NOVEMBER 2003

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VOL. 38, NO. 3 NEWSLETTER NOVEMBER 2003

Technical Luncheon

Date: November 18, 2003
Time: 11:30 AM
Location: Hess Building
5430 Westheimer, Houston
Cost: $22 w/reservation
$27 at the door
Reservations:
GSH 713/463-9477
Email: Joan@hgs.org
(reservations are encouraged)
Title: **3D Seismic Data Acquisition In Southern Louisiana: Considerations For Technical And Commercial Success**
By Steve Knapp, Kevin Callaghan and Randy Sides, Seitel
Speaker: Steve Knapp, Seitel
Abstract:
Over the last two decades 3D seismic data has changed the way exploration and production companies discover and exploit subsurface hydrocarbons. Technical and commercial drivers that have made this high-resolution image available to a wide audience have accelerated its impact. Several key technical milestones have aided the advancement of the technique over the course of time: portable recording systems which can withstand the elements, recording systems that can acquire a large number of channels, radio telemetry, GPS positioning, and processing capabilities (prestack migration, AVO). On the commercial side, non-exclusive surveys rather than proprietary ownership has allowed for many explorers to benefit from one dataset with shared cost and limited liability, thereby lowering the cost for accessing the seismic data. In the end it is the team effort combining the data owner, the acquisition

Technical Luncheon continued on page 6.

Technical Breakfast

Date: Wednesday, November 12, 2003
Time: 7:00 am, Breakfast will be served in the lobby of the auditorium.
7:30 am, Presentation in the Auditorium.
Location: Shell International E&P Technology Center,
3737 Bellaire Blvd,
Houston, TX 77025.
Reservations:
Reservations are recommended
GSH 713/463-9477
Email: Joan@hgs.org
Contact: For further information, please contact John F. Parrish at 281-300-2570 or emailGSHTechB@PeriSeis.com
Note: Before 7:00 am, please enter via the guard station between 3737 and 3747 Bellaire Blvd. On street and off street visitor parking is available at 3747 Bellaire Blvd.
Title: Generation and processing of pseudo shear-wave data: Theory and case
Study By: Vladimir Grechka (Shell) and Pawan Dewangan (Colorado School of Mines)
Speaker: Vladimir Grechka
Abstract:
Processing of converted (PS) waves currently adopted by the exploration industry is essentially based on resorting the PS data into common conversion point gathers and using them for velocity analysis. In this presentation, we explore an alternative procedure. Our key idea is to generate the so-called pseudo-shear (YS) seismograms from the recorded PP and PS traces and run conventional velocity analysis on the reconstructed YS data. This results in an effective S-wave velocity model because our method creates data that possess kinematics of

Technical Breakfast continued on page 4.

President's Column

By L. C. (Lee) Lawyer, Editor

We are going to break many years of precedent. For the first time since the Geophysical Society of Houston was formed, we are going to allow advertising in the Newsletter. I suspect that this doesn't stagger you all that much. "Big Deal", you say. "Why didn't you do this ten years ago? The HGS has had advertising in the Bulletin for years and years." Well, I want you to know that it is a big deal. The publication of the HGS Bulletin is a major effort, involving a lot of people. Look at the number of volunteers that put time in on that publication.

So here comes the GSH Newsletter. Remember that pages are added to the newsletter by factors of four. Add a couple of pages of advertising and you need to come up with two more pages of editorial material. We have about eight pages of announcements. Sometimes we move up to 12 pages when the situation warrants it.

Imagine that we have eight pages of editorial material and eight pages of advertising. Financially, that would be a good deal. I don't know whether the membership will be happy leafing through a newsletter that is mostly advertising. But on the other hand, since the Newsletter is the most costly activity of the GSH, it would be nice to have some offsetting revenue.

We still have to iron out the details. We will need a price list, full page, + page, business card, etc. per issue or per multiple issues. Advertiser's deadlines must be established and adhered to. Formats must be established. I have every hope that we will have all of those things by the time you read this column.

President's Column continued on page 4.

