



Review of Progress EDGER FORUM February 2010

Robert H. Tatham

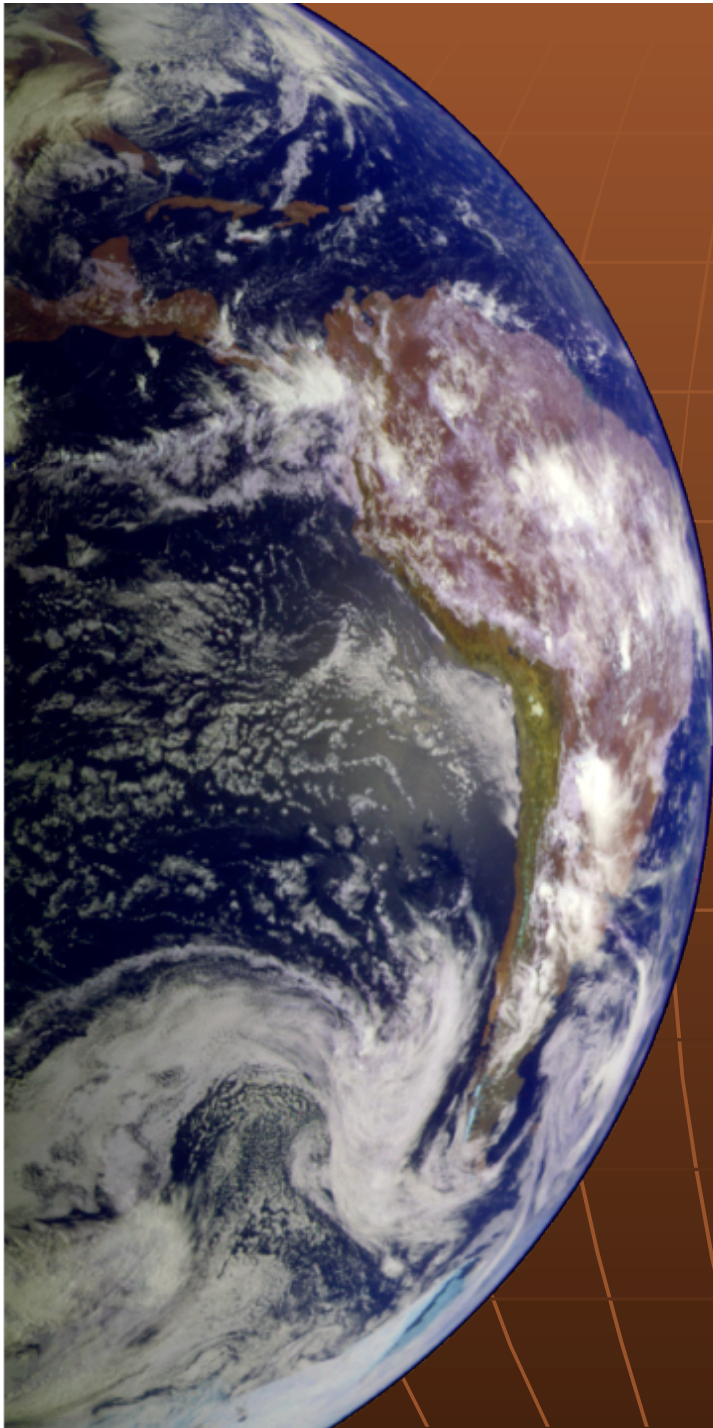
Mrinal K. Sen

Kyle T. Spikes

THE UNIVERSITY OF TEXAS AT AUSTIN

JACKSON

SCHOOL OF GEOSCIENCES





Forum for Exploration and Development Geophysics Education and Research

*Nurturing Education and Research
for Tomorrow's Technology Needs
at the Edge of Knowledge.*

THE UNIVERSITY OF TEXAS AT AUSTIN

JACKSON

SCHOOL OF GEOSCIENCES

The Exploration Geophysics Program

Leverage Industry support in the overall Exploration Geophysics Program.

- **Industry Supported Program – EDGER Forum**
- **Geology Foundation and Jackson School Support**
- **JSG and Department Support (T/A and other)**
- **Other Student Support (e.g. Scholarships, National Oil Companies)**
- **Other Research Contracts**
 - **Government and Research Support Agencies**
 - **Focused Industry Supported Projects (e.g., ERL)**

The Jackson School of GeoSciences

- **Department of GeoSciences (DGS)**
- **Bureau of Economic Geology (BEG)**
- **UT Institute of Geophysics (UTIG)**

An 'independent' school led by the Dean, Sharon Mosher, reporting to the Provost

The EDGER Forum

Education:

- Emphasizes Education as well as Research
- Graduate Students employable by the industry
- Includes Post-doctoral researchers
- **Focused Areas of Application** offer educational context for research

The EDGER Forum

Research:

- Focused Research core element of the Forum
- MS Thesis projects coordinated to support larger research directions
- Sponsors coordination on MS Research Projects
- Includes Post-Doc Fellows
- **Focused Areas of Application** facilitate cooperative research with industry, student internships and recruiting by industry

The EDGER Forum

Forum:

Third-party (Academic) Forum to coordinate technical activities between Industry Producers, Industry Contractors and Academia.

- Focused Technical Symposia
- Interactive problem-focused workshops
- Develop and Maintain Objective Ordered D.B.
- **Focused Areas of Application** provide opportunity for additional workshops.

