. 9-12 at the Two Rivers Convention Center in Grand Junction, Colo.

It is the first time Grand Junction has hosted the annual RMS event.

The meeting theme is "Vintage Geology – Perfectly Aged," and the technical sessions will include updates on the most recent work on resource plays across the region, the sedimentary and structural architecture of the latest plays in the Rockies and the impact and future of energy minerals.

Some of the specific session topics are:

- New Ideas in Piceance Creek and Uinta Basins.
- Resource Plays – Exploration and Exploitation.
- Tight Oil and Gas Reservoirs – Where, How and Why?
- Colorado Plateau Geology and Paleontology: A Tribute to Robert G. Young.

The All-Convention luncheon will begin at 11:45 a.m. on Monday, Sept. 10.

For online registration or more information go to rmsaapg2012.com.

Eastern Section Annual Meeting

The Eastern Section's 41st annual meeting returns to Cleveland, the site of the Section's very first meeting, Cleveland, for a gathering built on the theme "Classic Rocks – 153 Years of Performance."

The meeting will be held Sept. 22-26, and the technical program offers short courses, field trips and a technical program that centers on the Section's four major basins.

Technical sessions will include:

- Case Histories and Development of the Marcellus Shale Reservoirs.
- Horizontal Wells: Design, Drilling, Completion and Fracturing Techniques.
- Regional Geologic Concepts and new Plays in the Appalachian and Illinois Basin.
- Trenton-Black River Exploration and Production in Michigan and Indiana.
- Exploration and Production of Shale Source/Reservoir Rocks.

Entertainment at the meeting includes a night at the Rock & Roll Hall of Fame, with full access to the museum.

For online registration or more information go to esaapg2012.org.

Kurdistan

from page 44

Shaikan-1 was designed to test the Cretaceous, Jurassic and Triassic formations with the possibility of extending to the Permian. All of these formations consist primarily of carbonate, and we spent several months on the well – much of the time drilling blind or with minimal returns.

From the outset the returns – when we did get returns – were bitumen-stained, and this was the case throughout the Cretaceous. In the Jurassic we were getting spotty shows of heavy oil, but were still fighting lost circulation.

In all we lost more than 400,000 bbls of drilling fluid into this well.

Upon reaching the Sargelu formation, a well-known source rock in Iraq, we decided to conduct an open hole drill stem test (DST). We had signs of oil and permeability, while losing mud.

We opened the well for DST#1 at a depth of 1,450 meters to 1,510 meters on Aug. 2, 2009. After 45 minutes we had oil at the surface.

The surface DST equipment was inadequate to fully test and evaluate the subsequent flow, but it was obviously significant. Preliminary test rates indicated 5,000 to 8,000 barrels of 21 to 22 degree API oil per day, with flowing wellhead pressures of 290 to 350 pounds per square inch (psi).

The productivity index was 30 barrels of oil per day per psi.

We went on to drill a further 1,500 meters with regular oil shows and lost circulation events. We conducted further open and cased hole DSTs. We never produced any formation water and could find no water contacts on the logs.

This well turned out to be transformational for Gulf Keystone. We have discovered a very significant oilfield, which today is estimated to hold between eight billion and 13.4 billion barrels of gross oil-in-place, according to independent estimates. Appraisal wells have both extended the accumulation and pushed the lowest known oil deeper.

The reservoirs at Shaikan are highly fractured, which makes the ultimate recovery impossible to predict, but we can say with certainty that this field is huge and that it will prove to be economic.

Today, Shaikan is considered one of the world's largest oil discoveries of the last decade.

The Geophysical Corner is a regular column in the EXPLORER, edited by Satinder Chopra, chief geophysicist for Arcis Seismic Solutions, Calgary, Canada, and a past AAPG-SEG Joint Distinguished Lecturer. This month's column deals with lithology and brittleness with new seismic attribute.

An Effective Way to Find Formation Brittleness

By RITESH KUMAR SHARMA and SATINDER CHOPRA

The discrimination of fluid content and lithology in a reservoir is an important characterization that has a bearing on reservoir development and its management.


SHARMA


CHOPRA

For the unconventional reservoirs, such as shale gas formations, besides other favorable considerations that are expected of them, it is vital that reservoir zones are brittle. Brittle zones frac better, and fracing of shale gas reservoirs is required for their production.

Among the different physical parameters that characterize the rocks, Young's modulus (E) is a measure of their brittleness. Attempts are usually made to determine this physical constant from well log data, but such measurements are localized over a small area. For studying lateral variation of brittleness in an area, 3-D seismic data needs to be used, because computation of Young's modulus from seismic data requires the availability of density (ρ).

The computation of density, in turn, requires long offset data, which usually is not available.

In this study, we propose a new attribute (Eρ) in the form of a product of Young's modulus and density, which can be determined from seismic data without the requirement for long-offsets.

For a brittle rock, both Young's modulus and density are expected to be high, and so the Eρ attribute would exhibit a high value and serve as a brittleness indicator.

* * *

The determination of lithology and fluid content distribution in a reservoir is a desirable objective for its characterization and subsequent management.

Physical properties such as porosity and permeability make it possible to evaluate a hydrocarbon reservoir – however, the properties that have a direct impact on the relevant elastic constants, among others, are bulk modulus, shear modulus and Young's modulus.

- Bulk modulus is a measure of a material's resistance to change in volume and is known as incompressibility. It is treated as a porosity indicator.
- Shear modulus is measure of rigidity of a rock or resistance to deformation taken in a shear direction and is treated as a lithology indicator.
- Young's modulus (E), also known as stiffness modulus is a measure of the stiffness of the material of the rock.

Historically, geoscientists have attempted to delineate the fluid and lithology content of a reservoir on the basis of these physical properties.

An estimation of the physical properties described above requires P-impedance, S-impedance and density. For computing these prerequisites, prestack inversion of surface seismic data is usually performed. Extraction of density from seismic data needs far-offset information – but it also is true that the quality and amplitude fidelity deteriorate significantly at large angles of incidence. So, the computation of density is considered an arduous task.

In the absence of density, efforts have been made for characterization of a reservoir in terms of lithology and fluid content. For this purpose, P-impedance and S-impedance are used for litho-fluid discrimination, as the former is sensitive to fluid, whereas the latter is not.

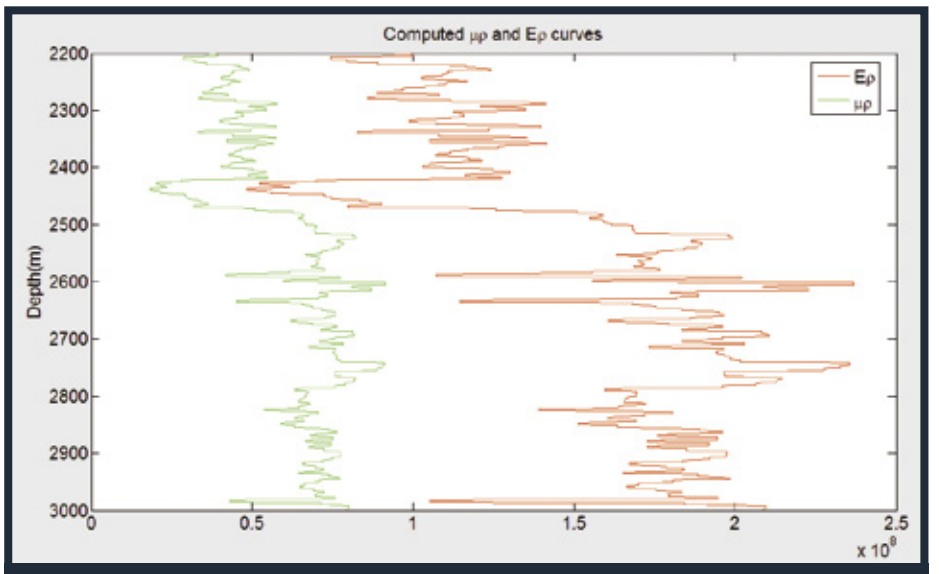


Figure 1: Computed μρ curve (green) plotted against the Eρ curve (red). Notice, the Eρ curve exhibits emphasized lithologic variation than the μρ curve.

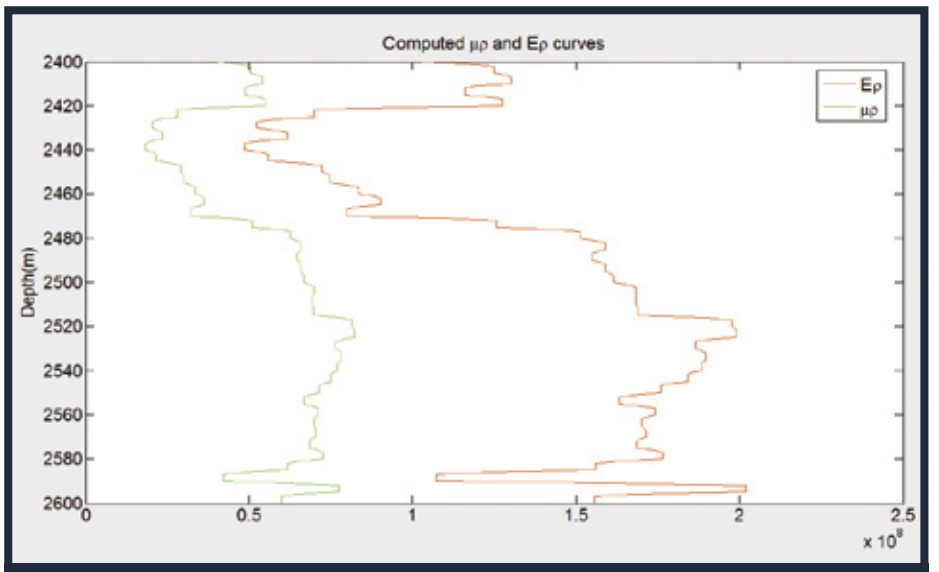


Figure 2: μρ and Eρ curves computed from segmented input logs for the same well. More emphasized lithologic variation is seen on the Eρ curve than on the μρ curve.