SHRIMP PEEL
NOVEMBER 7
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GEOPHYSICAL SOCIETY OF HOUSTON

Joan Henshaw, Office Manager • 10575 Katy Freeway, Suite 290 • Houston, TX 77024 • Office Hours 8 a.m. - 5 p.m.
Phone: (713) 463-9477 • Fax (713) 463-9160
email: joan@hgs.org • website - http://gsh.seg.org

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Tech Luncheons	Seth Berman	281/275-7506		seth_quake@yahoo.com
Tech Committee	Pat Peck	713/461-7178	713/461-2788	pat.peck@oildata.com
SIGS				
Data Processing	Karl Seibert	713/328-2673		kseibert@corelab.com
Potential Fields	Afif Saad	281/342-8575		AfifHSaad@netscape.net.
	Bob Van Nieuwenhuise	281/391-6444		bobearthwave@aol.com
Rock Physics	Keith Katahara	713/759-1770	713/356-1800	keith@spinexp.com
	Tad Smith	832/351-8980		tad_smith@veritasdgs.com
SEC. VP	Mike Mueller			muellemc@bp.com
Annual Meeting	Jim Moulden	832/636-8665		jim_moulden@anadarko.com
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Shrimp Peel	Lee Shelton			Lee_Shelton@veritasdgc.com
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SEG Membership	Mike Fenton	713/215-7452		mike_fenton@oxy.com
TREASURER	Keith Matthews	281/275-7578		kmatthews@fairfield.com
EDITOR	Lee Lawyer	281/531-5347		llawyer@prodigy.net
Assistant Editor	John Sumner	713/431-6796	713/431-6094	john.r.sumner@exxonmobil.com
Company Contacts	Scott Sechrist	281/856-8029	281/856-7445	acoustic@airmail.net
Electronic Pub	Scott Sechrist	281/856-8029	281/856-7445	acoustic@airmail.net
Photography	John Sumner	713/431-6796	713/431-6333	john.r.sumner@exxonmobil.com
Publicity	Scott Sechrist	281/856-8029	281/856-7445	acoustic@airmail.net
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ALTERNATE SEG REPS	Bill Gafford	281/370-3264		geogaf@hal-pc.org
	Alf Klaveness	713/468-5123	713/468-5123	none
	Wulf Massell	713/650-3820		wulf@epicgeo.com
	Art Ross	281/360-9331		artross@airmail.net

HGS/GSH Shrimp Peel

Friday, November 7, 2003 6pm. - 10pm.
at
Sam Houston Race Park
7275 N. Sam Houston Pkwy. West
(281.807.8700)

Boiled Shrimp - Beer & Beverages - Horse Races - Music - Door Prizes - Boiled Shrimp - Beer & Beverages - Horse Races - Music - Door Prizes - Boiled Shrimp

Tickets $25 Advance/$35 at the Door

> Event held indoors-Pavilion Centre
> Enter through North gates, 13-18
> Valet parking available
> Tickets mailed to address on form
> Pay with check or credit card
> Order by Oct 31 - No refunds

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Send form and check or credit card to:
Houston Geological Society, Shrimp Peel,
10575 Katy Freeway, Suite 290, Houston, Texas 77024

Name: _____ Company: _____

Address: _____ City/State: _____ Zip: _____

Number of tickets: _____ Phone: _____ Email: _____

If paying by Credit Card:

Name on card: _____ Billing Address: _____

Card Type: (circle one): VISA / MASTERCARD / AMERICAN EXPRESS / DISCOVER

Card Number: _____ Expiration date: _____

Signature: _____ Date: _____

Daytime Phone Number of Card Holder _____

Make all checks payable to HGS/GSH Shrimp Peel.
For more information call 832.351.8814 or e-mail lee_shelton@veritasdgc.com

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HGS INTERNATIONAL DINNER MEETING

University of Houston Department of Geosciences and U.H. Geoscience Alumni Association in association with the HGS International Group Presents:

The 5th Annual Robert E. Sheriff Lecture Series

TITLE: "Large Scale Continental Extension "

Featured Speaker: Dr. Brian P. Wernicke, Chandler Family Professor,
Division of Geological and Planetary Sciences
California Institute of Technology, Pasadena, California
Date: Monday, November 17, 2003
Place: Westchase Hilton, 9999 Westheimer
Time: Social 5:30 p.m., Dinner 6:30 p.m.

Robert E. Sheriff Lecture Series:

The lecture series is sponsored by the University of Houston Department of Geosciences and UH Geoscience Alumni Association in association with the Houston Geologic Society International Group. Mr. Bill Beck, president of the University of Houston Geological Alumni Association (UHGAA) will serve as Master of Ceremonies. Dr. John F. Casey, Department of Geosciences Chairman, will present an overview of current activities at UH. There will be posters and presentations on current thesis and dissertation research activities of UH graduate students.

Come and meet the next generation of geoscientists from UH!!