Current Members of the EDGER Forum

- Anadarko Petroleum Corp
- BP America Product Corp
- Chevron
- ConocoPhillips
- Dawson (Permanent Member)
- Landmark (In Kind)
- BGP (new)
- Cimarex (new)

Benefits of Participation

Students

Professional MS and Research PhD students

- Graduates employable by Industry

Research

Research Focus on Inversion, Imaging, Analysis and Interpretation of Multi-component Seismic Data

Focused Areas of Application provide direction for research and transfer of technology to sponsors.

- Provide direction to Research Projects
- Continuous Access to Research Results

Forum

Advance technology for benefit of technical community

- Annual Technical Symposium
- Problem-oriented Workshops
- Objective-Oriented M/C Inter. Data Base

Benefits of Participation: Students

Professional MS and Research PhD students

- **Access to the Students themselves**
(Graduates employable by Industry)
- **Sustainable supply of graduates**
(Requires on-going support)

Target

- **Minimum 18 grad. Students in Exploration Geophysics**
- **Minimum Six advanced degree graduates per year**

Summary of Student Activities

Academic Year	UGrad (F / S)	New Gr. St.	Degrees (MS/PhD)	No. Interns
'99 – '00	14 / 14	--	-	1
'00 – '01	21 / 22	4	1 / 0	2
'01 – '02	26 / 22	2	2 / 0	3
'02 – '03	20 / 24	4	1 / 1	4
'03 – '04	27 / 26	5	1 / 0	2
'04 – '05	29 / 31	7	3 / 0	9
'05 – '06	31 / 30	4	3 / 2	8
'06 – '07	23 / 21	6	8 / 3	6
'07 – '08	16 / 17	7	6 / 2	10
'08 – '09	18 / 18	8	2 / 3	6
'09 – '10	18 / 18	5	1 / 1*	2*

* to Dec. '09

Students with Focus in Exploration Geophysics

Graduates since 1999:

Helena Zirczy MS 2000

Chau Ao BS (Hon) 2001

Fernando Cerda MS 2002

Patricia Montoya MS 2002

Chengshu Wang PhD 2003

Matt Morris MS 2003

Jason S

Carmen

Sharon

Kim Kumar MS 2006

Chandan Kumar PhD 2006

Jason Gumble PhD 2006

Eric Lyons MS 2006

Matt McDonald MS 2006

Kathryn Young MS 2006

Russ Young MS 2007

Kevin Bain MS 2007

Chris Sine MS 2007

Samarjit Chakraborty MS 2007

Reeshidev Bansal PhD 2007

William Burnett MS 2007

Engin Alkan MS 2007

Nedra Bonal PhD 2007

Emily Pangborn MS 2007

07

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007

Ali AlJadhar MS 2007

Tiancong Hong PhD 2008

Daniel Smith MS 2008

Chaoshun Hu PhD 2008

Anisa Perez MS 2009

Samik Sil PhD 2009

Jonas de Basabe PhD 2009

Jeffrey Kao MS 2009

Chunlie Chu PhD 2009

**36 Total: 25 MS, 10 PhD.
1 BS (Hon)**

Students with Focus in Exploration Geophysics

Current Graduate Students:

Jason Stevens (PhD Cand.)

Alireza Shahin (PhD Cand.)

Sandy Suhardja (PhD Cand.)

Vladimir Bashkardin (PhD Cand.)

Will Burnett (PhD Cand.)

Yang Wang (PhD)

Fiona Ye (MS)

Robert Brown (MS)

Yi Xia (PhD)

Na Shan (MS)

Xiaolei Song (PhD)

Yi Tao (PhD)

Diego Valentin (MS)

Mohammed Alhussain (PhD)

Corey Joy (MS)

Son Phan (MS)

Terence Campbell (PhD)

Yang Xue (PhD)

Tao Lin (PhD)

**19 Total: 6 MS
13 PhD**

Students in the Department of Geological Sciences

	<u>US</u>	<u>Visa</u>	<u>Total</u>
Undergrad:	331	22	333
Grad:	139	66	205
Total:	450	88	538

Fall '09

Benefits of Participation: Research

Research Focus on Imaging, Analysis and Interpretation of Multi-component Seismic Data

This includes addressing problems with possible solutions in P- and S-wave data applications and P-P and P-SV AVO analysis.

- **Provide direction to Research Projects**
- **Access to Research Results**
- **Focus Areas of Application tie together a variety of MS research projects.**

Research Topic Areas

- **Interpretation of Multicomponent data**
- **Direct Shear vs. P-SV data comparisons**
- **Effects of Fluids on Seismic Response**
- **Direct Inversion of P-P and P-SV data**
- **Imaging—with the flexibility to focus on anisotropy and P-SV data**
- **Reservoir Modeling and Time Lapse Seismic**
- **Other topics**

Earlier Research

- **Vp/Vs interpretations for Lithology**
- **Time-Lapse Vp/Vs to monitor gas expansion in reservoir**
- **AVO vs. Azimuth, Fracture parameter estimation.**
- **Full elastic inversion of P-P and P-SV data (PhD)**
- **P-P and P-SV AVO Coefficients (MS)**
- **P-P (Biot) and sensitivity to Fluids (viscosity)**

Focus Areas of Application

- **Problems in Unconventional Resources and Resource Plays (Shales)**
Very actively growing
- **Time-Lapse Seismic and Reservoir Monitoring**
In line with broad theme
- **Numerical Simulation (Future?)**