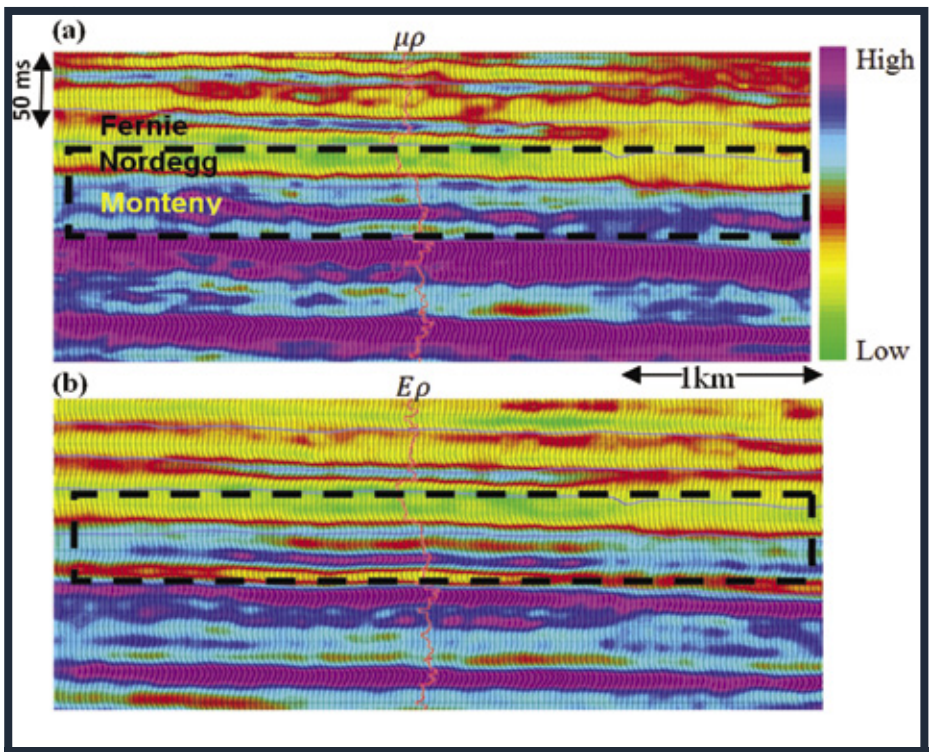


Figure 3: Comparison of (a) μρ section with (b) Eρ section, which illustrates the detailed lithology information seen on the Eρ section compared with the μρ, especially in the rectangular highlighted area.

The stiffness of a rock is an important property – especially for shale gas reservoirs where fracing is employed for stimulation. Stiffer shales frac much better than ductile ones and enhance the permeability of those zones. Young's modulus can characterize such stiffer pockets in shales.

Considering the importance of a lithology indicator as well as an attribute that could yield information on the brittleness of a reservoir, we propose a new attribute, Eρ, which is the product of Young's modulus and density. It can be derived from the P-impedance and S-impedance and can be shown to be a scaled version of μρ.

For a brittle rock, Young's modulus would be high – and density would be high, too –therefore the product of Young's modulus and density would be high as well and would accentuate the brittleness of the rock.

Examples

In figure 1 we show a comparison of the μρ and Eρ curves for a well in northern Alberta.

Notice, the Eρ curve emphasizes the variation corresponding to lithology change more than in the μρ curve.

For ease in interpretation, we segment the input log curves – and the results shown in figure 2 stand out nice and clear.

For implementation of this analysis on seismic data we considered a gas-impregnated Nordegg member of the Jurassic Fernie formation of the Western Canadian Sedimentary Basin.

The Nordegg member of the Fernie formation varies throughout the WCSB. It consists of predominantly brownish, greyish and black shales, which vary from siliceous rich cherts and dolomites to carbonate rich shale.

Due to the complex geology of the reservoir in the Nordegg, differentiating the lithology and fluid content is a challenge.

The Nordegg-Montney interface is a regional unconformity that separates the Jurassic and Triassic strata in the area. The Montney formation is composed of fine-grained siltstone grading to fine-grained sandstones, with limited shale content. There is a diagenetic dolomitic overprinting on the siltstones and sandstones. In local areas of the Montney there is a coquina facies made up of bivalves.

As the first step, simultaneous impedance inversion was run on the pre-conditioned 3-D seismic data to obtain P-impedance and S-impedance volumes. Next, these impedance volumes were transformed into μρ and Eρ volumes.

In figures 3a and b, we show segments of vertical sections from the μρ

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Multi-Disciplinary URTeC Opens Call for Papers

A call for papers has been issued for the inaugural Unconventional Resources Technology Conference (URTeC), a joint venture that will bring together for the first time the key disciplines and technologies engaged in the development of North American unconventional resource plays.

URTeC, sponsored by AAPG, the Society of Petroleum Engineers and the Society of Exploration Geophysicists, will be held Aug. 12-14 in Denver.

Organizers are seeking papers from petroleum engineers, geologists, geophysicists and other professionals interested in sharing innovations, best practices and experiences in integrated approaches for North American unconventional resource plays.

The event, organizers say, fills the unique need for a peer-reviewed, science-based unconventional resources conference that will take an asset team approach to development of unconventional resource plays – similar to how oil and gas professionals work in today's market.

Papers will be accepted through Nov. 15.

The program includes 20 themes applicable to unconventional resources and appeals to engineers, geologists and geophysicists, including:

- Unconventional Project Development.
- Unconventional Reservoir Characterization.
- Unconventional Shale Plays.
- Unconventional Tight Oil and Tight Gas.
- Unconventional Coal Seam/Bed Methane.
- Other Unconventional Reservoirs.
- Formation Evaluation of Unconventional Reservoirs.
- Fracture Characterization.
- Lateral Well Characterization.
- Flow Mechanics in Tight Reservoirs.
- Laboratory Methodologies.
- Reservoir Monitoring.
- Organic Geochemistry.
- Well Performance Prediction.
- Fluid Behaviors.
- Drilling Optimization.
- Completion Optimization.
- Rock Mechanics.
- Three-D Seismic Applications.
- Health, Safety and Environmental Issues.

The three technical program co-chairs are AAPG Honorary Member and past president Steve Sonnenberg, with the Colorado School of Mines; AAPG member Ken Beeney, with Devon Energy; and Luis Baez, with BG Group.

"The combined power of these three leading scientific organizations means URTeC has the potential to be the most substantial inter-society collaboration since the Offshore Technology Conference began in the 1960s," they write.

To submit an abstract, or for more information and/or to request information on exhibiting and sponsoring, visit the URTeC website at www.urtec.org.

UNCONVENTIONAL RESOURCES TECHNOLOGY CONFERENCE
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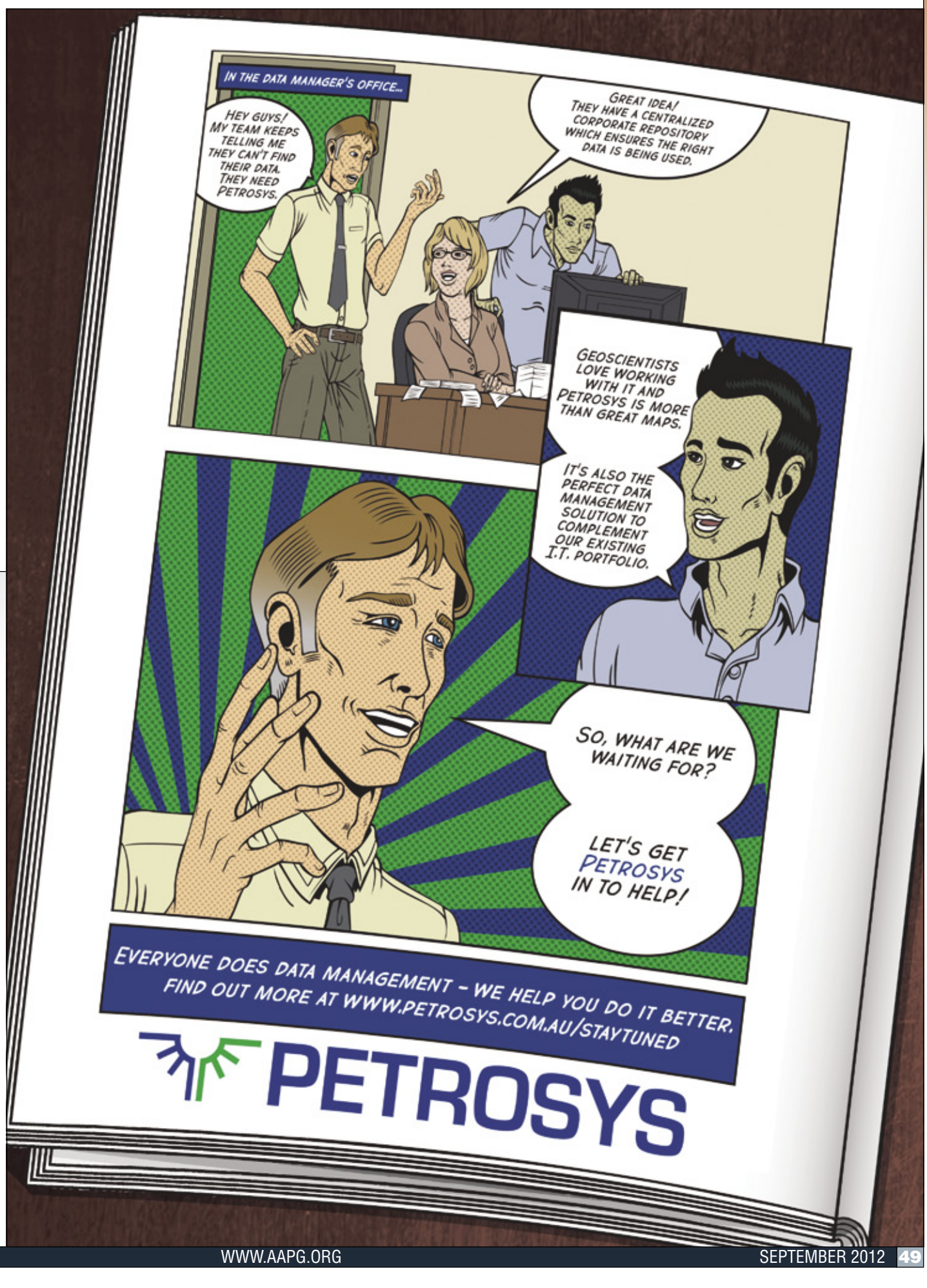

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and Eρ volumes, respectively.

Apparently, we notice Eρ has a higher level of detail than the μρ attribute. The upper parts of the figures exhibit lower values of the attributes as they correspond to the sandstone presence, whereas the higher values are seen in the lower part, verifying the availability of dolomitic siltstone in this zone.

Conclusions

We have proposed a new attribute (Eρ) in the form of a product of Young's modulus and density, which is a good lithology indicator. We describe it as a scaled version of the μρ attribute and illustrate that it intensifies the variation in lithology.

This attribute can be derived seismically, and we have shown that with it we can determine the brittleness of a formation.

We thank Athabasca Oil Corporation for giving us permission for presentation of the results shown in this study. We also thank Arcis Seismic Solutions for permission to present this work.

(Editor's note: Both Sharma and Chopra are with Arcis Seismic Solutions, Calgary, Canada.)

SPOTLIGHTON ...

‘Switch – the Movie’ Screenings Go Global

By VERN STEFANIC, EXPLORER Managing Editor

Coming soon, possibly to a theater near you …

“Switch,” an award-winning, feature-length documentary film that explores the future of energy on a global-scale, will be shown commercially in at least 10 cities across the United States in September.

In addition to the national exposure, the screenings – intended for the general public – will ensure the film is eligible for this year’s Academy Award consideration in the documentary category.

It also will be featured in campus-wide screenings at 40 universities nationwide, several of which Tinker will attend as a GSA/AGI/AAPG Distinguished Lecturer, to educational groups and at other private settings in both the United States and around the world – including a special screening at the upcoming AAPG International Conference and Exhibition in Singapore.

Throughout September, the film will play in commercial theaters in:

- New York.
- Los Angeles.
- Washington, D.C.
- Boston.
- Houston.
- Dallas.
- Austin, Texas.
- Oklahoma City.
- Denver.
- San Francisco/Oakland.

Internationally, “Switch” will be shown to groups in Calgary, Canada, and Batangas, Philippines during September. In August it was screened at the International Geological Congress in Brisbane, Australia, and in Mexico City, Mexico.