The Robert E. Sheriff Lecture Series was initiated in 1999 by the UHGAA. For the past four years it has been co-sponsored by the International Explorationists Group of the Houston Geological Society. The series honors Dr. Sheriff as an educator, scholar, and a proponent for the geosciences.

Its mission is to:

1. Bring some of the best known geologists and geophysicists in the world to the Houston community in order to share highly relevant ideas to exploration geology and geophysics and,
2. Showcase geoscience activity at the University of Houston.

Dr. Brian P. Wernicke holds the position of Chandler Family Professor in the Division of Geological and Planetary Sciences at California Technology University in Pasadena, California. He received his Bachelors degree from the University of Southern California in 1978 and a Ph.D. from Massachusetts Institute of Technology Department of Earth and Planetary Sciences in 1982.He was a recipient of the Presidential Young Investigator Award in 1985. Harvard University bestowed upon him an Honorary A.M. Degree in 1987. He was named a Fellow of the Geological Society of America and awarded the Society's Young Scientist Award (Donath Medal) in 1991. Wernicke's research interests include tectonic evolution of the continental lithosphere; physical processes governing the large-scale structural evolution of orogenic belts; and neotectonics.

Editor's Note

To insure your information reaches the GSH society members in a timely manner it must appear in the appropriate newsletter issue. Please note the following deadlines and plan your function's publicity strategy accordingly. Items must be received on or before the corresponding deadline date. Materials can be sent to Lee Lawyer at llawyer@prodigy.net with a cc to John Sumner at john.r.sumner-@exxonmobil.com. If you have any questions please call Lee Lawyer at 281/531/5347 or John Sumner at 713/431/6796.

2003 GSH Newsletter Deadlines

Issue ..... December 2003
Deadline..... November 11, 2003

Issue .....January 2004
Deadline..... December 8, 2003

Announcements

SHRIMP PEEL
November 7, 2003

SHERIFF LECTURE
November 17, 2003

ROCK PHYSICS SIG
November 18, 2003

PROCESSING SIG
November 19, 2003

Membership Report

The following report shows the new members to the GSH. Included in the totals are the approximately 400 members who have not renewed. Please renew now! If you have any questions, please call the GSH staff office at 713/463-9477.

New Members ~ Active
Brown, Albert P.
Byers, Jay M.
Carlson, Davis R.
Chunduru, Raghu K.
Dunn, Michael A.
Fiduk, Joseph C.
Forney, Jan L.
Kidd, Maurice W.
Saad, Afif H.
Shields, Martin L.
Sims, William Eldon
Vassilou, Anthony

Associate
Winter, Norman L.
Mayer, Rob

Emeritus
Thompson, George

Membership as of October 10, 2003

1110	Active
369	Associate
22	Comp
59	Emeritus
30	Honorary
32	Life
24	Student
Total 1646	

Reservations

Make reservations by e-mail at joan@hgs.org and include your member number (found on Bulletin mailing label). Call 713/463-9477 Fax (713) 463-9160

Auxiliary

Join the Geophysical Auxiliary of Houston!

The Geophysical Auxiliary of Houston invites the wife of any present or past member of the GSH or SEG, the widows of former members of the GSH and SEG and women members of these organizations to join us for our 2003-2004 year. We still have several exciting events planned for 2003-2004 and we invite you to join this great group of people as we lunch, learn, and make new friends! Sign up now so you can start receiving our newsletter and not miss a thing.

Our year began on September 24 with a tour of the "Forbidden Gardens" located in Katy, Texas. The weather was terrific (no rain and not too hot) as 24 members and guests toured this fascinating outdoor museum replicating some of China's major historic scenes. Guided tours took us back to the third century BC to view the first Emperor's amazing 6,000 piece terra-cotta army replicated in 1/3 scale, vignettes of the emperor's dining room and Imperial Court, and a full scale replica of the empress' sedan chair. Members strolled through the tranquil gardens and enjoyed the quaint gift shop. This was an enlightening opportunity to experience the mystery and magic of Chinese culture and history. The tour was followed by an expansive buffet lunch at Café East. Many thanks go to our Chairperson, Nan Pye, for planning a truly unique and informative event.