48 Pubs. Year to Date:

Geophysics / Geophy Prosp.	5
Other Refereed Journals	14
The Leading Edge	3
SEG / EAGE Expanded Abs. *	22
Other Proceedings	4

***Expanded Abstracts included in
Appendix of Interim Report**

Benefits of Participation: Forum

- **Annual Technical Symposium**
- **Workshops in Application Areas**
- **Objective-Oriented and Geographically Project-Oriented M/C Interpretive Data Bases**
- **UT-Austin is the depository for the 4C 4D Teal South 4C 4D data**
- **UT-Austin will display GSH and O. S. Petty Museum Artifacts in Dawson Geophysical Training Center**

PROPOSE: Working groups of sponsors and Student/Faculty Researchers on Bakken as a documented model of shale

Past Forum Activities

Annual Technical Symposium

1999- 2000 – Future of Exploration Geophysics

2000- 2001 – Assessment of Stratigraphic Seals

2001- 2002 – New Directions in AVO

2002 - 2003 – Seismic Attributes

2003 - 2004 – Successful Applications of M/C

2004 - 2005 – Partial Gas Saturation

2005 - 2006 – Seismic Response to Fluid Properties

2006 – 2007 – Problems in Land Applications

2007 – 2008 – Unconventional HC Resources

2008 – 2009 - Seismic Response in Resource Plays

2009 - 2010 - Unconventional Resources & Shale Production

1999-2000 Direction in Exploration Geophysics

The University of Texas at Austin
Department of Geological Sciences

The Future of Exploration Geophysics: Meeting the needs of Industry and Academia

A Symposium honoring Professor Milo Backus
And his career in Exploration Geophysics

Monday, December 6 and Tuesday, December 7, 1999

Keynote Speaker: Dr. Thomas Barrow, Chairman of GX Technologies,
and former president of Humble Oil & Refining

Dinner honoring Prof. Backus at the Texas Memorial Museum
on Monday, Dec. 6 hosted by Dept of Geological Sciences.

The symposium will include:

Keynote Address by Mr. Thomas Barrow

Session of educational and research activities at

The University of Texas at Austin from the

- Department of Geological Sciences
- Institute for Geophysics
- Bureau of Economic Geology
- Texas Institute for Computational and Applied Mathematics (TICAM) associated with
 - >The Department of Computer Sciences
 - and the
 - > Department of Petroleum and Geosystems Engineering.

Session of presentations from industry representatives

- BP/Amoco on 'Directions in Exploration Geophysics'
- Texaco on 'Risk Evaluation for Exploration'
- Baker Hughes on 'Resource Needs of Contractors
- GeoQuest on 'partnerships between Industry and Academia'

Co-operative sessions between industry and university
participants to address joint needs.

The outcome of this symposium will play a major role in the evolution of the Exploration Geophysics program in the Department of Geological Sciences and encourage further cooperation among various elements of the university and with the petroleum industry.

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Forum Activities: Petty Geophysical Museum

Museum of Geophysical Artifacts now located on 4th floor (near Walter Library) of the Jackson Geoscience Building, UT-Austin.