“Switch” was supported by several foundations, including the AAPG Foundation.

It features past AAPG president Scott Tinker in the starring role as the narrator and “guide” for a journey around the world that looks at the global energy transition, including how energy is used, how it is created, how it is used, how much of it is needed and how much more of it can be produced.

Importantly, it discusses realistic approaches for dealing with what many see as a coming energy crisis around the world – and explores what the challenges will be for all people, as well as some of the solutions.

Or, as Tinker asks in the film:

“What will it really take to go from the energy that built our world to the energy that will shape our future?”

> “Switch – The Movie” will have a special showing at the AAPG International Conference and Exhibition in Singapore.
>
> The film will be shown Monday night, Sept. 17.
>
> Scott Tinker, the film’s onscreen guide as well as its co-writer and co-producer, will be on hand to introduce the film and answer questions.
>
> Tinker also will be featured during ICE at the AAPG/DPA Featured Speaker Luncheon, talking about “The Global Energy Transition: What Will It Take to Make the Switch?”

Take One

The origins of “Switch” date back over five years, when Austin, Texas-based documentary film maker Harry Lynch was making a short documentary for NBC (regional) called “Unconventional,” and interviewed Tinker for the film in his role as a professor at the Jackson School of Geosciences and director of the Bureau of Economic Geology at the University of Texas at Austin.

“He interviewed me for an hour or so,” Tinker recalled, with Lynch seeking an expert’s perspective for his film, and insight into the energy industry and global energy demands seldom seen by the general public.

“I was impressed with his approach and obvious talent,” Tinker said.

“After the interview was over, he asked me if I had ever written a book,” Tinker said. “I remember laughing and saying that I was too lazy to write a book, and he remembers me saying I was too busy to write a book.

“Regardless, he says to me, ‘Why don’t you make a movie?’

“That was over four years ago January,” Tinker laughed, “so it wasn’t faster than writing a book.”

Tinker is the on-camera “star” of “Switch,” and as director Lynch is the off-camera creative force. The two share writing and producing credits.

“It is a healthy partnership, as we bring different perspectives,” Tinker said of the creative dynamics. “We didn’t pre-write it – it was written as it was filmed, and a lot of the story evolved after the filming was finished.

“The eventual story is very different from the first cut of the film,” Tinker added.

That was at least partially because

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early audiences convinced Tinker and Lynch that the film needed to be less about "concepts" and more about people.

"We had to balance education with entertainment," Tinker said. "When we were starting I told Harry, 'I have all these great graphs and charts,' and he said, 'You can't use any graphs and charts!"

(Tinker somewhat sheepishly points out that they "ended up with a chart or two.")

"I had to resist the urge to 'Google' and learn a whole lot of stuff ahead of time before our site visits," Tinker said, "'cause I'm a researcher. But sometimes Harry wouldn't even tell me where we were going. He didn't want me to come off like I was too knowing."

Early screenings also produced a common reaction: Audiences wanted to know "more about Scott" – who he is, and why should it matter what "he" says or thinks.

So Tinker's personal journey through the world of energy, which has been going on now for three decades, became the film's focus.

An example: Early in the movie Tinker is driven to a power plant *inside* a mountain in Norway – which elicits genuine amazement from Tinker.

"I didn't know that it was inside a mountain," Tinker said, "so when you see my reaction to what we find, that's real."

Personal Best

"Switch" has been shown nearly 100 times to various audiences over the past year – including the 2011 AAPG Leadership Conference in Boulder, Colo., and the AAPG annual meeting in Long Beach, Calif. – and early viewers may find the film a bit "different" on a second viewing.

"The comments and criticisms were pretty consistent: It was too long," Tinker said. "So we took five minutes out after the Colorado Leadership Conference – and the reaction in Long Beach was very positive."

Tinker and Lynch now anxiously await the reaction from the general public, which may or may not be familiar with the energy industry or exploration dynamics.

"While many other energy films set out with an agenda, then advocate for one energy type or another, 'Switch' is different," Tinker said earlier this year. "We started with a question, then went out to discover the answers, working hard to remain unbiased and open to new ideas."

"With our preview audiences, we've seen that people from left and right, young and old, fossil and renewable, energy companies and environmental groups are all positive on the balanced message and on the conversation it could help start," Lynch added. "And that's really our goal – to start a balanced national energy conversation with this film, its extensive video-based companion website, the K-12 education modules and, perhaps in the future, a TV series."

Tinker said they were determined that, as they traveled around the world looking at energy demands and potential solutions, the film would have objectivity, balance, candor, scale and scope.

"That would give the film the staying power that other advocacy projects don't have," Tinker said.

And it would make finding a balanced path to our energy future personal.

"We realized it needs to be about one person's energy use per year," Tinker said. "That fit with the theme. People matter. Every person matters."

Tinker (right) at PS10, the world's first concentrating solar tower, near Sevilla, Spain, where the sun's heat makes steam to drive a generator.

Photos courtesy of Switch Energy Project

Belle Ayr Mine manager Shane Durgin gives Tinker a tour and overview of a coal mine in Wyoming's Powder River Basin.

Pittsburgh Seeks Technical Abstracts

Technical paper and poster abstracts continue to be accepted online for the 2013 AAPG Annual Convention and Exhibition, which will be held May 19-22 in Pittsburgh, Pa.

The event will be held in the David L. Lawrence Convention Center, marking the first time AAPG has tabbed Pittsburgh as its convention locale.

The meeting theme is "Making the Play With Geotechnology," and technical papers and posters are being sought for 12 themes:

- Global Unconventional Resources.
- The Appalachian Basin – A Re-Emerging Giant.
- Emerging Conventional Frontiers.
- Active Conventional Oil and Gas Fields.
- Siliciclastics.
- Carbonates and Evaporites.
- Energy and the Environment.
- Analysis of Petroleum Systems.
- Structural Geology and Neotectonics.
- Geophysics and Seismology.
- E&P Technology and Research – the Past and the Future.
- AAPG and SEPM Student Posters.

Abstracts will be accepted online through Oct. 11. For more detailed information on the themes or on the abstract submission process, go to aapg.org/pittsburgh2013/index.cfm.

Student Expos, Career Fairs Set This Fall

Four of AAPG's premier Student Expo and Career Fair events will be held in September and October, each one offering geoscience students and companies the chance to meet, network and talk about job opportunities.

The events, which take place in various parts of the United States, also feature a variety of activities, short courses, field trips and judged poster sessions.

Mainly, though, Student Expos are intended to help students start their careers in the energy industry, and for energy companies to find top talent to hire.

The upcoming events are:

- AAPG/SEG Student Expo, Sept. 17-18 at the George R. Brown Convention Center in Houston (www.studentexpo.info).
- Rocky Mountain Rendezvous, Sept. 21-24 at the University of Wyoming Conference Center, Laramie, Wyo. (geology.uwyo.edu/rmr).
- Student Job Quest, Sept. 22-26 in Cleveland, held in conjunction with the Eastern Section annual meeting (www.esaapg2012.org).
- AAPG/SEG West Coast Student Expo, Oct. 11-13 at the California State University Northridge Student Union, Northridge, Calif. (www.csun.edu/geology/aapg-seg.htm).

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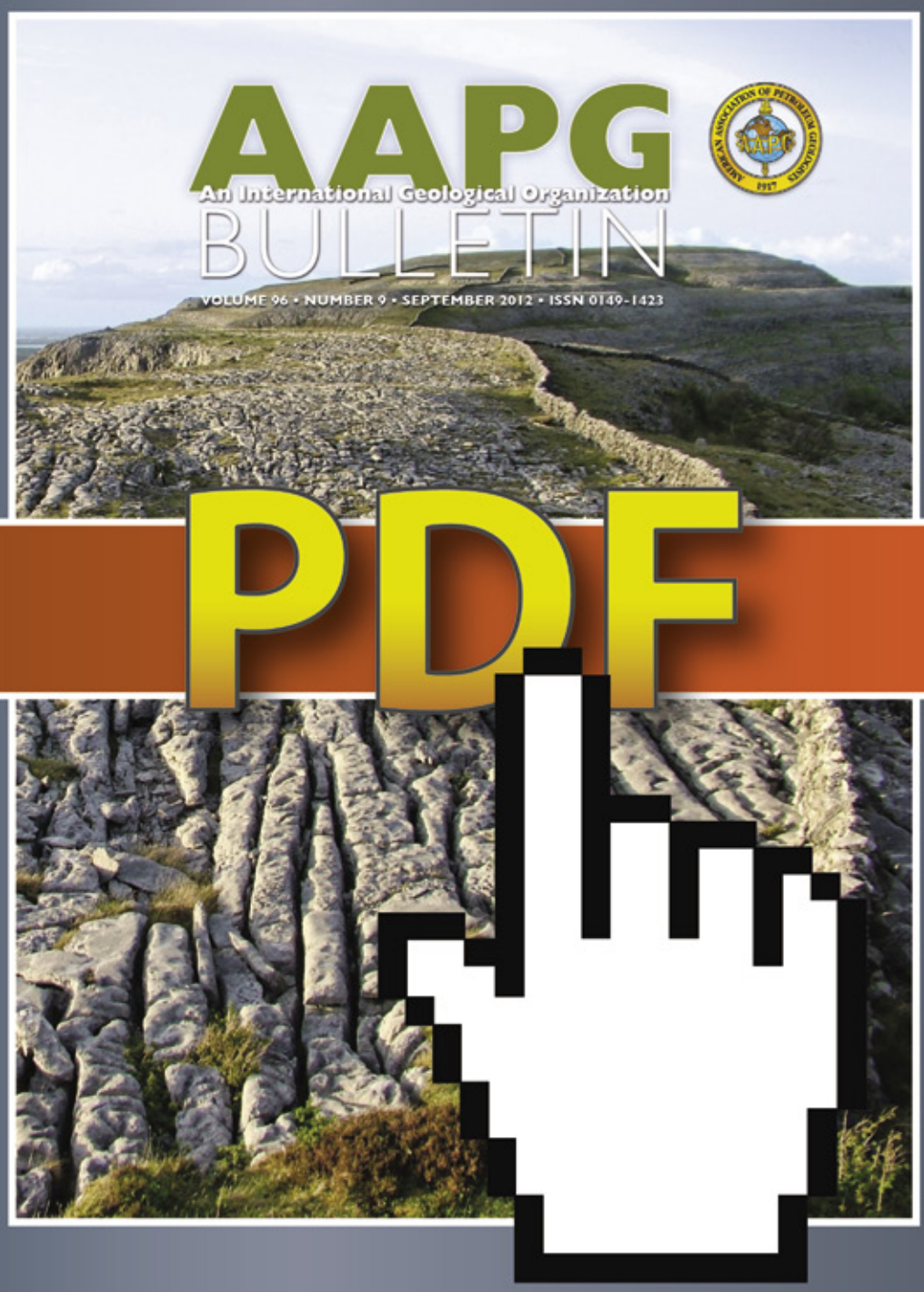

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Article highlights include:

A new method for modeling saturation

Iulian N. Hulea and Chris A. Nicholls

Mercury-air capillary pressure data is used for rock-type definition and for predicting saturation and permeability. New methods are presented for modeling saturation in rocks with multimodal pore throat size distributions and for relating permeability to pore throat sizes.