Don't miss the Fall Luncheon, which will be held Thursday November 13 at the Houston Racquet Club located at 10709 Memorial Drive. Valerie Koehler of Blue Willow Books will be on hand to tell us all about the latest and greatest books for our reading enjoyment. Join us as we find out what's hot and what's not, as Valerie presents reviews of several current books. This is also a wonderful opportunity to start planning for gifts for the upcoming holidays, as Valerie is always ready with a book for any occasion. Our chairperson for this enjoyable event will be Lynn Schoenberger. Please contact her at 713-464-5249 for further details. Better yet, join today and be sure to receive our newsletter detailing all our upcoming events!

We will start the New Year right with our Winter Luncheon as we gather on Tuesday, January 13 at the Braeburn Country Club, located at 8101 Bissonnet. We look forward to a lovely lunch while our Chairperson, Emilie Fulton, provides us an opportunity to brush up on our knowledge of ballroom dancing. Dancers from Fred Astaire Dance Studios will be there to entertain us with old favorites and the latest fads.

We have an extensive and diverse schedule of events remaining for 2003-2004 and we again invite you to join us as we look forward to these entertaining, enjoyable and enlightening programs. Yearly dues are only $15.00. Call Membership Chairperson, Donna Parrish at 281-859-8088, GSH Liaison, Luann Cefola at 281-759-7338, or President, Carol Gafford, at 281-370-3264 for a membership application and information on how to join.

President's Column continued from page 1.

There will be space for business cards. I may put mine in there but I realize that by doing so I would incur a major risk. What if someone asked me to do something, some consulting, some actual work? Egad! When could I find time for golf and tennis? You may not have those problems. Placing your business card in the Newsletter is a good way to get your name up in lights with very little expense.

The page costs will be nominal for advertising but there will be no color at least not initially. Who knows, in time we may publish comic strips and they need color. But maybe not. With a little effort, I could turn into a first rate ad man. I understand that there is real money there. Turn your advertising budget over to me. Sit back and see the business roll in.

What if no one wants to advertise in the GSH Newsletter? No big deal. Nothing will change. The GSH will continue to be an excellent venue for the dissemination of information regarding our technical programs and a super way to meet geophysicists with whom you have a common interest. But if we make a little revenue to offset expenses, hey, why not?

Technical Breakfast continued from page 1

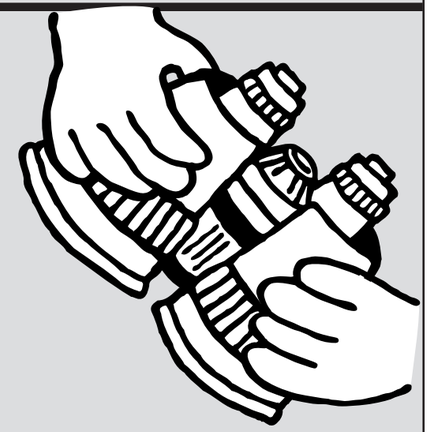
pure shear-wave primaries. We never deal with such complexities of converted waves as moveout asymmetry, reflection point dispersal, and polarity reversal, therefore, these generally troublesome features become irrelevant.

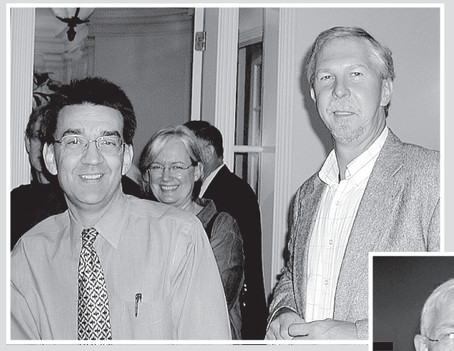
We describe the details of our methodology and examine its behavior both analytically and numerically. We apply the developed processing flow to a four-component ocean bottom cable line acquired in the Gulf of Mexico. Since the obtained stacking velocities of P- and YS-waves indicate the presence of effective anisotropy, we proceed with estimating a family of kinematically equivalent vertical transversely isotropic velocity models of the subsurface.

Biography:
Vladimir Grechka received his MS (1984) in geophysical exploration from Novosibirsk State University, Russia and a PhD (1990) in geophysics from the Institute of Geology and Geophysics, Novosibirsk, Russia. He worked in the same Institute from 1984 to 1994 as a research scientist. He was a graduate student at the University of Texas at Dallas from 1994 to 1995.

Vladimir joined the faculty of Colorado School of Mines, where he became Associate Research Professor of and co-leader of the Center for Wave Phenomena. He joined Shell International E & P in 2001 and currently works as Senior Geophysicist at Bellaire Technology Center. Vladimir's research is focused on theory of seismic wave propagation in anisotropic media, velocity analysis, multi-component seismics, and effective media theories. Vladimir received J.Clarence Karcher Award from the Society of Exploration Geophysics (1997) and the East European Award from the European Geophysical Society (1992). He is a member of SEG and EAGE and Associate Editor of Geophysics.

