

# **BULLETIN**

## **Corpus Christi Geological Society**



and

## **Coastal Bend Geophysical Society**



**March  
2020  
ISSN 0739 5620**

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## CORPUS CHRISTI GEOLOGICAL SOCIETY

P.O. BOX 1068\* C.C.TX. 78403

2019-2020

[www.ccgeo.org](http://www.ccgeo.org)

### OFFICERS

President	Austin Nye	361-452-1435	<a href="mailto:austin@nyexp.us">austin@nyexp.us</a>
President Elect			
Vice President	Randy Bissell	361-885-0110	<a href="mailto:randyb@headingtonenergy.com">randyb@headingtonenergy.com</a>
Secretary	Emily Olson	361-542-7434	<a href="mailto:emily@olsongeo.com">emily@olsongeo.com</a>
Treasurer	Sebastian Wiedmann	361-946-4430	<a href="mailto:swiedmann.geo@gmail.com">swiedmann.geo@gmail.com</a>
Past President	Frank Cornish	361-563-9184	<a href="mailto:frank.cornish@gmail.com">frank.cornish@gmail.com</a>
Councilor I	Rick Paige	361-884-8824	<a href="mailto:rpaigesio2@gmail.com">rpaigesio2@gmail.com</a>
Councilor II	BJ Thompson	361-816-2326	<a href="mailto:william.thompson426@gmail.com">william.thompson426@gmail.com</a>

### AAPG DELEGATE

### EDITORS

Bulletin Editor	Marian Wiedmann	361-855-2542	<a href="mailto:wiedgulf@gmail.com">wiedgulf@gmail.com</a>
Bulletin Tech. Editor	Jeanie Timmermann	361-883-1492	<a href="mailto:jeanie@industrialcorrosion.net">jeanie@industrialcorrosion.net</a>
Web Master	Josh Pollard	361-654-3100	<a href="mailto:support@interconnect.net">support@interconnect.net</a>

### GEOLOGICAL SOCIETY COMMITTEES & CHAIRPERSONS

**MEMBERS PLEASE NOTE COMMITTEES CONTINUE TO FUNCTION WITHOUT A NAMED CHAIR, ALL ARE WELCOME TO ANY COMMITTEE THAT SUITES YOUR INTEREST**

Advertising/Bus. Cards Arrangements	Robby Sterett Wes Gisler & Will Graham	361-739-5618 830-239-4651 361-885-0110	<a href="mailto:robert.sterett@gmail.com">robert.sterett@gmail.com</a> <a href="mailto:arrangements@ccgeo.org">arrangements@ccgeo.org</a> <a href="mailto:willg@headingtonenergy.com">willg@headingtonenergy.com</a>
Continuing Education			
Education	Dawn Bissell	361-960-2151	<a href="mailto:bissells@swbell.net">bissells@swbell.net</a>
Scholarship Program	Dawn Bissell	361-960-2151	<a href="mailto:bissells@swbell.net">bissells@swbell.net</a>
Fishing Tournament	Leighton Devine	361-882-8400	<a href="mailto:ldevine@suemaur.com">ldevine@suemaur.com</a>
History	<b>OPEN</b> (Ray Govett)	361-855-0134	<a href="mailto:ray30@hotmail.com">ray30@hotmail.com</a>
Membership	Dorothy Jordan Randy Bissell	361-885-0110 361-885-0113	<a href="mailto:dorothyj@headingtonenergy.com">dorothyj@headingtonenergy.com</a> <a href="mailto:randyb@headingtonenergy.com">randyb@headingtonenergy.com</a>
Type Logs			



**COASTAL BEND GEOPHYSICAL SOCIETY**  
**P.O. BOX 2741\*C.C. TX. 78403**  
**2017-2018**

**OFFICERS**

President	Dr. Subbarao Yelisetti	361-593-4894	<a href="mailto:subbarao.yelisetti@tamuk.edu">subbarao.yelisetti@tamuk.edu</a>
Vice President	Samara Omar	361-902-2826-office 361-446-7334-mobile	<a href="mailto:Samara_Omar@eogresources.com">Samara_Omar@eogresources.com</a>
Secretary/Treasurer	Erik Scott	361-902-2880-office 361-800-3364-mobile	<a href="mailto:Erik_Scott@eogresources.com">Erik_Scott@eogresources.com</a>
Golf Chairman	Mark Wiley	361-902-2844-office 361-445-6712-mobile	<a href="mailto:Mark_Wiley@eogresources.com">Mark_Wiley@eogresources.com</a>
Scholarship Chairman	Matt Hammer	361-888-4792 361-563-6137	<a href="mailto:mhammer@royalcctx.com">mhammer@royalcctx.com</a>