Damage and plastic deformation of reservoir rocks, Parts 1 and 2

Seth Busetti, Kyran Mish, Peter Hennings, and Ze'ev Reches

In a series of studies, the authors develop a numerical tool for modeling finite deformation of reservoir rocks. Part 1 discusses damage rheology and Part 2 applies the rheology to investigate fracture propagation at the tip of a hydrofracture.

Gas chimneys and normal fault

Bradley R. Ilg, Samuel Hemmings-Sykes, Andrew Nicol, Jan Baur, Miko Fohrmann, Rob Funnell, and Mike Milner

Widespread gas chimneys imaged in 2D and 3D seismic-reflection data within the southern Taranaki Basin, New Zealand, are most common above Cretaceous source rocks modeled to have expelled hydrocarbons. Most of the observed gas chimneys are related to late-stage normal faults.

A numerical simulation of brine flow

Beatriz Garcia-Fresca, F. Jerry Lucia, John M. Sharp Jr., and Charles Kerans

Brine reflux can be an effective mechanism to dolomitize large carbonate successions. Results from the Permian San Andres Formation show that brine reflux could have provided magnesium to dolomitize carbonates and that successive reflux events can result in pervasive dolomitization.

FOUNDATIONUPDATE

Trustees to Meet in Arizona

By NATALIE ADAMS, AAPG Foundation Manager

The AAPG Foundation Trustee Associates will hold its 35th annual meeting Oct. 28-Nov. 1 at the Phoenician Resort in Scottsdale, Ariz.

The Trustee Associates are a select group of contributors organized for the purpose of supporting the AAPG Foundation, providing counsel and leadership to its Trustees, lending support to its fundraising efforts and guiding the scientific and educational agenda, which it overwrites.

Today there are more than 275 Trustee Associates who play a stellar role in the development of the AAPG Foundation's financial resources, thereby dramatically accelerating its ability to support scientific educational programs. The group supports more than 30 funds and programs.

For information on joining the Trustee Associates, visit the Foundation website, foundation.aapg.org.

* * *

The AAPG Foundation and Oklahoma State University Geoscience and Geographic Information Systems (GIS) Consortium was formed to create, promote and provide access to digital peer-reviewed GIS products carried out through OSU's Boone Pickens School of Geology, the Geography Department and the AAPG GIS Publications Committee.

These products have direct applications to the search for and development of petroleum and energy-related mineral resources, environmental geology and related economic issues.

Established in 2008 through funding by AAPG member T. Boone Pickens, the Boone Pickens Digital Geology Fund accelerates and sustains AAPG Datapages' Geographic Information Systems publishing program through the AAPGF-OSU Geoscience GIS Consortium.

The Foundation Trustees and staff, as always, thank Mr. Pickens for his continued, generous support of the program.

Additional contributions are accepted for this initiative.

* * *

Simply put, the AAPG Foundation exists to support the geosciences.

It funds many educational opportunities, public outreach and various grants and scholarships at the university level.

It recognizes outstanding achievement in the geosciences and assists in the dissemination of new technological information as well as the preservation of important studies, data and research.

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See **Foundation**, page 56

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Tuition for the week:	Price through 8/20/2012	Price increase after 8/20/2012
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SAVE $200 BY BECOMING AN AAPG MEMBER AND REGISTERING BEFORE AUGUST 20TH

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from page 54

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Canada , ME, Asia stops planned

Shell-Funded DL Going on Tour


SALLER

A new, specially funded, designated speaker has been added to the prestigious AAPG Distinguished Lecture program for the 2012-13 season.

The Shell Distinguished Lectureship, made possible through a recent generous contribution by Shell to the AAPG Foundation, will annually endow a speaker who will initially focus on petroleum geology topics related to Canada, Latin America and Southeast Asia.

The inaugural Shell Distinguished Lecturer will be Art Saller, stratigrapher and exploration geologist for Cobalt International Energy in Houston.

Saller was selected – as all Shell Lecturers will be – by a five-member sub-committee of the Distinguished Lecture Committee, which will organize the Shell Distinguished Lecture tour. That group includes the group's co-vice chairs plus three people representing North America, international Regions and Shell, respectively.

Saller will travel later this fall, with tour details yet to be announced.

During his 28 years in the petroleum industry, Saller, an AAPG member who has taught short courses for the Association, has done research and provided stratigraphic support for exploration and production projects in west Texas, Canada, Angola, Indonesia and many other locations.

He also has published numerous papers on carbonate sedimentology and deepwater siliciclastic systems as well as helped edit books.

In 2007, he was part of an exploration team that was given Chevron's Chairman's Award for oil discoveries in offshore Angola.

He also has helped run field trips to the Caicos Platform (Bahamas), Belize and the Permian Basin for Cities Service/Occidental, Unocal, Chevron, university geology groups and the Nautilus Training Consortium.

When announced as a 2012-13 DL speaker earlier this year he had four talks to offer groups:

✓ Controls on Hydrothermal Dolomites and Their Reservoir Properties.

✓ Diagenetic Evolution of Porosity in Carbonates During Burial.

✓ Sequence Stratigraphy of Classic Carbonate Outcrops in West Texas and Southeast New Mexico With Subsurface Analogs.

✓ Pleistocene Shelf-to-Basin Depositional Systems, Offshore East Kalimantan, Indonesia: Insights Into Deepwater Slope Channels and Fans.

AAPG's DL program, funded largely by the AAPG Foundation, is the Association's flagship initiative for spreading the latest in science, technology and professional information.

The nine DL speakers for 2012-13 North American tours (including the AAPG Ethics Lecturer) were announced in the August EXPLORER. The international DL roster has yet to be announced.

For more information on the program go online to www.aapg.org/education.

DLs Start Tours

AAPG's 2012-13 Distinguished Lecture season starts this month, with two speakers making their initial two-week tours.

Touring will be:

- Kathleen M. Marsaglia, professor in the department of geological sciences at California State University Northridge.

Marsaglia will be on tour Sept. 10-21 in western North America.

- Chris Paola, CSE distinguished professor at the University of Minnesota, Minneapolis will be on tour Sept. 24-Oct. 5 on an eastern North America circuit.

Specific speaking cities will be available in September online at www.aapg.org/eduction/dist_lect/domestic.cfm.

PROTRACKS

Lemiski is on a mission

Wanted: YPs in the HoD

By COURTNEY CHADNEY, EXPLORER Correspondent

Have you ever asked yourself, who made up that policy for AAPG?

Why are things the way they are in this organization?

Just where is AAPG headed?

New and/or younger members often are a bit bewildered by those questions – but the answer is easy to find:

Probably, the AAPG House of Delegates, or HoD for short.

And now that you know that, HoD delegate Ryan Lemiski is on a personal mission to make sure everyone knows that – but especially for AAPG Young Professionals to know that, because only then will young professionals be able to become an integral part leading the Association in the coming years.

He would know. When Lemiski was elected last year he became AAPG's first YP HoD delegate (see November 2011 EXPLORER) – a proud moment in his life and a historical note for AAPG.

But earlier this year, when he attended a YP Committee meeting at the AAPG Annual Convention and Exhibition in Long Beach, Calif., he witnessed firsthand a universal lack of HoD knowledge among the group.


LEMISKI

"It became apparent that many people in the room were unfamiliar with the duties and responsibilities of their elected delegates," said Lemiski, a representative from Calgary, Canada, where he is an exploration geologist for Talisman Energy.

"That room contained what I would consider some of the most engaged young individuals in our society," he added, "and if they are unfamiliar with the HoD, imagine what the less involved students and YPs must know, if anything, about the HoD."

A Young Perspective

Here's part of the answer: AAPG's HoD is a group of elected individuals (delegates) from affiliated professional societies, international AAPG Regions and U.S. Sections. Each society or region is permitted one delegate for up to 70 members; delegates serve three-year terms.

As the AAPG Bylaws say: "All of the legislative function of this Association, within the scope of the Constitution and Bylaws, shall be vested in a House of Delegates."

Delegates are responsible for:

- Familiarizing themselves with AAPG's policies and programs.
- Processing requests from the Executive Committee regarding information on the eligibility of member applicants.
- Communicating AAPG news, activities and policies to their respective Section and Region membership.

Meetings are conducted throughout the year, with the largest HoD meeting being held at the AAPG annual meeting.

"YPs should be aware of the HoD and its function," Lemiski said. "The only way we can ensure that AAPG is the organization that YPs from around the globe wish to be a part of is by ensuring that this organization caters to the wants and needs of its younger members."

To be fair, the initiative to expose more YPs to the HoD already seems to have had an impact – Lemiski is no longer the only YP in the house.

"We've had three more YPs elected

Continued on next page

Continued from previous page

as delegates in 2012, and several YPs were appointed as alternates for the 2012 meeting of the House of Delegates in Long Beach," he said.

Lemiski also reported that the YP delegates already made an impact at the Long Beach meeting, bringing a "young" perspective to issues like the AAPG membership simplification debate.

And Lemiski believes there was "tremendous support" for a larger YP presence in the House.

"Most longtime AAPG members recognize the importance of YPs to the future of the society," he said.

Jeff Lund, past HoD chair, also believes the YPs are key in the future of AAPG.

"Any dynamic organization needs active participation from across the spectrum of its membership," Lund said, himself a proponent of YP involvement. "That means members from around the globe, members interested in different geological specialties and especially across age groups."

Current HoD chair R. Randy Ray assures that the encouragement of YPs in every level of the HoD will continue.

"I am working to put YPs on each of the six HoD committees to encourage their interest in AAPG functions," Ray said. "They bring a unique perspective and we want their views represented."

Ray added "there is no better preparation for our future AAPG leaders" than the HoD, because there they learn of AAPG's history and sense of professionalism.

"They will become familiar with the Constitution and Bylaws, which are the underlying structure of how AAPG is organized," he said.

"One of the challenges is the small number of YPs which are delegates," Ray continued. "It is difficult for YPs to get elected as a delegate when better known, longtime AAPG members are on the local ballots for delegate elections."

"Especially in some of the smaller AAPG sections, new YPs need to talk to their society leadership and make it known that they are willing to serve," he said, "It may require long serving delegates to step back for one term in order to allow new people to serve in the House.

"This needs to be discussed at the local society and Region level," he said, "with a view to having that society fully represented in the transition to the future.

How to Get Involved

Lemiski and his colleagues are focused on attracting new members, but he agrees the road to success could be very difficult.

"In a digital age where many young people believe the resources to a successful career reside on the net, it's easy to dismiss the significance and importance of membership in a professional society," he said.

Lemiski's response, however, is that it's worth the effort, because the benefits of being fully involved in AAPG are endless, including:

- Learning how the Association functions.
- Making multi-generational and global professional network contacts.
- Having a voice in AAPG matters.

And for Lemiski, there is one more advantage to involvement: Having the opportunity to experience meetings run under Roberts Rules.

"I've always been fascinated by policy, procedures, governance and high-level decision making," he said.

"But furthermore, HoD provided me with an opportunity to meet and interact with experienced professionals," he continued. "Much of the career advice I've received has come directly from conversations with delegates who have had long successful careers in this industry."