Sightings





Remembrance

Howard E. Itten (1917—2003)

Howard Itten was born September 7, 1917 on a farm north of Yuma, Colorado. He died September 1, 2003 in Temple, Texas. During his youth his family moved several times, finally settling in N. W. Denver, Colorado. Howard loved the outdoors, nature, the mountains and animals. Several winters he tended a neighbor's sheep, cattle and horses. Many a time there was a newborn lamb behind the kitchen coal stove. When he was about 12 he raised Jersey calves and showed them at the Boulder County Fair where he won State Championships in 1930, 1931 and 1932.

Howard worked his way through college. During his freshman year at Colorado University, Boulder he hashed in a fraternity house for his room and board. The next year he transferred to the Colorado School of Mines, commuting from home to Golden, CO. where CSM was located. He did all kinds of odd jobs, delivering groceries, working as a soda jerk, etc.

He graduated from Colorado School of Mines in 1941 with a Geological Engineering degree. Following graduation he joined Stanolind Oil & Gas Co. (BP-Amoco), working in various capacities advancing to Division geophysical supervisor in Stanolind's Ft. Worth Division.

He was active in the Fort Worth Geological and Geophysical societies and served as President of the Fort 'Worth Geophysical Society. He was a member of the Petroleum Club, Fort Worth Club and Ridglea Country Club.

In 1952 Howard left Stanolind to co-found Empire Geophysical and served as its President until 1962 when it was acquired by Independent Exploration Co. (IX). He then pursued other interests, becoming an independent petroleum consultant in New Orleans and later in Houston.

He owned a real estate office in Lakeway, Texas in the 1970's and became a licensed Real Estate broker and member of the Austin Board of Realtors specializing in Lakeway and Lake Travis properties. He retired in Lakeway in the 1980's before moving to Temple.

He was President of the Guadeloupe River Chapter of Trout Unlimited in Texas and later made an Honorary Life Member for his exceptional contributions, both as a donor and for providing service to the Chapter. He loved playing golf, fly-fishing and hunting. He appreciated music and loved a good game of bridge.

The Itten name will be perpetuated on the CSM campus through the Howard E. Itten Endowed Scholarship, which he established several years ago. Howard was a member of St. Luke's on the Lake Episcopal Church of Lakeway and later of Christ Episcopal Church in Temple, Texas. His wife Eula preceded him in death.

Those of us who knew Howard and Eula always enjoyed our visits with the Ittens. Howard was a good businessman with integrity and an abundance of common sense. We, his friends and colleagues, will miss him.

Dick Baile
J. R. Hunt

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16. Publication of Statement of Ownership
☒ Publication required. Will be printed in the November 2003 issue of this publication. ☐ Publication not required.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Joan Henshaw Manager — Date: Sept. 23, 2003

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).

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3. Be sure to furnish all circulation information called for in item 15. Free circulation must be shown in items 15d, e, and f.
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6. In item 16, indicate the date of the issue in which this Statement of Ownership will be published.
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PS Form **3526**, October 1999 *(Reverse)*

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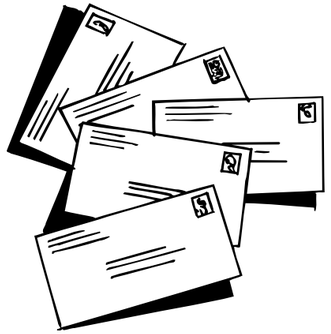
Letters to the Editor

Dear Editor,

In your recent GSH Newsletter Editorial you asked for letter to the Editor. I'd like to see the SEG and AAPG merge and the office move from Tulsa to Houston. While we're at it let's merge GSH and HGS and hold one set of Technical Lunches and SIGs here in Houston. Any takers?

Alan Foley - Geonetwork



Editor:

In 1930, the Society of Economic Geophysicists was formed. In 1931, the name was change to the Society of Petroleum Geophysicists. In 1932, the SPG became a Division of the AAPG. In 1937, the name was changed to the Society of Exploration Geophysicists and was accepted by the AAPG as an affiliated society. In 1955, the SEG held its last joint meeting with the AAPG. The GSH was formed in 1947 under the name of Houston Section of the SEG. The name was changed ten years later to the GSH.