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**Visit the geological  
web site at  
[www.ccgeo.org](http://www.ccgeo.org)**

## CCGS/CBGS JOINT MEETING SCHEDULE 2019-2020

September 2019							October 2019							November 2019							
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	
1	2	3	4	5	6	7			1	2	3	4	5							1	2
8	9	10	11	12	13	14	6	7	8	9	10	11	12	3	4	5	6	7	8	9	
15	16	17	18	19	20	21	13	14	15	16	17	18	19	10	11	12	13	14	15	16	
22	23	24	25	26	27	28	20	21	22	23	24	25	26	17	18	19	20	21	22	23	
29	30						27	28	29	30	31			24	25	26	27	28	29	30	

Thursday, Sept. 26<sup>th</sup> at 5:30-8:00p.m. Kickoff at Hoegemeyer's Barbeque Barn.

12-1:00pm  
 Speakers: Richard Parker  
 Geophysicist  
 w/Schlumberger  
 Edgar Velez geomechanics  
 domain champion for the  
 western hemisphere

11:30-1:00 pm  
 Speaker: Dr. Neil Bockoven  
 "Early Human Interactions &  
 Migrations—Three Mysteries"

December 2019							January 2020							February 2020						
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S
1	2	3	4	5	6	7				1	2	3	4							1
8	9	10	11	12	13	14	5	6	7	8	9	10	11	2	3	4	5	6	7	8
15	16	17	18	19	20	21	12	13	14	15	16	17	18	9	10	11	12	13	14	15
22	23	24	25	26	27	28	19	20	21	22	23	24	25	16	17	18	19	20	21	22
29	30	31					26	27	28	29	30	31		23	24	25	26	27	28	29

12-1:00pm  
 Speaker: Peter M. Duncan  
 President & CEO of Micro-  
 Seismic, Inc. "Frac-Driven  
 Interactions & Well Spacing:  
 A Microseismic Perspective

11:30am-1:00pm  
 Speaker: SEG Distinguished  
 Lecturer, Sergey Fomel—  
 University Texas, Austin.  
 "Automating Seismic data  
 analysis and interpretation.

## CCGS/CBGS Joint Meeting Schedule 2019-2020

March 2020							April 2020							May 2020						
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S
1	2	3	4	5	6	7				1	2	3	4						1	2
8	9	10	11	12	13	14	5	6	7	8	9	10	11	3	4	5	6	7	8	9
15	16	17	18	19	20	21	12	13	14	15	16	17	18	10	11	12	13	14	15	16
22	23	24	25	26	27	28	19	20	21	22	23	24	25	17	18	19	20	21	22	23
29	30	31					26	27	28	29	30			24	25	26	27	28	29	30
														31						

Dr. Charles Puryear-Senior  
Research Geophysicist at Multi-  
Physics Technologies. "Spectral  
Extrapolation & Acoustic  
Inversion for the  
Characterization of an Ultra-  
thin Reservoir."  
**MARCH 26: MEMBERS  
MEETING NUECES BREWING  
6:30PM**

Collegiate Month

11:30-1pm, Speaker: Dr. Osareni C.  
Ogiesoba, Research Scientist,  
Bureau of Economic Geology. The  
Univ. of TX at Austin. "Comparison  
of Structural Styles Observed in  
Upper Eocene (Jackson Group) &  
Oligocene (Vicksburg Group) Strata  
within the Rio Grande & Houston  
Embayments"

## Calendar of Meetings and Events

### Calendar of Area Monthly Meetings

Corpus Christi Geological/Geophysical Society.....	Third Wed.—11:30a.m.
SIPES Corpus Christi Luncheons.....	Last Tues.—11:30a.m.
South Texas Geological Society Luncheons.....	Second Wed—noon San Antonio
San Antonio Geophysical Society Meetings.....	Fourth Tuesday
Austin Geological Society.....	First Monday
Houston Geological Society Luncheons.....	Last Wednesday
Central Texas Section of Society of Mining, Metallurgy & Exp.....	2 <sup>nd</sup> Tues every other month in San Antonio