Lemiski's advice to other YPs who have an interest in becoming a delegate:

✓ Become highly involved in your Section or Region.

✓ Get to know your leaders by regularly attending their Executive Committee meetings.

✓ Become familiar with the specific Association-related issues of your Section or Region.

✓ Learn all you can about AAPG and the House of Delegates. EE

Editor's note: John R. Powell is president of the Dibblee Geological Foundation in Santa Barbara, Calif.

Dibblee's California maps available

Mapping Talents, Passion Created a Legend

By JOHN R. POWELL

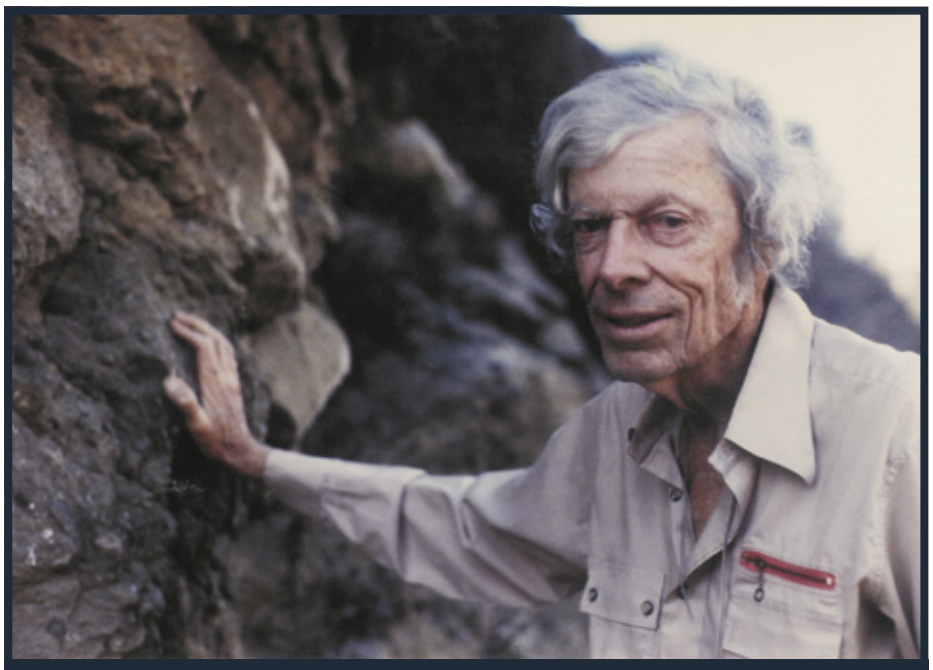
While attending Stanford University in 1932 Tom Dibblee may not have known he would become a legend and the most famous field geologist in California (or have a Wikipedia page!), but he did know he wanted to be a field geologist like those at the U.S. Geological Survey.

When he was in high school, Tom followed consulting geologist Harry R. Johnson around his family's 20,000-acre ranch while Johnson accessed the ranch for its oil potential. By the end of that summer Tom had produced a geologic map of his own that, in retrospect, looked remarkably similar to the geologic map of that portion of the Tajiguas Quadrangle his non-profit (the Dibblee Geological Foundation) published in 1988.

Later, when still in high school on trips accompanying his father east into the Central Valley of California, Tom started identifying similar stratigraphic sections to those he had seen on his ranch.

His 70-plus-year-long mapping career had begun.

Upon graduation from Stanford in 1936, Tom went to work for Union Oil and then on to Richfield where his field mapping led to the discovery of the Russell Ranch field in near New Cuyama. By 1952 Tom had mapped all the oil-potential sedimentary basins in California, and his legendary reputation for roaming the back country on foot for weeks at a time became part of his lore.



Famed geologist Tom Dibblee's legacy continues with the Dibblee Geologic Map Collection.

From Richfield, Tom went on to fulfill his dream of becoming a field geologist for the USGS.

With the USGS he mapped the Western Mojave Desert, evaluating known and potential borate deposits for boron in making rocket fuel. Following that assignment he mapped 25 miles each side of the San Andreas Fault, from the Coachella Valley to north of the San Francisco Bay. That project alone resulted in more than 100 published quadrangles.

After retiring in 1977 Tom began mapping the geology of the 1.2-million-acre Los Padres National Forest of central coastal California on a voluntary basis. His efforts in the Los Padres Forest resulted in more than another 100 geologic quadrangles and a Presidential Volunteer Action Award from President Reagan in 1983.

In all, Tom mapped more than 550 quadrangles at scales of 1:24,000 and 1:62,500 that form a nearly continuous mosaic of regional field geology east of the Sierras from north of San Francisco to near the Mexican Border – about one quarter of the state of California.

Finding a Home

One of the beauties of the Dibblee Geologic Map Collection is how remarkably consistent the nomenclature and color schemes are throughout the series. Great care was taken by Tom and his editors to ensure this consistency.

Tom had a very special ability to remember what rocks he had seen and where, and their association with other units. He also could rapidly and rather accurately determine the orientation of the bedding and structure from a distance, allowing the opportunity to move through an area quickly.

His knowledge of regional stratigraphy, structure and paleontology has been basic to understanding much of California's geology (Dorothy L. Stout, GeoTimes, May 1992).

In the early 1980s a group of Tom's colleagues formed the Thomas Wilson Dibblee Jr. Geological Foundation. The Foundation's mission was simply to

Continued on next page

All 419 maps in the Dibblee Map Collection are featured in AAPG's online bookstore (http://bookstore.aapg.org) for immediate download. Each quadrangle is priced at $22.

By the time the Dibblee Geological Foundation completed the map collection, many users wanted the maps in digital formats as well as in print. The Foundation approached AAPG Datapages to help provide an e-commerce solution, and all maps were placed into the Digital Download program at the AAPG Bookstore (other maps are in press, but release dates are uncertain because so much remains to be done).

To date, all maps have been available as layered PDFs (see main story). Most maps are less than two mb (file size). In May AAPG Datapages received word all maps have been converted to a geo-referenced TIF format and also will be provided for customer download at the bookstore (also at a price of $22 per quadrangle).

The advantage of a geo-referenced TIF file is it can be immediately imported to a common GIS mapping application for use as a data layer in an E&P project. Although it is possible to extract an information layer from a layered PDF, the new geo-TIF maps will save the user several steps and guarantee higher mapping accuracy.

"We have not determined a release date of the geo-TIF maps," says Ron Hart, of AAPG Datapages, "but it is a high priority project for us and we already are working on a solution to speed the release. Watch for announcements later this fall."

Continued from previous page

help preserve the scientific, technical, educational and economic values of Dibblee's life work through timely publication of hundreds of maps.

In June 2002 the Dibblee Geological Foundation's mission was adopted by the Santa Barbara Natural History Museum, and in response created the Dibblee Geology Center. That mission of timely publication was fulfilled in 2008 with the completion of 419 geologic maps of more than 550 quadrangles; first under editor Helmut E. Ehrenspeck, who passed away in 2001, and then by editor and AAPG member John A. Minch, who completed the project.

Dibblee worked every day on his maps to within a couple weeks of his passing away – he would have been 100 years old last October – and he not only mapped while at work but spent most of his free time throughout his life mapping in areas that were located between his assignments.

In the late 1980s the Dibblee Geological Foundation Board postulated that map sales of the Santa Monica Mountain quadrangles would generate needed cash because of the heavy development-related consultant base in the Los Angeles area, and asked Tom to map them. He set out with his field partner Helmut Ehrenspeck and completed the dozen quadrangle assignment within a few years time.

Dibblee commented after that it was some of the most complicated geology he had ever mapped.

The Dibblee Map Collection

The Dibblee Geologic Map Collection of 419 maps is available in both paper and electronic formats. Paper versions of the Dibblee Maps can be purchased at the Santa Barbara Museum of Natural History store (http://store.sbnature.org/catalog/) and electronic Geo-PDFs are available through the AAPG Datapages (http://bookstore.aapg.org/). Volume deals resulting in as much as 25 percent off are available on paper maps through the regional specials at the Santa Barbara Natural History Museum store. Volume deals also are available on electronic versions in three regional sets, including the Northern Basin, Humboldt Basin and Desert through the Datapages by contacting aapgdata@aapg.org.

The digital maps feature high quality PDFs created from the original files, and include a USGS topographic map overlay layer. Maps are geo-registered to the four corners of each map using the original USGS overlay projection:

- North American Datum 1927 (NAD 27).
- Universal Transverse Mercator Grid (UTM zone 10 or zone 11).

A wide format printer is required for full size printing.

Funding for publishing and later digitizing all of the Dibblee Geologic Map Collection was predominantly a grass-roots effort of private and corporate donors and foundation re-gifting, such as from the AAPG Foundation. No government funds were made available or utilized.

To complete the digitization of the initial 76 maps (for the Datapages Project), funding was borrowed from other sources.

We are asking for contributions to retire that debt. One way to contribute is to purchase a block of maps, requesting that the funds be applied to retiring the debt.

For more information contact John Minch at jmainc@earthlink.net.

"Professional News Briefs" includes items about members' career moves and the honors they receive. To be included, please send information in the above format to Professional News Briefs, c/o AAPG EXPLORER, P.O. Box 979, Tulsa, Okla. 74101; or fax, 918-560-2636; or e-mail, smoore@aapg.org; or submit directly from the AAPG website, www.aapg.org/explorer/pnb_forms.cfm.

PROFESSIONAL NEWS BRIEFS

Fred H. Behnken, to manager-geosciences technology, Concho Resources, Midland, Texas. Previously staff geologist, Kinder Morgan Production, Midland, Texas.

Eduardo A. Berendson, to senior geologist-subsurface area lead, BP-Egypt, Cairo, Egypt. Previously lead geoscientist, Vegas Oil and Gas, Cairo, Egypt.

Richard C. Burnett, to senior geophysicist, Cathexis Oil and Gas, Houston. Previously principal geophysicist, ConocoPhillips, Houston.

Stephen Caffery, to consultant/owner, Coastal Oil and Gas, Lafayette, La. Previously district geologist, LLOG Exploration, Lafayette, La.

Carlos A. Dengo has retired from ExxonMobil as vice president-geoscience for ExxonMobil Upstream Research Co. He resides in Austin, Texas.

J.A.D. "Tony" Dickson has been named the SEPM Pettijohn Medal winner for outstanding contributions in sedimentology and stratigraphy. He will receive his award in May at the society's annual meeting, held in conjunction with the AAPG annual meeting in Pittsburgh. Dickson is emeritus reader at University of Cambridge, department of earth sciences, Cambridge, England.

Tom Eggert, to principal analyst-reservoir characterization, Quantum Reservoir Impact, Houston. Previously senior geological adviser, Occidental Oil and Gas, Houston.

Paul Enos has been named the Twenhofel Medal winner, SEPM's highest honor. He will receive his award in May at the society's annual meeting, held in conjunction with the AAPG annual meeting in Pittsburgh. Enos is distinguished professor emeritus, department of geology, at University of Kansas, Lawrence, Kan.

Neil Fishman, to senior geological adviser, Hess Corp., Houston. Previously research geologist, U.S. Geological Survey, Denver.

Ron Gutiw, to staff geologist-Brooks North, Cenovus Energy, Calgary, Canada. Previously senior geologist, TAQA North, Calgary, Canada.