Dear Editor,

There has to be some venue to pass our industry's history along to the younger members. Dan Ebrom's effort to get the New Waves group going is commendable and is a great idea – I did notice, however, that the group has not yet reached the select status of being listed on the masthead of the Newsletter. Your articles in TLE represent one of the few forums available, but they can cover just so much, particularly since you insist on taking up all that space with those portraits – plus people have to have the time and the inclination to write. There must have been a special on Big Chief tablets and #2 pencils at the Malakoff 5 & 10 to get Floyd Wilson to comment on downed aircraft and weight drops in the July 2003 issue of TLE.

It seems to me that most stories come from field experiences but what young people get to spend much time in the field any more? I happened to get the opportunity to attend a retirement luncheon for a Texaco Vice President, Otis Hocker, a few years ago and asked him what his favorite job had been throughout his 40+ years. He said that being Vice President was a pretty good job but so was his first job on a gravity crew working in the Egyptian desert. He then had a story of escaping Egypt just ahead of the German army invasion. Just recently I had the opportunity to talk with Jim Polk, who was working with a seismic company in Libya in 1969 when the revolution occurred that put Qadhafi in power. He said that a machinegun in ones face was an effective traffic control technique – at least it worked on him. His work environment from then on and his (and his new bride's) exit made a good story. I was, also, recently talking with Jim Bennett about how accurate Hurricane forecasts are nowadays, and he relayed his experience of leaving a well location on the Gulf Coast in the late 1950s at the end of a shift in the middle of the night, when forecasters reported that a hurricane was "still well out in the Gulf". He was alone in his car when the storm surge caught the car, lifted it up, and set it back down across the road. The headlights lasted long enough for Jim to see that they were shining under water. He finally got out of the car in chest-deep water, in pitch-black darkness, a million miles from anywhere, and survived. Personally, my own biggest concern occurred when I sent an unmanned water truck down 14th street in Golden, CO right toward the main street of town. Fortunately, it hit a power pole a block from downtown and unfortunately, set a sparking power line under Professor Smiley's car, trapping him inside. Everything turned out fine, but I did get a ticket for driving a defective vehicle (and I wasn't even driving).

I'm not certain of the actual interest in these types of stories. I would suggest that the SEG/GSH (or someone retired with a lot of time and money like yourself) set up a system with something like these obnoxious answering machines that let you record, QC, re-record, and save messages. The eventual messages (interesting stories) could then be edited for appropriateness and cleanliness and put on a website for downloading. I've seen interpreters sitting at workstations for days with earphones on listening to music, Rush, or God knows what. They should at least be given the opportunity to listen to interesting and/or entertaining stories from their heritage – while they watch the little auto-picker run around their data bases.

Regards,
James A Wood

Editor:

I really like to hear anecdotes of our past. Human-interest stories are also interesting. The portraits in TLE you refer to often have interesting incidents in their background. How would GSH people react to publishing anecdotes submitted by our membership?

Rock Physics SIG

Date: Tuesday, November 18, 2003
Time: 5:30 p.m.
Location: Visualization Center
Veritas DGC, Inc.
10300 Town Park Dr.
Houston, TX 77072
Contacts: Keith Katahara (keith@spinexp.com
Tad Smith (tad_smith@veritasdgc.com)
Title: A Simple Method for Fitting P-wave Velocity Versus Water Saturation Curves
by John Castagna, University of Oklahoma, and John Hooper, Fusion Geophysical

Abstract:

Gassmann's equation, which predicts a strong drop in P-wave velocity when a minor amount of gas is introduced into sandstone, is the low frequency limit of the more general Biot theory. Laboratory and log velocity measurements do not generally conform to Gassmann's equations and it is generally accepted that Biot theory cannot reproduce observed saturation curves. This discrepancy between observed velocities measured at high frequencies and Biot theory is sometimes referred to as non-Biot dispersion. However, we find that most measured saturation curves can be fit within the context of Biot theory if two additional concepts are employed (1) using only acoustically connected porosity rather than total porosity as suggested by Brown and Korringa, and (2) using an effective fluid modulus as suggested by Alain Brie to account for non-uniform distribution of gas in the pore space. In selecting the effective fluid modulus three saturation regimes must be considered. (1) Uniform distribution of gas in the pore space where a Reuss average of the fluid modulus is used (2) Segregated distribution where gas occurs preferentially in high aspect ratio pores and a Voigt modulus is used as observed by Domenico and explained by Knight, and (3) An intermediate regime containing patches of uniform and segregated distributions. Saturation curves predicted using this approach differ greatly from Mavko's patchy saturation model but agree with a wide variety of laboratory measurements.