In cooperation with the Geophysical Soc. of Houston



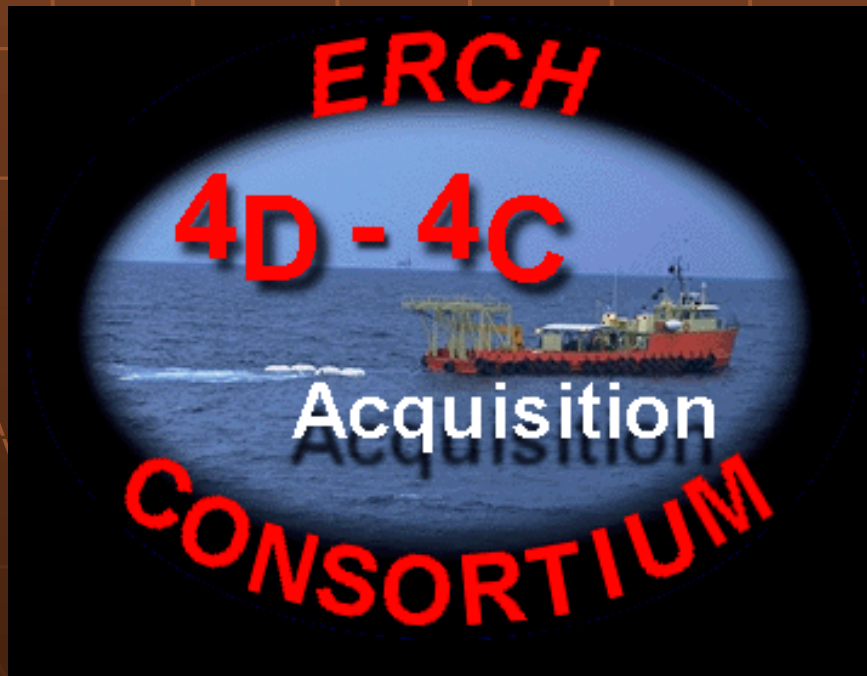
Petty Geophysical Museum



Teal South 4C 4D OBS data

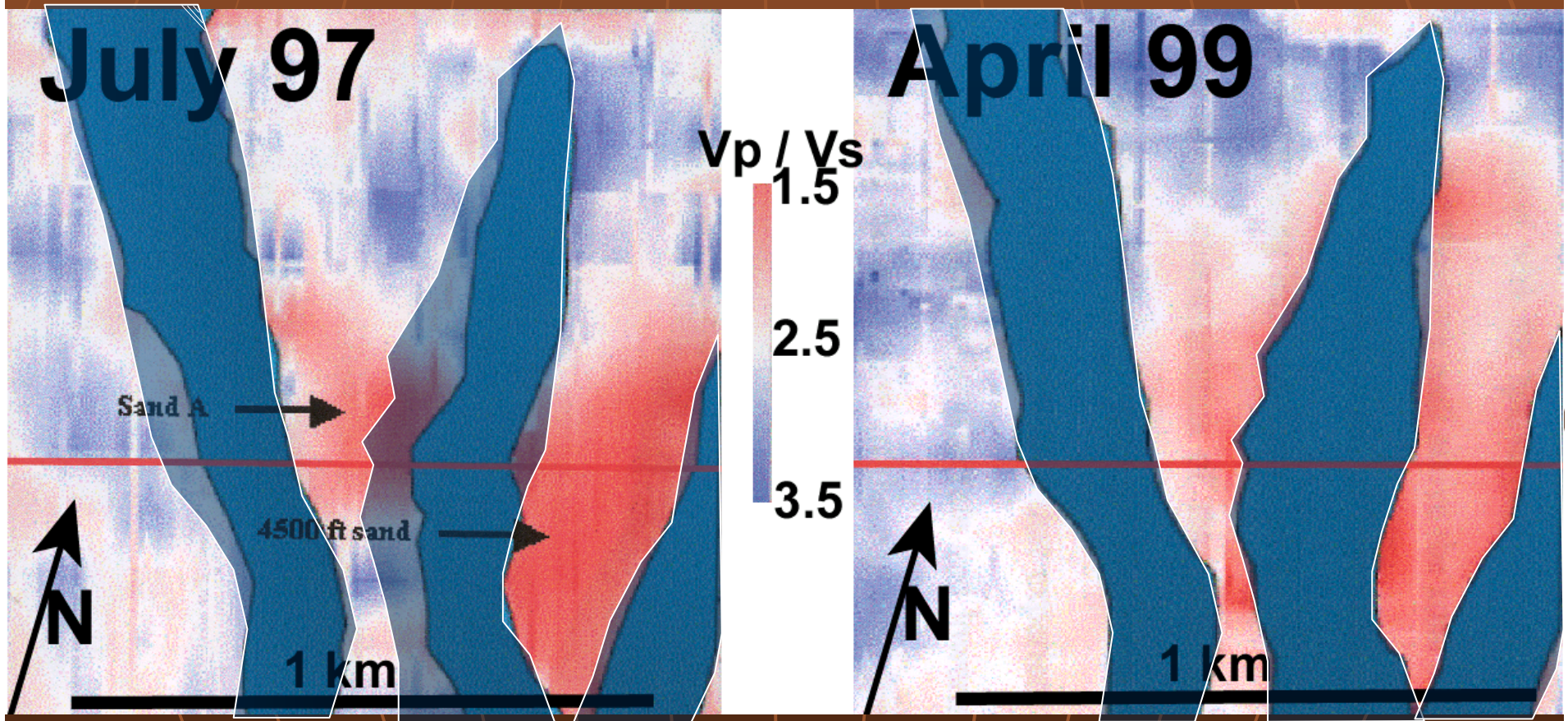
UT-Austin has become the depository for this historic 1997 data set.

Seismic Data are available to any interested investigator.



Teal South 4C 4D OBS data

Time-Lapse V_p/V_s to monitor gas expansion in reservoir



Cerda (2001)

Technical Workshops

December 10, 2003.
Hosted by Shell

Focused on:

**Current Problems in Acquisition,
Processing and Interpretation
of Multicomponent Seismic Data**

December 2, 2004
Hosted by
ConocoPhillips

**Continuation of previous
workshop**

Sept. 2005

**EAGE / SEG Summer Research
Workshop—Pau, France**

Dec. 16, 2009
Hosted by BP

**Workshop in Houston
focused on Shale plays**

Summary of Educational Activities

- Five Graduate Students finished last year
- Forum is a focus for admitting new students to JSG
- Focused Area of Application for MS Stud.

Challenges

- Balance of MS and PhD Students
- Recruiting and Funding applicants
(Grad Student cost is \$80,000 /yr.)

Typical cost of a PhD graduate student at UT in 2009-2010

9-Month stipend as a Research Asst.	\$ 21,000
Fringe Benefits (Health Ins.)	5,670
Tuition & Fees*	7,700
3-Months summer (40 hrs)	14,000
Fringe Benefits	3,780
Tuition & Fees*	1,690
Misc. (Thesis copying, Travel to meetings)	3,000
Overhead (50%)	23,730
Total cost per student	\$ 80,570

*Not subject to overhead

Summary of Research Activities

- **Post-Doc Researcher**
- **48 Publications since June 1, 2009**
- **Focus Areas of Application**
- **Two cooperative projects in progress**

Challenges

- **Balance of MS and PhD students**
- **Balance focused research / broad research directions.**

Summary of Forum Activities

- **Technical Symposium**
- **Shale Workshop**
- **MC Interpretive Data Base**
- **Petty museum in JGB**
- **Data Depository**

Challenges

- **Provide more workshops**
- **Develop Working Groups w/Sponsors**
- **Balance of 'Community' Service and Forum Members interests**