Jay Hightower, to exploitation development manager-Midland Basin and eastern shelf, Apache Corp., Midland, Texas. Previously business unit manager, Apache Corp., Calgary, Canada.

Mark R. Johnson, to senior geologist, ConocoPhillips, Midland, Texas. Previously account manager, Baker Hughes Wireline Systems, Houston.

Fred Kunzinger, senior principal, Noah Consulting, Houston. Previously senior manager-global data management, Hess Corp., Houston.

Carol Law, to head of technical and commercial operations, Falcon Oil & Gas, Toronto, Canada. Previously exploration manager-east Africa, Anadarko Petroleum, Spring, Texas.

Patrick R. McDonald, to interim chief executive officer, Forest Oil Corp., Denver.

Thomas Scott Meyer, to team leader-geoscience project implementation, Santos Ltd., Adelaide, Australia. Previously manager of technical operations-Pinedale division, QEP Resources, Denver.

Phil Miller, to vice president-exploration, Pan African Oil, Calgary, Canada. Previously exploration manager-global new ventures, Nexen, Calgary, Canada.

Mark Milliken, to petroleum geologist, Elk Petroleum, Casper, Wyo. Previously petroleum geologist, Linc Energy, Casper, Wyo.

Susan L. Riddell Rose has been named the recipient of the 2012 Distinguished Business Leader Award from the Haskayne School of Business at the University of Calgary and the Calgary Chamber. She is president and CEO of Perpetual Energy, Calgary, Canada.

Allan Scardina, to exploration M&A manager, Shell International, The Hague, Netherlands. Previously new ventures regional chief geologist, Shell International, The Hague, Netherlands.

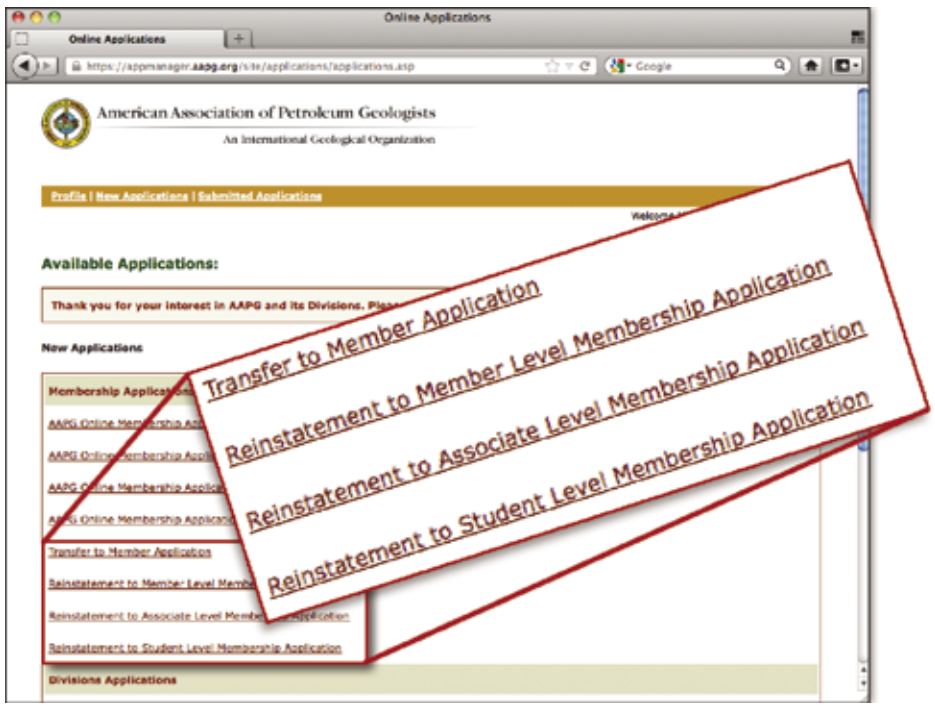
Donald Walker, to senior geologist-southern North Sea asset team, ConocoPhillips, Aberdeen, Scotland. Previously senior geologist-global unconventional resources new ventures, ConocoPhillips, Houston.

IN MEMORY

Francisco Azipiroz (Member 1993)
Rijswijk, Netherlands
John McGregor Barnes Jr., 81
Evansville, Ind., July 5, 2011
John R. Barwin, 78
Lakewood, Colo., April 13, 2012
Albert S. Bonner Jr., 83
Santa Fe, N.M., May 7, 2012
William E. Carl, 86
Corpus Christi, Texas, Dec. 5, 2011
James Dolphas Cobb Jr., 82
Midland, Texas, June 24, 2012
Bruce Franklin Curtis, 93
Boulder, Colo., Feb. 5, 2012
Richard Lee Darrow, 86
Bakersfield, Calif., Dec. 26, 2011
Theodore Anthony DeBrosse, 81
Columbus, Ohio, May 21, 2012
John B. Jacobson, 85
Lafayette, Calif., May 19, 2012
Robert Samuel Klipping, 83
Colorado Springs, Colo.
April 25, 2012
David Roy Lanning, 91
Kentwood, La., July 17, 2012
Frank Lookabaugh, 89
Oklahoma City, March 11, 2012
Raul John Madrid, 66
Napa, Calif., Nov. 8, 2011
Donald Dea McGirk, 94
Santa Cruz, Calif., May 9, 2012
* **Roelof John Murris**, 80
The Hague, Netherlands
May 9, 2012
David G. Poe (Member 1958)
Littleton, Colo.
Theodore John Reagan, 84
Smithville, Texas, Dec. 18, 2011
Erwin W. Saye, 89
Shreveport, La., July 11, 2012
Michael S. Shearn, 78
El Paso, Texas, April 27, 2012
Cyril Wagner Jr., 77
Midland, Texas, Aug. 31, 2011

(Editor's note: "In Memory" listings are based on information received from the AAPG membership department. Age at time of death, when known, is listed. When the member's date of death is unavailable, the membership anniversary date is listed. Asterisk denotes AAPG Honorary Member.)

WWW UPDATE



App Manager Handy

By JANET BRISTER, AAPG Website Editor

Our column in August reviewed AAPG's new Applications Manager System. The focus was on Member or Associate applicants who never have been a part of the AAPG.

This month is a look at the other types of applications that may be submitted in this new App Manager. They are:

- Transfer to Member.
- Reinstatement to Member, Associate or Student.
- Division Certification applications (petroleum geologist, petroleum geophysicist and coal geologist) and their versions of reinstatement.

After joining AAPG and completing enough years of experience in the industry, it is an appropriate time for Associates to move to Member status. The "Transfer to Member" application facilitates that move.

To get started, simply click on "join online" under the dropdown shortcuts into AAPG's website – or use the left nav bar "About AAPG" > "Join online" link.

The assumption here is you currently are a member of the Association and will not need to establish log-in information – but should you need to refresh your log-in information, simply click on the prompt for having forgotten your username or password and you'll be instructed how to reset this information.

(This will work assuming the email address in your AAPG record is correct. If your email is incorrect you will need to contact Member Services to update your record.)

Once you've successfully logged into the App Manager, locate in the top gold bar "New Applications" and click on it.

Now you can start the process of transferring to Member status.

There will be information required of you in order to complete that process, but you can provide what you have and then return later to complete the process. Your information remains saved until you are finished.

Those returning to the site to complete saved applications will find these applications at the very bottom of this "New applications" landing page under "Applications to Continue."

To remember this, just remind yourself you are making a new application – and it remains new until you submit the application.

Welcome Back!

Reinstatement forms are for those Members, Associates or Students whose dues have lapsed.

Records will need to be brought up to date during this application process, so have your CVs or transcripts ready.

The Division of Professional Affairs has taken advantage of this new App Manager to allow Members seeking certification to begin that process.

You will want to visit the DPA website to determine the information needed to meet certification requirements. But if you believe you qualify, you start that process here. The certification applications have their own segment on the last half of this page.

They also have provided for reciprocity for those members who are using SIPES or GSL membership to qualify for their DPA certification.

As stated in the August issue, there are emails sent to applicants throughout the process updating them on their progress and steps they have completed.

Once submitted, you may log back into the system and check the status of your application under the "Submitted Applications" link in the gold nav bar.

When your application has been accepted you will be notified via email and your status will change in the "Submitted Applications" web page.

Good browsing!

Follow AAPG Executive Director David Curtiss on Twitter @DavidKCurtiss.

Letters to the editor should include your name and address and should be mailed to Readers' Forum, c/o AAPG EXPLORER, P.O. Box 979, Tulsa, Okla. 74101, or fax (918) 560-2636; or e-mail to forum@aapg.org. Letters may be edited or held due to space restrictions.

READERS' FORUM

Caribbean Data

Regarding Keith James' article "The Caribbean: Is It From Here or There?" (Historical Highlights, August EXPLORER):

Keith is on the ball, as usual. Having worked the area for many years I have always agreed with Keith.

Data tells the story, not hypotheses.

Stuart Munro
Pointe Noire, Congo

An International Organization

Regarding "Concepts Shift Creates Ripples of Change," President's Column, July EXPLORER – Two points to take AAPG and its members further and farther:

- (On changing AAPG's name) It was a wise and quick inclusion for American geologists between 1916 and 1917; but it is now a century (in five years) later, and we have not changed our title to include the "international" geologists.

Can we have another "positive" paradigm shift and name change? Of course, yes. All we need is a strong will.

- Many small and flourishing workshops and GTWs (Geosciences Technology Workshops) have sprung up all around the world dealing with new specialized topics. Their main purpose is to have "focused" discussion on a specific, challenging topic for our industry. The specialists/researchers rule there – and again the facilitators/generalists are the recipients of results and providers of more opportunities. The ICE and ACE remain to cater to all the membership.

Studying the subjects, locations and scheduling of such workshops will allow AAPG to find more opportunities to serve its membership – both the generalists and specialists.

With such a focus on and gathered knowledge about activities and challenges/solutions we can speed our learning and expedite our contribution to our industry – and thus provide the world with more and more energy.

Ibrahim Al-Ghamdi
Dhahran, Saudi Arabia

(Editor's note: Al-Ghamdi is past chair of the AAPG International Regions Committee.)

I have been reading with the utmost interest the statements, both from past AAPG President Paul Weimer and members who have written to the Readers' Forum, concerning AAPG's global role and significance.

I recently was elected a DPA councilor, representing Latin America Region. As part of my duties, I have started an aggressive campaign of sending e-mails to many newly hired Petrobras geologists, telling them about the professional advantages they can have by joining AAPG. I started with those hired between 2000 and 2008, who now have four years or more experience in the petroleum industry – no less than 420 geologists.

So far, I have received a poor feedback from them.

Additionally, I sent personal emails to more than 100 selected people with eight-plus years in the petroleum industry and who could apply to join the DPA as certified geologists or geophysicists. Only a handful made a move to reply, and some of them are somewhat distrustful, saying that AAPG is essentially "American," starting by its own name.

It seems that the "International Organization" subtitle should be more emphasized.

And I, of course, endorse Alistair Brown's statements in the July Readers' Forum ("Going Global") concerning the metric system. The old imperial system adopted in the rigs can be funny – if not dangerous – with all those feet, inches and drilling mud density measured in "pounds per gallon"!