Technical Luncheon continued from page 1.

company, and the oil company that results in success from both a technical and commercial viewpoint.

The planning and execution of current 3D surveys bear little resemblance to their predecessors, especially when operations encroach upon urban areas. Project management has taken on added dimensions that require coordination of a multifaceted operation with stringent quality control procedures. Land work to secure permits, both surface and mineral, in the area of seismic operations is clearly one of the major logistical hurdles. In urban areas, nearly half of the project costs are allocated to permitting. In addition, the regulatory approval process involves interaction with many different municipal entities, ranging from local (town council), parish (Utilities Commission or Parish Police), state (Wildlife and Fisheries Commission), and federal (U.S. Army Corp of Engineers).

Project management also includes survey design, a cumbersome task in areas of restricted access due to environmental and cultural considerations or other factors that may restrict shot and/or receiver placement. Planning that considers these limitations facilitates efficient operations once the crew is actually in the field. In order to ensure optimal shot and receiver placement, aerial photographs or satellite images are typically used to determine exclusion zones and to assist in making adjustments in shot/receiver positioning and charge sizes for dynamite shots.

Surveys require extensive planning and this management, along with other considerations control costs, while maintaining data integrity. Typically data acquisition comprises half of the project cost distributed as follows: surveying (10%), drilling (15%) and recording (25%). Permitting and other land work constitutes an additional 45%, with miscellaneous extras filling out the remaining 5%. These include quality control in the field, data processing, and other items such as maps, aerial or satellite imagery and deliverables. Non-exclusive surveys allow for these costs to be shared while at the same time limiting liability.

In summary one finds that careful attention to the technical requirements for a given area, combined with close control of the decisions that effect cost yield a 3D seismic program with can be considered successful on both technical and commercial aspects. Cooperation and teamwork between the data owners, the acquisition contractors and the oil companies ensures that the geophysical objectives are satisfied in a manner that benefits everyone. Technical and commercial risk needs to be managed when making decisions, not only by the oil company consumer, but also by the data owner provider. With these concepts in mind one can foresee an exciting future for seismic data acquisition in south Louisiana and in other challenging operational areas.

Biography:

Steve Knapp (stknapp@seitel-inc.com) is currently Business Unit Manager for Seitel Solutions and Chief Geophysicist for the Seitel Group of companies, with responsibilities that include data management and technology implementation in the USA and Canada. After obtaining a Bachelor's degree in Geology and Materials Science from Rice University in 1980 and a Master's degree in Geology from Texas A&M in 1983. Steve joined Digicon Geophysical in the Data Processing division, where he progressed through special projects into management. There followed a couple of overseas assignments; first with the NAM data processing center in the Netherlands and second in Digicon's commercial data processing center in Bogota, Colombia where Steve was the processing manager. Upon his return to the USA, Steve transferred from the vendor community to the E & P community when he joined Triton Energy as an international explorationist. In this role Steve was responsible for coordinating seismic data acquisition and processing on many projects covering the globe. In 1999 he joined Seitel and has been involved in the advancement of emerging technologies such as AVO, attributes, imaging, inversion, visualization and multicomponent seismology and has published a series of technical papers within these areas, one of which received the "Best Paper" award at the 2001 SEG Meeting held in San Antonio. He is a member of the AAPG, SEG, and EAGE.

Steve enjoys cooking, reading and spending time in the great outdoors with his wife, Mariela and their two sons, Thomas and George.

Processing SIG

Date: Wednesday, November 19, 2003
Time: 4:30—6:30 PM
Location: Veritas DGC Data Processing Center
10300 Town Park Drive, Houston, Texas 77072
Contact: Karl Seibert
713/398-6089
Email: kseibert@corelab.com
Organizers: Chuck Peng (BHP Billiton Petroleum (Americas) Inc.)713/961 8491
Email: chuck.c.peng@bhpbilliton.com
Richard Cook (Shell International E&P, Inc.)
713/245 7195
Email: richard.cook@shell.com
Theme: Depth Imaging using Gaussian Beams
Speaker #1: Professor Robert Nowack, Purdue University
Subject: Gaussian Beams for Forward Modeling and Seismic Migration
Abstract:

The Gaussian beam method is an asymptotic method for the computation of high-frequency wavefields by the summation of paraxial Gaussian beams. It was proposed by Popov (1981) and initially applied by Cerveny, Popov and Psencik (1982) and Katchalov and Popov (1981). An advantage of Gaussian beam expansions is that the individual Gaussian beam components have no singularities along their paths which assures that the summation is regular everywhere. In contrast, the Maslov method needs well-separated caustics and pseudo-caustics. The Gaussian beam method also does not require two-point ray tracing which can be important for seismic imaging when multiple arrivals occur. Felson et al. (1991) and others investigated expansions of Gaussian Beams in which the wavefield is expanded over a position and wave number phase-space lattice. In terms of Gabor expansions, stable summations can be made over discrete, over determined frames of window functions. Gaussian beam expansions were applied to the migration of seismic reflection data by Hill (1990, 2001) and this resulted in a very efficient imaging algorithm in laterally varying media. I will first give several examples of using Gaussian beam expansions for forward modeling of seismic wavefields. I will then give several examples of using Gaussian beams for the seismic migration of sparsely sampled common-shot data. This will be applied to the SEG/EAGE salt model and compared with the Ray/Born inversion.

Biography: ***Robert L. Nowack***

Robert L. Nowack received a BS (1975) in physics from Beloit College, an MS (1977) in geophysics from Stanford University and a PhD (1985) in geophysics from the Massachusetts Institute of Technology. Since 1986, he has been a professor of geophysics at Purdue University specializing in ray and beam methods applied to seismic imaging and tomographic inversion applied to the earth's crust. He was a visiting professor at the Institut de Physique du Globe at the University of Paris in 1989, at the University of Utrecht in the Netherlands in 1992, at the University of Texas at Austin in 2002, and at the University of California at Santa Cruz in 2003. He has served as an associate editor for the Bulletin of the Seismological Society of America since 1995 and Studia Geophysica and Geodaetica since 1999. He is a member of AGU, SEG, and SSA.

Speaker #2: Dr. Samuel Gray, VeritasDGC, Inc., Calgary
Subject: Nuts and Bolts of Beam Migration
Abstract:

Gaussian beam migration (Hill, 1990, 2001) is an elegant, accurate, and efficient depth migration method. It has the ability to image complicated geologic structures with fidelity exceeding that of single-arrival Kirchhoff migration and approaching that of wave-equation migration. In fact, its accuracy can exceed that of most wave-equation migrations in imaging very steep dips, especially in three dimensions.

We can view Gaussian beam migration as a generalization of Kirchhoff migration that operates in the frequency-wavenumber, as well as the time-space, domains, and allows for multipathing in a natural way. The key to this generalization is the use of Gaussian beams for the Green's functions. These are generalizations of standard rays that compute the wavefield at points some distance away from the raypath. Propagating the recorded energy along a particular beam, and applying an imaging condition, gives part of the total migrated image; the total image is the sum of the contributions from all the beams. Each beam can be specified to be planar at the Earth's surface, and the downward continuation can be performed on beams, or slant-stacks, of the input traces. Migrating a limited number of slant stacks over a limited number of initial directions makes Gaussian beam migration efficient, and assuring that the number of directions is adequate to sample the entire wavefield makes it accurate.

There are trade-offs, however. Gaussian beam migration is not quite as flexible as Kirchhoff migration, and it is also much more complicated because of its localizations in space/wavenumber and time/frequency. By relying on velocity along the raypath, the computed wavefield can be inaccurate away from the raypath, resulting in a less accurate image than wave-equation migration can provide. These trade-offs need to be understood and exploited for Gaussian beam migration to reach its full potential, and they are the subject of my talk.

Biography: ***Samuel H. Gray***

Samuel H. Gray received a BS (1970) from Georgetown University and a PhD (1978) in mathematics from the University of Denver. Between 1978 and 1982 he worked at the US Naval Research Lab in Washington, DC, and was a faculty member at General Motors Institute (now Kettering University) in Flint, MI. From 1982 to 1999 he worked for Amoco and BP, first in Amoco's Tulsa Research Center and later at Amoco Canada. While at Amoco and BP, he was a member of several teams building and using depth migration and velocity estimation tools. Since 1999, he has been at Veritas DGC, where he continues to work on depth imaging, velocity estimation, and seismic modeling techniques. He has served as Associate Editor of Geophysics, and he has co-authored papers which have won the Best Paper in Geophysics award (1999) and Honorable Mention for Best Paper in Geophysics (1998 and 2001).