## CCGS PRESIDENT'S LETTER


NAPE is an interesting phenomenon. My experiences with NAPE have been as diverse as the floor itself. From the highest highs of the shale boom to the \$20 market we never saw coming, NAPE and the people who go and show have persisted and adapted with the ride. It's an industry snapshot each time, and a lot of fun to behold and be part of. There was plenty of resource presence, no doubt, but the seeming conventional reemergence was encouraging for a conventional guy. Maybe that's what I wanted to see because that's what I was looking for, but it was a really fun NAPE to attend from the conventional perspective. A lot of interesting conventional drilling deals, some cool reentry ideas, a handful of water floods, field acquisitions, exciting chalk trend ideas, and the Greta sideways game had quite a presence. The booths were busy, people were showing deals, and the goodies were cool, as always. I liked the Seitel sleeves. When you're selling a deal at NAPE there is really nothing better. You know it better than anyone, hopefully, and get to defend it and get excited and get other people excited, it's a wonderful thing. It's also fun to window shop, tire kick, eventually find that one deal you've been looking for to dive into, evaluate on the spot, be on the other side and get excited with the seller. Selling a deal on the floor at NAPE is like hitting in the winning run, and there are not many experiences that match it because how many RBIs end up with poking a substantial hole in the ground with the hopes of money coming out?

One of my favorite semi family friendly NAPE stories revolves around my first attempt at using Uber, which did not work out. While I was trying to figure it out in front of the hotel, an eccentric cabby hollered if my associate and I needed a ride. I told him I was trying to figure out Uber. He offered some colorful language and a ride, and we shrugged and accepted. I rode shotgun, my compadre in the back with another customer. The cabby turns up the Marvin Sease and starts signing along...enthusiastically. Now, I'd never heard of Marvin Sease, but for those of you who may celebrate his collection, you can imagine our surprise as our 6'6" of a driver sang along as if his front seat were a stage. We were entertained. My associate and I began chatting with him, and he said he was famous, and we should look up his YouTube. He must have meant Wikipedia, so there we went and found mentions of an impressive All Star NBA career, first to succumb to the leagues new drug policy, a mention in another article about him leaving the public eye until Charles Barkley recognized him in a taxi in Houston. He autographed our badges, gave us his card, and ended up being our driver for the rest of the week. Super nice guy. Very into his music. Great driver.

Austin Nye—CCGS President



## SPONSORS



**Nueces Energy, Inc.**  
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[www.nuecesland.com](http://www.nuecesland.com)

Nueces Energy, Inc. is a complete land services company in the business of providing professional landmen and project management to various energy related jobs primarily in the oil and gas industry.

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Contact **Walter S. Light Jr.**  
President/Geologist  
713.823.8288  
EMAIL: [wthunderx@aol.com](mailto:wthunderx@aol.com)

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## **CBGS President's Letter**

### **CBGS Board 2019-2020**

Dr. Subbarao Yeliseti- President  
Samara Omar- Vice President  
Erik Scott- Secretary/ Treasurer  
Matt Hammer - Scholarship Chair  
Mark Wiley - Golf Chair  
Education – Robert Schneider

### **CBGS Scholarships**

The Coastal Bend Geophysical Society (CBGS) has donated \$10,000 to the Department of Physics and Geosciences, Texas A&M University-Kingsville in support of the multidisciplinary Petrophysics Graduate Program that has been requested. These funds will be used as scholarships in attracting quality graduate students.

The board awarded three scholarships of \$2,000 each to undergraduate geophysics majors from Texas A&M University-College Station, University of Houston and Texas A&M University-Kingsville. We will be awarding the scholarships again this year.

### **Scholarship Requirements**

Criteria for awarding the Scholarship from Coastal Bend Geophysical Society of Corpus Christi, Texas:

1. Scholarships are open to undergraduate or graduate students.
2. Must have declared major in Geophysics, or Geology with a concentration in Geophysics or Petrophysics.
3. Preference is given to students attending Coastal Bend schools (TAMU-K, TAMU-CC and Del Mar College), then to Coastal Bend natives attending other universities.
4. Must have a GPA of at least 3.0 and be in good standing with the school.
5. Must make effort to attend a Coastal Bend Geophysical Society Meeting in Corpus Christi Texas after being awarded a scholarship to be recognized by the society.

### **News**

- Oil prices fell to their lowest level since December 2018 with U.S. crude back below \$50 a barrel due to reduced demand from China as a result of the coronavirus outbreak.
- In the third week of January, U.S. crude futures were trading around \$54 a barrel and expected to reduce to \$53 a barrel for the balance of 2020, and below \$51 in calendar 2021, respectively. This compares to \$64.90 in 2018 and \$57.04 in 2019 as reported by Scott DiSavino on reuters.com.