If I recall it correctly, a few years ago a Martian probe crashed because some of the software was designed metric, and other imperial.

Flavio Juarez Feijo
Porto Alegre, Brazil

Alister Brown's letter commented on the need for the AAPG to abandon the English units of measurement, miles, feet and acres, and to adopt metric units, or the SI (Systeme International) measurements – metres, kilograms, seconds.

A few years ago I also sent a letter to the Readers' Forum in which I made the same recommendation that the English measurement system be abandoned and the SI system be used in AAPG publications. This is particularly pertinent since the AAPG is trying to promote itself as an international organization.

With the United States and AAPG becoming more and more a land/organization populated by immigrants, these persons arrive with the SI system already ingrained. So, why the reluctance in adopting the SI system and, as a result, remaining the only country using the English measurement system?

In my previous letter I also recommended eliminating the letters "etc." I again make this recommendation, because it is meaningless. It probably is used because the author either cannot think of more things to write or is reluctant to make a complete list. Also, "etc" is usually preceded by the words "for example" or "such as," both of which imply a complete list will not be made.

Sidney Rieb
Vashon, Wash.

(More on) The Bible and Geology

I read with keen interest the Readers' Forum letter by H.J. Howe on "Geology and the Bible" (July EXPLORER). Geoscientists should equally be aware of certain highlights in the Bible.

My submission is that the Bible does not have any errors or contradictions – rather, it is the interpretation made by the reader, depending on the reader's belief and mind set. In my estimation, the Bible is the bedrock of truth.

In my estimation, Nicolas Steno is the Father of Stratigraphy. He was a Bible-believing creationist. His principles of stratigraphy are still being used in exploration today. He equally did not find any contradictions in the Bible.

When the heavens and the earth were created, the earth was covered by water. The earth's land mass appeared later. In the geologic record, the separation of Gondwana and Laurasia in the Triassic is informative.

Plate tectonics is used today to explain the sea floor spreading at oceanic ridges. Examples are the mid-Atlantic ridge and the ridges in the Pacific Ocean. The plates formed collide and tthe older plate is subducted under the younger ones. Mountain chains, volcanoes and island arcs and earthquakes are formed by this process ...

The biggest Bible account of global deluge is Noah's flooding. In the geologic record, we have the Austin Chalk (Upper Cretaceous), the white cliffs of Dover, Chalk group (Late Cretaceous), the counterpart on the Normandy coast, the Niobrara

Continued on next page

CLASSIFIEDADS

POSITION AVAILABLE

The Bureau of Safety and Environmental Enforcement within the U.S. Department of the Interior has full-time positions available for experienced and entry level geologists, geophysicists, petroleum engineers, and GIS specialists. The positions are located in the Office of Production and Development in Camarillo, California. For more information about working at the BSEE visit http://www.bsee.gov/careers. To find out more about current or upcoming jobs with BSEE in Camarillo, contact (805) 389-7707. U.S. citizenship and background check required.

* *

WYOMING STATE OIL AND GAS SUPERVISOR

The Wyoming Oil & Gas Conservation Commission (WOGCC) is recruiting for a State Oil and Gas Supervisor. This is an at-will position that serves as the Executive Head of WOGCC, a state regulatory agency, in Casper, WY. Incumbent will direct all work activities that regulate the petroleum industry and its operations within the State and confers with the Commission and Governor on recommended policy changes and plans. This individual must be a registered Petroleum Engineer or Petroleum Geologist in Wyoming. The hiring range is $140,000 to $160,000 per year dependent upon qualifications.

See WOGCC website at http://wogcc.state.wy.us for a more detailed listing of essential functions. To apply: e-mail a cover letter, resume and references to Bob King, Interim State Oil and Gas Supervisor at bob.king@wyo.gov or mail the same to Bob King, WOGCC, P. O. Box 2640, Casper, WY 82602-2640. Open Until Filled. EEO/ADA Employer

* *

University of South Carolina
Assistant Professor in
Sedimentary Systems Geology

The Department of Earth & Ocean Sciences (www.geol.sc.edu) at the University of South Carolina invites applications for a tenure-track, assistant professor position in the area of Sedimentary Systems Geology. The position is a 9-month academic-year appointment. A Ph.D. is required at the time of appointment. Post-Doctoral experience is preferred. We seek a candidate with outstanding research and teaching capabilities in sedimentary systems to complement our existing strengths in sediment transport, stratigraphy, geochemistry, geophysics, tectonics, paleoclimate, hydrology and paleoceanography. Although the specialty is open, we are looking for an individual with broad or interdisciplinary research interests that combine field, theoretical and experimental approaches to address scientific problems on a variety of timescales. Areas

See **Classified**, page 66

Continued from previous page

chalk (Late Cretaceous), outcrops in the old country in West Africa, containing "Efun" probably Cretaceous in age. Other Cretaceous outcrops in Australia, Gingin chalk, China's Yixian formation, Asia and South America and in Europe have abundant marine fossils and dinosaurs fossils. These all point to mass extinctions, all in the Cretaceous.

The Bible does not have contradictions, rather it is an account of the earth's creation and that of human beings, plants, mammals, birds, insects and all of creation. The evolution process is a progression from the original.

Victor F. Agbe-Davies
Houston

Mr. Howe states "there is no comparability between the earth being created in seven days and the age of the earth being more than 4.6 billion years." This statement really has at least two certain unknowns:

- First, that God created the heavens and earth in seven days (Genesis 2:1-2). The actual time frame remains uncertain since we do not know whether those seven days were as we know them today, or was that God's time period, which could have been much longer …
- Second, the 4.6 billion years is an estimate based on controversial carbon 12, 14 and radioisotopes dating. These methods are unreliable in that uniformitarianism is not a legitimate model of earth's history, and the assumption of equilibrium between carbon 12 and 14 concentrations at the time of death may not be correct.

To date, although not all agree with the actual time period based on these procedures, these are tools that geologists and other earth scientists use.

The premise that the present is the key to the past may be false, since to determine past processes one would have to assume that the rate of change has remained constant throughout the past, the original conditions are known and the process has not been altered by outside sources.

I personally feel these age-dating procedures will be modified and improved some day in the near future, just as some of our other pre-existing positions have been disproved, changed or modified. Approximately 60 years ago most earth scientists were certain that data correlated with a model that showed continents to be stable. Then came along the notion of continental drift. Those scientists were accused of indulging in a pseudo science, yet today few dispute continental drift and plate tectonics.

We also (once) … denied the emergence of new land forms, such as those that appeared nearly overnight from beneath the sea. Other major changes occurred to this earth in a very short period of time (days), such as the effect of Mount St. Helens, where hundreds of feet of sediments were deposited in a very short period, as well as the results and effects of some of our latest tsunamis.

Scientists expected that when landing the spacecraft on the moon it would sink into the dust. However, it was initially found that the dust was only about 12 inches deep – and later measurements discovered there were only infinitesimal amounts of dust, and that leads scientists to believe the moon is less than 10,000 years old.

It has been evidenced that the sun is proof for a young earth, in that it is shrinking at a current rate of five feet per hour. At this rate the sun would have been twice its present radius one million years ago and the sun would have torched the earth only 20 million years ago.

Another example of the earth's young age is the magnetic field, since it's overall strength has declined about 7 percent since 1829. That means just 20,000 years ago the field would have been too strong to support life on this earth – therefore, it is estimated that the earth is younger than 10,000 years.

A few of the other evidences for a young earth include: less erosion of the continents and less sediments in the oceans; less salt in sea water; carbon 14 found in coal and diamonds; scarcity of human fossils; and soft tissue and blood cells found in dinosaur fossils ...

In my opinion Bible believers do not have a problem with scientists correlating rock strata with fossils and believing in micro-evolution ... Earth science is an evolving science.

We can get so wrapped up in Darwinism and age dating that perhaps we are not open to other possibilities, such as the Bible, imagination and free inquiry.

Paul S. Horvath
Ponte Vedra Beach, Fla.

(Editor's note: The complete transcripts from AAPG members Victor F. Agbe-Davies and Paul Horvath can be found online at www.aapg.org/explorer.)

Classified

from page 65

of interest include but are not limited to: source-to-sink dynamics, basin analysis, paleoclimatology of sedimentary rocks, sea-level change & sequence stratigraphy, sedimentary geochemistry, energy resources, or stratigraphic paleobiology. The successful candidate is expected to direct an active externally funded research program, and to teach undergraduate courses in sedimentology-stratigraphy, Earth history, and/or field geology, as well as graduate courses specific to her/his field. Applications should include a curriculum vita, a statement of research and teaching interests, and the names, addresses, emails, and phone numbers of at least three references. A single pdf file containing this information should be sent by email to: sedsystems2012@geol.sc.edu. For more information, please contact Search Committee Chair by email at: sedsystems2012@geol.sc.edu. To ensure full consideration, applications should be submitted by October 1, 2012.

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Alaska Division of Geological & Geophysical Surveys
Geologist III, Energy Resources Team
Starting salary $5,042 - $6,156 monthly DOE

The Alaska Division of Geological & Geophysical Surveys is recruiting for a Geologist III to join its statewide Energy Resources program in Fairbanks. This is a permanent full-time position offering the successful candidate the opportunity to conduct geologic mapping and basin analysis projects related to hydrocarbon resource assessment across diverse terranes throughout Alaska. We are seeking a person with educational training and experience in geology with emphasis in sedimentology, stratigraphy, structural geology, and field mapping. Primary duties will be to perform geologic mapping and energy resource studies to acquire the data needed to understand and describe oil and gas sedimentary basins and their geologic framework. Experience interpreting subsurface data and conducting geologic field work in remote areas is desirable.

Application must be made on the Workplace Alaska website (http://notes3.state.ak.us/wa/postapps.nsf/JobsByTitle?OpenView&Start=1&Count=30&Expand=7#7) or by calling 1-800-587-0430 or 1-907-465-4095 for a hard copy application. These forms, on-line or hard copy, must be submitted to the Department of Administration, Division of Personnel, PO Box 110201, Juneau, AK 99811-0201. Fax: 1-907-465-2576. The State of Alaska is an EEO/ADA employer. Individuals requiring accommodations should call 1-800-587-0430 or 465-4095 in Juneau or (907) 465-3412 (TTY) or correspond with the Division of Personnel at the address above. The State of Alaska does not sponsor work VISAs for non-U.S. citizens; non-U.S. citizens must have a valid work VISA by the time the recruitment period closes in order to be considered.

MISCELLANEOUS

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Ads are at the rate of $2.90 per word, minimum charge of $60. And, for an additional $50, your ad can appear on the classified section on the AAPG web site. Your ad can reach more people than ever before.

Just write out your ad and send it to us. We will call you with the word count and cost. You can then arrange prepayment. Ads received by the first of the month will appear in the subsequent edition.

DIRECTOR'S CORNER

OTC – A Strong, Beneficial Relationship

By DAVID K. CURTISS, AAPG Executive Director

Achieving AAPG's mission to advance the science and technology of petroleum geology often requires setting a broader context.

We don't practice petroleum geology in a vacuum. Finding oil and natural gas is a multi-disciplinary endeavor that incorporates geology, geophysics, petroleum engineering, mechanical engineering, chemical engineering, and the list goes on and on. As a result, we frequently cooperate with other scientific and professional societies.