***We look forward to continued
growth and development with the
Jackson School of GeoSciences and
the Energy Industry***

Access to Problem Oriented M.C. Application Database

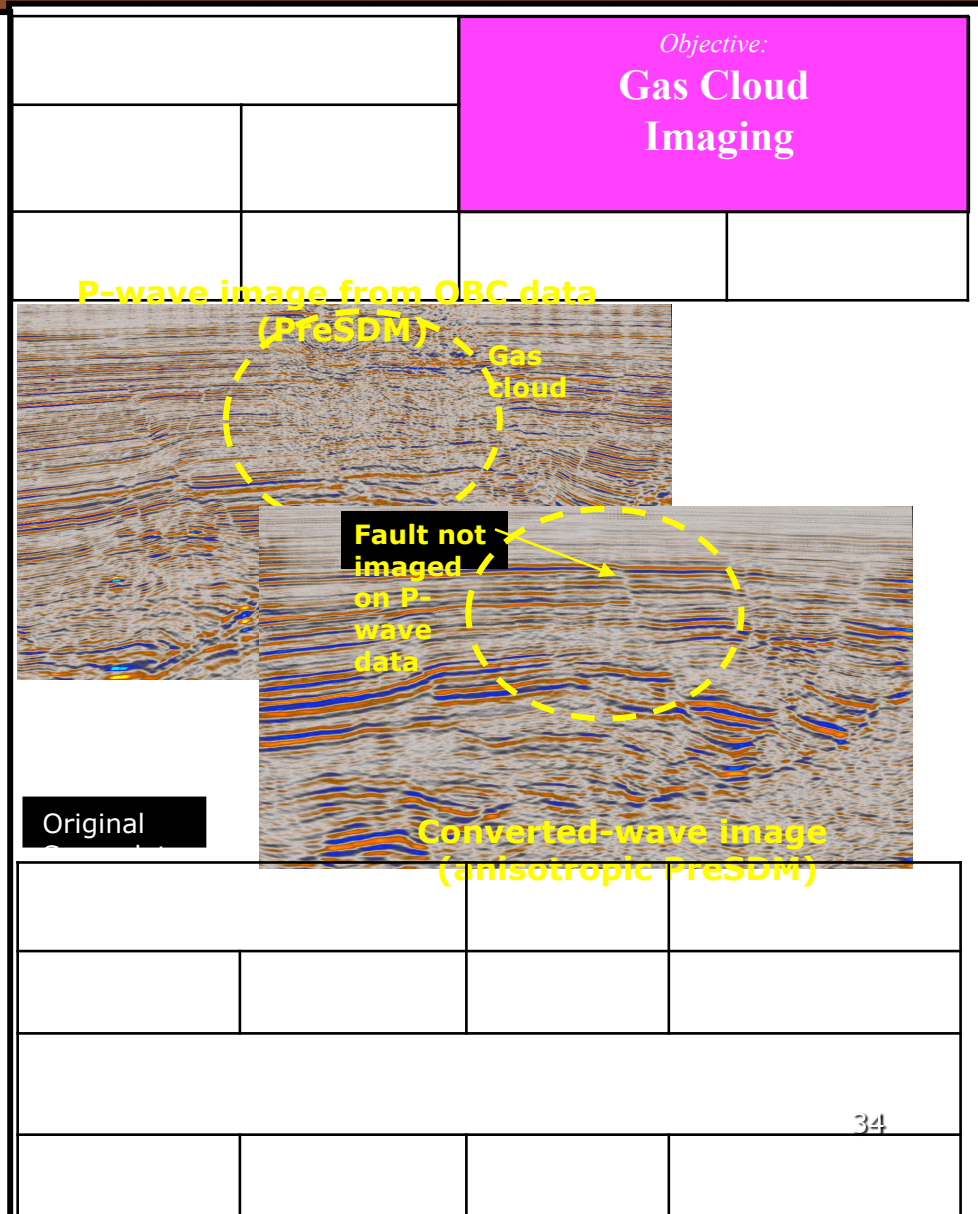
Value-added data base catalogue of successful multicomponent seismic interpretations from published sources focused on problem (or objective).

Content: 500 complete entries—target 1000.

Brief demo of web-accessible data base available

Sample Data

Field Name	Objective	Sub-Object.		Method
		1	2	
Sorrento	Lithology	Discrimination	SS/SH	Vp / Vs
Sorrento	Lithology	Discrimination	Type II Sand	P&S Amp.
Sorrento	Lithology	Discrimination	SS/SH	Vp / Vs
Sorrento	Lithology	Discrimination	Type II Sand	P&S Amp
Alba	Lithology	Discrimination	Type II Sand	P&S Amp
Alba	Lithology	Discrimination	SS/SH	Vp / Vs
Blackfoot	Lithology	Discrimination	Type II Sand	P&S Amp
Blackfoot	Lithology	Discrimination	Type II Sand	P&S Amp
Blackfoot	Lithology	Discrimination	SS/SH	Vp / Vs
Blackfoot	Lithology	Discrimination	SS/SH	Vp / Vs
Cataract Colliery	Anisotropy	Stuct. Imag		Structural
Chapman Ranch	Overpressure			Vp / Vs
Church Butte	DHI	Detection		P&S Amp
Defour Gas Field	HCI	Gas Detection		P&S Amp
Bluebell	Fracture	Param Est		S1 / S2
Donald	Gas Cloud Im			Structural
Donald	Gas Cloud Im			Structural
Empire Abo	Lithology	Discrimination	SS/SH	Vp / Vs
Horse Butte	Lithology	Discrimination	SS/SH	Vp / Vs
Lomond	Gas Cloud Im			Structural
Midland Basin	Lithology	Discrimination	SS/CO3	Vp / Vs
Midland Basin	Lithology	Discrimination	SS/CO3	Vp / Vs
Natih	Fracture	Param Est.		S1 / S2
Oseberg	Lithology	Discrimination	SS/SH	Vp / Vs
Paloma	Lithology	Discrimination	SS/SH	Vp / Vs
Prudhoe Bay	Lithology	Estimation		Vp / Vs
Second Wind	Lithology	Discrimination	SS / SH	Vp / Vs
Putah Sink	DHI	Gas Thick. Est.		Vp / Vs