- According to Baker Hughes, U.S. oil drillers added 3 rigs in the week of Jan 24. The current rig count is 676. There were 862 active rigs in the same week a year ago.
- The number of U.S. gas rigs dropped to 115, the lowest since November 2016 as reported by Scott DiSavino on reuters.com.

### **CBGS Business**

CBGS currently has 42 active members, 4 honorary members, and 40 student members. Raised \$1,200 towards student scholarships through membership revenue.

### **CBGS workshops/talks**

CBGS will be organizing **2020 SEG Distinguished Lecture** entitled “*Automating seismic data analysis and interpretation*” by Sergey Fomel on February, 11th, 2020, from 11:30 am -12:30 pm. Sergey’s biography and abstract can be found at

<https://seg.org/Education/Lectures/Distinguished-Lectures/2020-DL-Fomel>

CBGS is also planning to host another lecture featuring Charles Puryear on March 4<sup>th</sup>, 12-1 pm. Contact Samara Omar at [Samara\\_Omar@eogresources.com](mailto:Samara_Omar@eogresources.com) for additional details about these talks.

CBGS is looking forward to offer workshops/talks in the future. Topic/speaker suggestions are welcome. Email your suggestions to [Samara\\_Omar@eogresources.com](mailto:Samara_Omar@eogresources.com) or [Subbarao.Yelisetti@tamuk.edu](mailto:Subbarao.Yelisetti@tamuk.edu)

### **Golf Tournament**

CBGS organized its annual **Golf Tournament** to fund its scholarship program in the first week of October, 2019 at Northshore Country Club. Raised ~\$1,600 for the scholarship fund.

If you are interested in our next Golf Tournament, please contact Mark Wiley at

[Mark\\_Wiley@eogresources.com](mailto:Mark_Wiley@eogresources.com)

### **New Degree Tracks at TAMUK**

- Texas A&M University-Kingsville (TAMUK) started its first cohort of MS Petrophysics program in Fall 2018. If you are interested in joining this program in Fall 2020, please contact the graduate coordinator for MS in Petrophysics, Dr. Subbarao Yelisetti at [Subbarao.Yelisetti@tamuk.edu](mailto:Subbarao.Yelisetti@tamuk.edu).
- **BS degree in Geophysics, Minor in Geophysics and Certification in Geophysics** offered at Texas A&M University-Kingsville since Fall 2017. Interested students can contact Dr. Subbarao Yelisetti ([Subbarao.Yelisetti@tamuk.edu](mailto:Subbarao.Yelisetti@tamuk.edu)) for additional information.

### **Education/Events**

#### **-SEG**

SEG 2020 annual meeting will be held in Houston, TX from Oct 11-16<sup>th</sup>. See

<https://seg.org/AM/2020/> for additional details.

See <https://seg.org/Education/Lectures/Distinguished-Lectures> for information about upcoming SEG distinguished lecture in Houston and other locations.

See <https://seg.org/Education/Lectures/Honorary-Lectures> for SEG honorary lecture locations in Texas.

**-AGU**

2020 Fall AGU annual meeting will be held in San Francisco, CA from December 7-11<sup>th</sup>, 2020.

<https://fallmeeting.agu.org/2018/future-meetings/>

**Monthly Saving**

"Progress, far from consisting in change, depends on retentiveness....Those who cannot remember the past are condemned to repeat it." --George Santayana

**Monthly Summary**

Texas Oil and Gas Info	Current Month	Last Month	Difference	
<b>Texas Production</b>	<b>MMBO/BCF</b>	<b>MMBO/BCF</b>	<b>MMBO/BCF</b>	
Oil	132.3	131.5	0.8	October
Condensate	17.6	17.6	0.0	October
Gas	799.4	802.6	-3.2	October
	<b>Current Month</b>	<b>Yr to date - 2020</b>	<b>Yr to date - 2019</b>	
<b>Texas Drilling Permits</b>	1156	1156	1215	January
Oil wells	310	310	330	January
Gas wells	61	61	72	January
Oil and Gas wells	751	751	706	January
Other	1	1	17	January
<b>Total Completions</b>	1835	1835	1809	January
Oil Completions	1459	1459	1340	January
Gas Completions	376	376	469	January
New Field Discoveries	0	0	3	January
Other	572	572	600	January