* * *

One example of this cooperation is the Offshore Technology Conference (OTC) held annually in Houston in the month of May.

I attended my first OTC this past May. Together with 89,000 other attendees, I explored over 640,000 square feet (59,500 square meters) of exhibits from across the globe and attended technical sessions that discussed the science and technology needed to safely explore and produce offshore resources. It was a memorable experience.

In 1969 a group of 12 engineering and scientific organizations, led by the Society of Petroleum Engineers and including AAPG, founded OTC. The objective was to develop an event that responded to the industry's technological and scientific needs to successfully find and develop offshore petroleum resources, and to do so in an environmentally responsible manner.

It was clearly a success. In 1982, after only 13 years, it reached its all-time high attendance of 108,161 attendees. But OTC attendance followed oil prices downward in the mid-1980s. In 2001 the event had rebounded to 45,000 attendees and continues to grow. This year marked the largest exhibition in the event's history.


CURTISS

When AAPG members attend and contribute to the technical programs of these OTC events, we share our knowledge and demonstrate the relevance of petroleum geoscience to our colleagues in other disciplines.

OTC is managed by SPE and governed and led by a board of directors. AAPG's representative on the board is Cindy Yeilding, who works for BP in Houston. She took over from Susan Cunningham of Noble Energy, who also served as chairman of the OTC board in 2010 and 2011.

OTC's technical program is designed by a program committee where we are represented by Buford Pollett of Eni US Operating Company. He leads the AAPG technical program subcommittee, which builds technical sessions to incorporate petroleum geoscience in OTC.

The call for papers for OTC 2013 is open through Sept. 10. Please visit the OTC website (www.otcnet.org) and review the areas of interest for the various theme sessions.

I'd encourage you to contribute your expertise to advance the entire offshore industry's knowledge of petroleum geoscience.

* * *

OTC continues to grow and expand into new regions.

▸ Last year the first **Arctic Technology Conference** was held in Houston. It drew more than 1,300 attendees from 23 countries, 52 exhibitors, more than 130 technical talks in four themes, and poster sessions.

This event is focused on the technological and scientific needs of the Arctic environment. Planning is under way for the 2012 event, again in Houston, from Dec. 3-5. It is under the direction of a committee chaired by AAPG member John Hogg of MGM Energy. And the Arctic Technology Conference show management is provided by AAPG on behalf of OTC.

▸ In 2011 OTC also launched **OTC Brasil**. This successful event had more than 10,000 attendees and 435 exhibitors.

OTC Brasil will be conducted in cooperation with Instituto Brasileiro de Petróleo, Gás e Biocombustíveis from Oct. 8-10, 2013, Rio de Janeiro, Brazil. Planning already is under way to draw the world's deepwater experts to Brazil for a premiere event in deepwater exploration technology and science.

▸ And just recently the OTC board announced a first ever **OTC Asia** in Kuala Lumpur.

Scheduled for March 25-28, 2014, OTC Asia will gather together oil and gas professionals to network, share knowledge and learn about the latest technologies. It will cover exploration, drilling, production and environmental science and technology.

Don't miss this new event in Asia.

When AAPG members attend and contribute to the technical programs of these OTC events, we share our knowledge and demonstrate the relevance of petroleum geoscience to our colleagues in other disciplines.

They are doing the same thing for us – and the result is each of us having a better understanding of how our expertise contributes to the goal of finding and responsibly developing oil and natural gas.

And that is evidence of AAPG achieving its mission.

DIVISIONS REPORT

Spouting Jargon Is a Turn-Off

By TOM J. TEMPLES, DEG President

As the new president of the Division of Environmental Geosciences I get to begin my tenure with my views and thoughts of an area that DEG, and AAPG in general, needs to address.

I have been involved in oil and gas exploration, environmental cleanup and research for over 35 years. Through my work in the environmental arena I have seen up close what can happen when an industry does not develop trust with the public and regulators.

* * *

Our industry has had several notable disasters on the E&P side, such as the Macondo oil spill in the Gulf of Mexico, the Lake Peigneur accident and Piney Woods Mississippi hydrogen sulfide gas fire. The industry continues to feel the lingering distrust by the public and many politicians. Some of that is opportunism for political gain, to support efforts to limit the industry, or to support the push to a wind/solar energy policy.

The current hot environmental topic continues to be hydraulic fracturing and its impact on the environment. In many parts of the world, this is tied to the development of resource plays.

Hydraulic fracturing is not new to the industry. It has been used by the oil industry (in some form) since 1865. The first frac job, performed in the Hugoton field, was in 1947. It has been performed thousands of times, safely and without any impact to the environment.

As we have moved from traditional "oil patch" country into urban and suburban environments, public mistrust has become epidemic and regulators are put in the position of having to react through public forums, technical panels and outright bans, with regulations varying wildly from jurisdiction to jurisdiction.


TEMPLES

For example, the Pennsylvania state court recently ruled that local governments could use zoning laws to regulate oil and gas drilling activities, whereas the state of Colorado has threatened lawsuits with cities and counties that have considered or passed local regulations of the O&G industry in contravention of state resources law.

We geologists have traditionally been slow to react – if at all – to explain what we do and how it affects the environment and surrounding communities.

If we react at all, the approach has been to spout technical jargon. The majority of the American public is no longer educated technically or cares enough to understand what we do, preferring to get their information off the Internet or from a newscast, whether or not it is factual and/or true.

Spouting jargon only leaves the public confused, turned off and makes them think you are trying to pull something over on them. This was a lesson learned very painfully in the early days of RCRA and CERCLA clean up actions.

This inaction – or "mis-action" – has resulted in the imposition of regulations and created the image of the industry as an evildoer.

My mentor and friend Bill Kanes used to say, "There is no education from the second kick from a mule." By my recollection, we are way past the second kick and still have not learned how to deal with the public and regulators.

* * *

As part of DEG's efforts to address the current public distrust of hydraulic fracturing and its use by the O&G industry, we co-sponsored, with EMD, a Geoscience Technology Workshop on the technology in August, in Golden, Colo. The workshop was just one of the first steps toward the goal to addressing negative perceptions and reactions to exploration and production where possible.

We need to get involved at all levels and get the word out to politicians and the public.

How can you as a geoscientist get involved?

▸ Take any opportunity to speak to the public and the regulators.

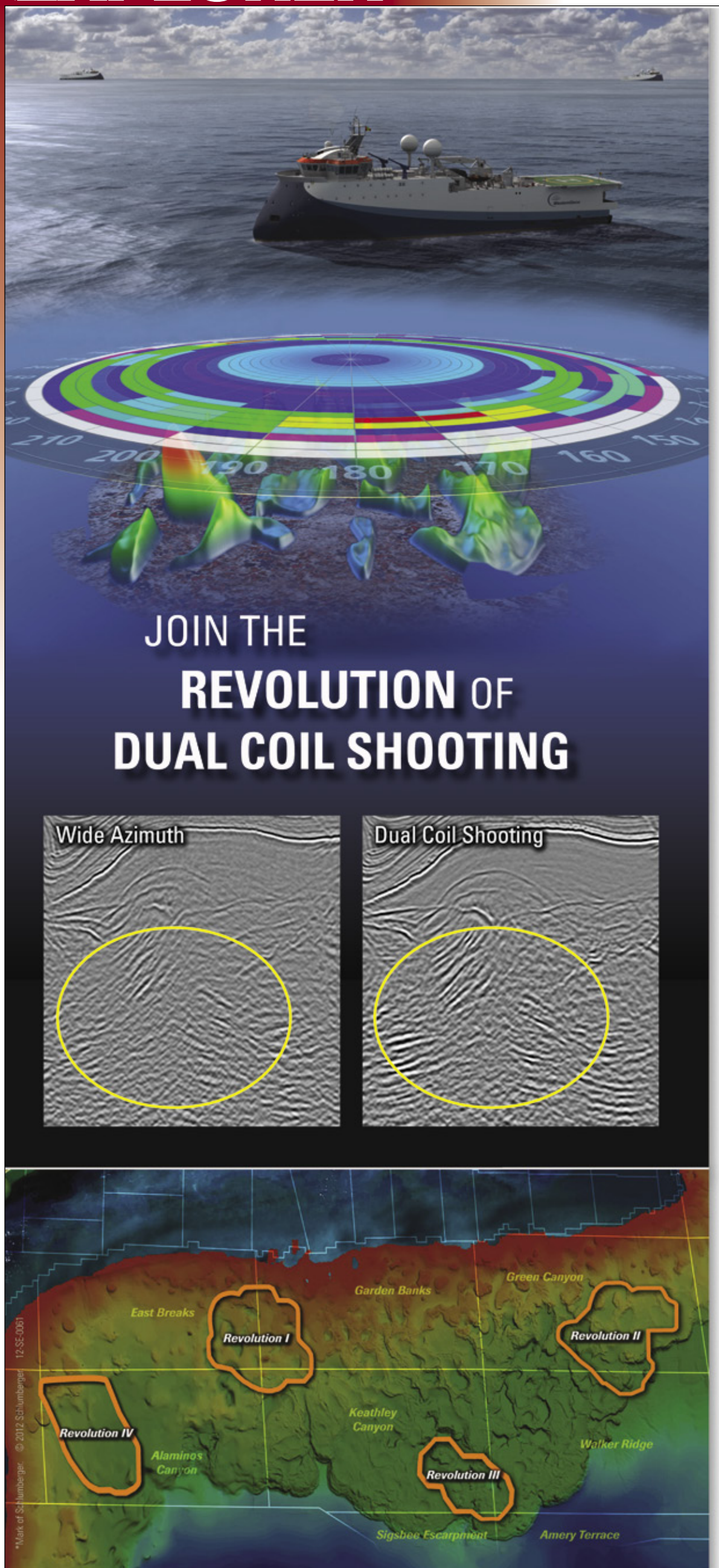
The keynote address at the DEG luncheon in Long Beach was "Hydraulic Fracturing: Separating Myth from Reality" by Steve Leifer, an attorney for Baker Botts LLP. For anyone interested, Steve has allowed us to distribute his slides from the talk on the DEG website (deg.aapg.org). It is an excellent resource.

DEG members are in a unique position to spread the truth because many of us live and work in non-oil patch parts of the United States and the world.

▸ If public speaking is not your thing then volunteer to serve on a DEG committee, serve as a councilor for DEG or help collect facts and figures for inclusion on our website to dispel the myths associated with our industry.

The DEG hopes that this and other efforts in the coming year will keep you engaged – and if you are not a DEG member consider joining and getting involved in DEG and the environmental side of the energy industry.

DEG will continue to do its best to keep those issues in front of the AAPG membership.



Multiclient Services

Revolution Dual Coil Shooting Multiclient Surveys Now Underway in the Gulf of Mexico

Enabled by the Q-Marine* point-receiver marine seismic system, Dual Coil Shooting* multivessel full-azimuth (FAZ) acquisition captures ultralong offset marine seismic data via a circular path. The result—even beneath salt or basalt—is higher fidelity seismic images, delivered efficiently.

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To learn more about the Revolution multiclient surveys and Dual Coil Shooting, call +1 713 689 1000 or email us at multiclient@slb.com.

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