Browser

UT-Austin | Jackson School Dogs | UTIG | BEG

Exploration Geophysics Program 

at The University of Texas at Austin

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 Forum for
Exploration and Development Geophysics Education and Research

at UT-Austin

Multi-component seismic interpretation browser
This objective-oriented exploration application provides the user with a searchable database of published examples of case histories in multi-component acquisition, processing, analysis, and interpretation. Database entries may be sorted on any number of criteria, such as 'objective', 'geographic area', or 'data type.' These examples may serve as analogs for current exploration targets or as educational resources for oil & gas exploration with multi-component seismic.

[Browse the entire database](#)

Historical Multi-component seismic projects
As multi-component seismic technologies mature, successful projects will have been archived here. This browser is organized by specific multi-component projects organized by geographic area, date of acquisition, data type, operator and project impact. Each entry leads to a document summarizing the project and includes links to individual summaries of published resources.

[View all Historical Projects](#)

[Select an area from a map](#)

Comments/Suggestions? Please contact Bob Tatham at tatham@mail.utexas.edu. [admin](#)

Shear wave Data Base Guidelines

Objectives:

Objective	Sub-1	Sub-2
Lithology	Estimation	---
	Discrimination	SS/SH
		Type II Sand
		Dol/LS
	Dol/Any	
HCI	Gas Detection	---
	Gas Thickness Estimation	---
	Liquid Hydrocarbon	---
Gas Cloud Imaging	---	---
Fracture	Detection	
	Parameter Estimation	
Anisotropy	---	
	Fracturing	
	Depth Conversion	
Shear Wave Reflectivity		
Improved Structural Imaging		
Reservoir Monitoring	Azimuthal Anisotropy	
	CO2 Monitoring	

S-wave Vel. Est.	Time Lapse	

Gas Hydrate	VSP	
Porosity		
Overpressure		
Processing	---	
	Statics	

Member Services UT Austin Exploration Geophysics Program SEG Website

Project Name	Objective	Sub Obj. 1	Sub Obj. 2	Method Name	Data Type
Collery 1	''	Imaging			
Cameron South 1	Gas Cloud Imaging			Structural	3D 4C
Cymric 1	Anisotropy			S1/S2	VSP
Dara 1	Gas Cloud Imaging			Structural	2D 4C
Defour 1	Hydrocarbon Indicators	Gas Detection		P and S Amplitudes	2D P-P,SH-SH
Delaware Basin 2	Improved Structural Imaging			Structure	P,SH
Eastern Goldfields 1	Improved Structural Imaging			Structural	9C
Emilio 1	Fracture	Detection		S1/S2	3D 4C
Empire Abo 1b	Lithology	Discrimination	Sandstone/Shale	Vp/Vs	P-P,SH-SH
Empire Abo 2	Anisotropy	SS/SH Discrimination		Vsh/Vsv	P,SH 3C
Erawan 1	Lithology	Discrimination	Type II Sand	P and S Amplitudes	2D 4C
Faeoroos Island 2	Improved Structural Imaging			Structure	2D 3C
Horse Butte 1	Lithology	Discrimination	Sandstone/Shale	Vp/Vs	2D P-P,SH-SH
Joffre 3	Lithology	Discrimination	Limestone/Shale	Vp/Vs	3D 3C
Kingfisher 1	Lithology	Estimation		Vp/Vs	P-P,SH-SH
Lomond 1	Gas Cloud Imaging			Structural	3D 4C
Natih 3b	Hydrocarbon Indicators	Gas Detection		Vp/Vs	3D 9C

Field Name: Lomond

Objective: Gas Cloud Imaging

Area: North Sea

Age of Target:

Comment:

Type of Interpretation: Structural

Sub-Objective 1:

Sub-Objective 2:

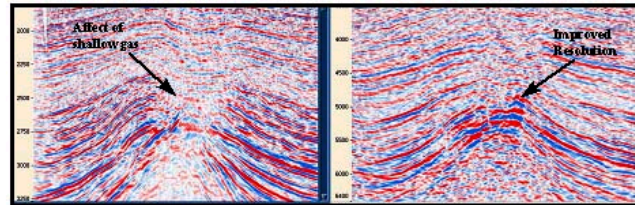


Figure (2) 3D 4C time domain processed data. Left : Inline from pp data through the gas affected area. Right : Equivalent inline from ps data through the centre of the gas affected area

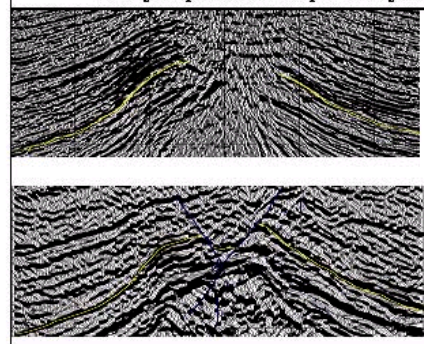


Figure (5)
Comparison between a streamer seismic line (above) and equivalent ps-seismic line (below) which has been translated to pp-time.