Subbarao Yeliseti  
President, CBGS

**BEER SUMMIT  
2020**



**2020 CCGS Members' Meeting  
Thursday, March 26, 6:30 pm  
Nueces Brewing Co.**

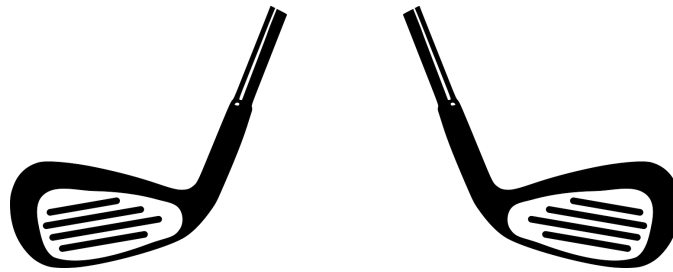
**401 Water Street – Corpus Christi  
(behind the new Marriot Hotel)**

**All members are encouraged to come to this meeting to discuss plans for the coming year and our Society's future.**

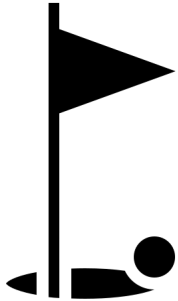
**Our 2020-21 program and activities will be based upon your participation in our Board and committees.**

**Please join us in planning our future.**

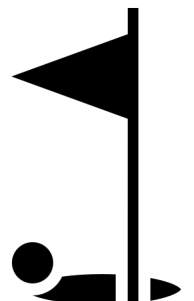
**Already ready to help?  
Email: [membership@ccgeo.org](mailto:membership@ccgeo.org)**



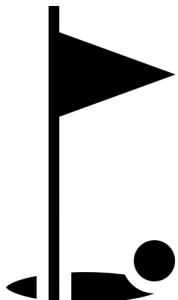
## Been to Corpus Christi lately?



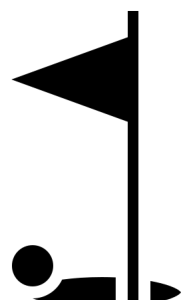
We've got golf, craft beer, museums, the aquarium, beaches, our picturesque Bayfront, and some mighty good seafood restaurants!



On April 17 - 18, 2020, enjoy all of that as you join the CCGS for a golf tournament and a pub crawl.

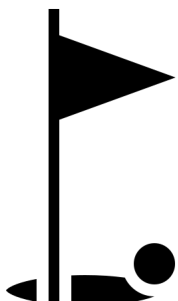


Friday the April 17<sup>th</sup> is the annual Spring Golf Tournament at North Shore Country Club. It's a fun best ball tournament on a beautiful course and every player wins a door prize!



On Saturday afternoon the "CCGS Pub Crawl" will commence. We have a chartered bus that takes us to 5 local craft breweries, where you can sample a pint at each.

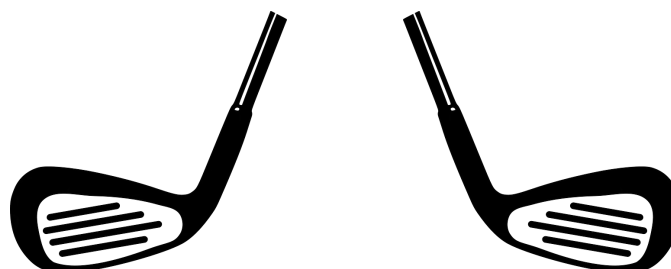
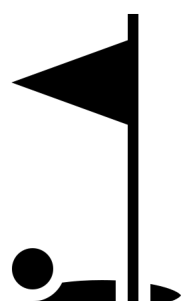
Come and join us!



For more information contact:

Golf - [fmunoz04@hotmail.com](mailto:fmunoz04@hotmail.com) and

Pub Crawl - [william.thompson426@gmail.com](mailto:william.thompson426@gmail.com)



# Corpus Christi Geological Society

## Golf Tournament

### 4-Person Scramble

April 17, 2020

12:30 p.m. Shotgun Start

At

**NorthShore Country Club**

**Portland, Texas**

*Golf*

*Prizes*

*Door Prizes*

*Beverages*

*Dinner*

Contact:

Fermin Munoz

[Fmunoz04@hotmail.com](mailto:Fmunoz04@hotmail.com)