The crest of the anticline which is obscured on the streamer line is clearly imaged on the ps - seismic with key faulting also delineated .

Resolution: Structure

Data Type: 3D 4C

Date of Acquisition:

Interval Thickness:

Objective Thickness:

Source Type: Airgun

Receiver Type: 4C OBC

Reference: Pope et al. (2000)

Comments/Suggestions? Please contact Bob Tatham at tatham@mail.utexas.edu.

Browser

- **Interpretive based browser is developed, and content is continuously being added.**
- **A project-oriented browser is operating.**
- **A project/geographically oriented browser has been added.**

Project-Oriented Browser

Redefine Browsing Criteria Member Services UT Austin Exploration Geophysics Program SEG Website

Project Name	Data Type	Operator	Acq. Date	Region	Basin
Scipio	2D 9C	Texaco	1986	USA-Michigan	Michigan
Lousana	2D 3C	CREWES	1987	Canada-Alberta	
Silo Field	3D 9C	RCP Phase II	1987	USA-Wyoming	
Carrot Creek	2D 3C	CREWES	1989	Canada-Alberta	
South Casper Creek	3D 9C	RCP Phase III	1989	USA-Wyoming	
Springbank	2D 2C	CREWES	1990	Canada-Alberta	
Cochrane	2D 9C	CREWES	1990	Canada-Alberta	
Wildesden Green	2D 3C	CREWES	1990	Canada-Alberta	
Natih	3D 9C	PDO / Shell	1991	Oman	
Cedar Hill Field	3D 9C	RCP Phase IV	1991	USA-New Mexico	San Juan Basin
Cold Lake	4C 3C	CREWES	1993	Canada-Alberta	
Joffre Field	3D 9C	RCP Phase V	1993	Canada-Alberta	
Olds	2D 9C	CREWES	1993	Canada-Alberta	
Bluebell-Altamont	2D 9C	Lynn / DOE	1994	USA-Utah	
Sorrento Field	3D 9C	RCP Phase V	1994	USA-Colorado	Morrow Chanel
Vacuum	4C 9C	RCP Phase VII	1995	USA-New Mexico	Permian Basin
Vacuum	3D 9C	RCP Phase VI	1995	USA-New Mexico	Permian Basin
Stratford	3D 4C	Statoil	1997	Norway	North Sea
Teal South	4D 4C	ERCH	1997	USA-Offshore Louisiana	
Alba	3D 4C	Chevron	1998	UK-North Sea	
Texoma	3D 9C	UT-BEG / EGL	1998	USA-Texas	Morrow Chanel
Black Bear Creek	3D 9C	UT-BEG / EGL	1998	USA-Oklahoma	
Weyburn	4D 9C	RCP Phase VIII	1998	Canada-Sask.	
Second Wind	3D 9C	UT-BEG / EGL	1998	USA-Colorado	Morrow Chanel
Shaganappi	2D 3C	CREWES	1998	Canada-Alberta	
Valhall	3D 4C	bp Amoco	1998	Norway	
Donald	2D 4C	Texaco	1998	USA-Offshore Louisiana	
Ashland South	3D 9C	UT-BEG / EGL	1998	USA-Kansas	Morrow Chanel
West Cameron	3D 4C	WesternGeco / Seitel	1999-2000	USA-Offshore Louisiana	
Weyburn	4C 9C	RCP Phase IX	2001	Canada-Sask.	
Qatar	3D 4C	Occidental	2003-2004	Qatar	

Alba Field
 Central North Sea
 UK Block 16/26
 3D - 4C (OBS) Survey
 67 square kilometers acquired in 1998

Impact of Multicomponent Seismic Survey:
 Credited with the initiation of a new drilling phase resulting in booking an additional **100 million Barrels** of reserves

Operator: Chevron

Partners: Arco, Conoco, Fina, Petrobras, Saga, Statoil and Unilon/Baytrust

Reservoir Description: 1984 Discovery
 Estimated 1 billion barrels of oil in place
 1994 Initial production: 80,000 BOPD of 20 API oil.
 Reservoir 2000 meters deep in 140 m of water.
 Eocene age unconsolidated channel sands (Type II) sealed by low permeability shales. Channel system approx. 12 km long, 1.5 km wide and 100 m thick. The low impedance contrast between the Type II sand and shale resulted in poor imaging with conventional P-wave seismic.
 $\phi = 35\%$, Perm = 2700 mD

Acquisition: 1989 3D Streamer survey conducted (Used for a base survey for time-lapse studies with the '98 OBS data.)

1992 Britannia 3D streamer survey

1996 Reprocess '89 streamer survey
 Oil-water contact defined very clearly.

April 1998 for the full field 3D - 4C survey by GecoPrakla
 (This is one of the World's first full-field 3D-4C Surveys)

2D - 3C test surveys: were gathered by two different contractors to confirm the possibility of gather P-SV data. GecoPrakla was selected as the contractor for the full 3D survey.

VSP data show upgoing an downgoing converted waves, with some of the strongest from the top of the reservoir.

2002 Long-offset streamer survey by Veritas (Britannia initiative)

Comments/Suggestions? Please contact Bob Tatham at tatham@mail.utexas.edu.

Project-Oriented Browser

[Redefine Browsing Criteria](#)
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[SEG Website](#)

Project Name	Data Type	Operator	Acq. Date	Region	Basin
Silo Field	2D 9C	RCP Phase I	1987	USA-Wyoming	
Lost Hills	2D 9C	KimTech	1986	USA-California	San Joaquin Valley
Scipio	2D 9C	Texaco	1986	USA-Michigan	Southern Michigan
Lousana	2D 3C	CREWES	1987	Canada-Alberta	
Silo Field	3D 9C	RCP Phase II	1987	USA-Wyoming	
Carrot Creek	2D 3C	CREWES	1989	Canada-Alberta	
South Casper Creek	3D 9C	RCP Phase III	1989	USA-Wyoming	
Cochrane	2D 9C	CREWES	1990	Canada-Alberta	
Wildesden Green	2D 3C	CREWES	1990	Canada-Alberta	
Springbank	2D 2C	CREWES	1990	Canada-Alberta	
Natih	3D 9C	PDO / Shell	1991	Oman	
Cedar Hill Field	3D 9C	RCP Phase IV	1991	USA-New Mexico	San Juan Basin
Olds	2D 9C	CREWES	1993	Canada-Alberta	
Cold Lake	4C 3C	CREWES	1993	Canada-Alberta	
Joffre Field	3D 9C	RCP Phase V	1993	Canada-Alberta	
Bluebell-Altamont	2D 9C	Lynn / DOE	1994	USA-Utah	
Sorrento Field	3D 9C	RCP Phase V	1994	USA-Colorado	Morrow Chanel
Vacuum	4C 9C	RCP Phase VII	1995	USA-New Mexico	Permian Basin
Vacuum	3D 9C	RCP Phase VI	1995	USA-New Mexico	Permian Basin
Stratford	3D 4C	Statoil	1997	Norway	North Sea
Teal South	4D 4C	ERCH	1997	USA-Offshore Louisiana	
Texoma	3D 9C	UT-BEG / EGL	1998	USA-Texas	Morrow Chanel
Black Bear Creek	3D 9C	UT-BEG / EGL	1998	USA-Oklahoma	
Second Wind	3D 9C	UT-BEG / EGL	1998	USA-Colorado	Morrow Chanel
Donald	2D 4C	Texaco	1998	USA-Offshore Louisiana	
Weyburn	4D 9C	RCP Phase VIII	1998	Canada-Sask.	
Alba	3D 4C	Chevron	1998	UK-North Sea	
Shaganappi	2D 3C	CREWES	1998	Canada-Alberta	
Valhall	3D 4C	bp Amoco	1998	Norway	
Ashland South	3D 9C	UT-BEG / EGL	1998	USA-Kansas	Morrow Chanel
West Cameron	3D 4C	WesternGeco / Seitel	1999-2000	USA-Offshore Louisiana	

Scipio Trend
 Southern Michigan
 North-Central US
2D – 2C (P-P, SH-SH) Survey
 Four 2-D lines acquired in 1986

Impact of Multicomponent Seismic Survey:
 Girard Prospect identified as an analog to the Albion-Scipio field
 Texaco No. 1-14 Morick drilled
 Encountered 150 ft. of reservoir dolomite—Water saturated.
 Geologic Success: Predicted reservoir encountered
 Economic Failure: No hydrocarbons present in reservoir

Operator: Texaco

Partners: None

Reservoir Description:
 1956 Discovery of Albion Scipio Field
 Cumulative production 122 million barrels of oil
 Over 200 billion cubic feet of gas
 Produces from 600 feet of dolomitized limestone
 Ordovician Trenton-Black River dolomite
 (Dolomitization generated reservoir porosity)
 The field is about 1 mile wide, and trends nearly linearly for 45 miles.
 Reservoir depth is less than 5000 ft.

Acquisition: 1986 4 2D lines of P-P and SH-SH data gathered with Bolt Omnipulse source.

Summary of Data Base entries	Project Sheet Reference:
Preliminary Paper: Pardus et al (1990) Discussion of entire project	Scipio 1
Used in larger book: Tatham and McCormack (1991) Includes example from Pardus et al., and uses as a basis for further discussion of interpretation details, included event correlation and reconciliation of errors in picking P and S wave data.	Scipio 2
<u>Users' Discussion:</u>	
<u>Last Update:</u> Dec. 24, 2003 RHT Includes Scipio 1-Scipio 2 project entries.	

Geophysicis “Curricular” Group

DGS:

- Clark Wilson
- Steve Grand
- **Bob Tatham**
- **Open Position**

BEG:

- Sergey Fomel
- Bob Hardage

UTIG:

- Don Blankenship
- Cliff Frohlich
- Clark Wilson
- **Mrinal Sen**
- **Paul Stoffa**

Industry Consortia

BEG:

- EGL (Hardage)
- Frac City (Laubauch)
- Marine Margins (Wood / Mann)

UTIG:

- Gulf Basin (Galloway / Bulffler)
- Gulf Intraslope (Olson)
- Plates (Lawver/Dalziel)

DGS:

- EDGER Forum (Tatham/Sen/Stoffa)
- Ron Steel