361-960-1126



# Corpus Christi Geological Society 3rd Annual Brew Pub Crawl Saturday, April 18, 2020

## SCHEDULE

**1:00 PM TO 1:45 PM** – Meet at Railroad Seafood Station & Brewing Company,  
1214 N. Chaparral, CC, TX 78401



**1:45 pm** – Depart for Lorelei Brewing



**2:00 pm to 2:45 pm** – at Lorelei Brewing

**2:45 pm**– Depart for Lazy Beach Brewing

**3:00 to 3:45 pm** – at Lazy Beach Brewing

**3:45 pm** – Depart for B & J's Pizza & Brewpub



**4:00 to 4:45 pm** – at B & J's Pizza & Brewpub

**4:45 pm** – Depart for Nueces Brewing

**5:00 to 5:45 pm** – at Nueces Brewing

**5:45 pm** – Depart for Rebel Toad Brewing

**6:00 to 6:45 pm** – at Rebel Toad Brewing

**7:00 pm** – Return to Railroad Seafood Station & Brewing



**NUECES**  
BREWING CO.

**\$75.00 per person**, to include transportation and five  
(5) CCGS Beer Tokens



For RSVP or questions, please contact B.J. Thompson at 361-816-2326

or [william.thompson426@gmail.com](mailto:william.thompson426@gmail.com)

Mail checks to "CCGS Brewery Crawl" 8326 Salsa Dr. CC, TX 78415



# 2020 Annual Shrimp Boil

at the home of  
**Rolf and Lissa Woods**  
15934 El Socorro Loop  
Corpus Christi, TX

Saturday, March 28, 2018  
Starting at 6 pm

Boiled Shrimp or Grilled Chicken  
and all the fixin's!

RSVP by Wednesday March 25th - \$30.00 in advance  
(Money will not be taken at the door)

Please send completed form and payment  
(check payable to EA) to:

Rita Graham ~ 437 Bermuda ~  
Corpus Christi, TX 78411

Corpus Christi Geological Society,  
Coastal Bend Geophysical Society, and  
Corpus Christi Energy Auxiliary

---

Please list the names of all those attending in your group, and the number of  
chicken or shrimp plates. All plates \$30.

Names:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ Chicken Plates  
\_\_\_\_\_ Shrimp Plates  
\$ \_\_\_\_\_ Total  
\_\_\_\_\_ check number  
*payable to EA*



**COASTAL BEND GEOPHYSICAL SOCIETY  
CORPUS CHRISTI GEOLOGICAL SOCIETY**

**LUNCHEON MEETING  
ANNOUNCEMENT**

**March 4, 2020**

---

- Location:** Water Street Events (Previously the Seafood Company Restaurant (300 Block N. Water Street CC, TX 78401
- Time:** 11:30a.m.—1:00p.m.
- Cost:** \$30.00 per person—cash or check only
- Reservations:** RSVP's will be accepted to [cbgs.sseg@gmail.com](mailto:cbgs.sseg@gmail.com)
- Speaker:** Dr. Puryear. "Spectral Extrapolation and Acoustic Inversion for the Characterization of An Ultra-thin Reservoir"

Charles Puryear received MSc and PhD degrees in Applied Geophysics from the University of Houston while working as a Teaching Assistant / Research Assistant and as an intern at Hess and Shell. While completing his PhD, he worked at Lumina Geophysical on development and application of methods for high resolution inversion and attribute analysis. After graduation, he accepted a position at EMGS, where he worked on quantitative techniques for the integration of seismic, electromagnetic and petrophysical data with rock physics models. He currently focuses on algorithm design for seismic modeling, inversion, attributes and quantitative interpretation with emphasis on maximizing resolution. He believes that reliable, extremely high resolution can be achieved by combining advanced spectral extrapolation methods with machine learning; this research shows significant potential for improved delineation of hydrocarbon reservoirs both onshore and offshore.

# Spectral Geosolutions

**Charles Ian Puryear**  
Consulting Geophysicist

PO Box 541632  
Houston, TX 77254

charles@spectralgeosolutions.com  
**(281) 854-8984**

**Summary:** I am a solutions-oriented Quantitative Geophysicist / Data Scientist who views data within a holistic framework while maximizing the data contribution through the practical utilization of technical analysis tools. I am an expert in Matlab and am proficient in Python. I have experience applying processing methods and workflows to a variety of problems in exploration geophysics, including seismic inversion, modeling, attributes, spectral analysis and both geological and quantitative interpretations. I have developed joint analysis techniques for seismic and electromagnetic data and am proficient at extracting maximum value from available data using techniques for integrated analysis.

**Education:**

- **Ph.D. Geophysics, 2012**
  - University of Houston
- **M.S. Geophysics, 2006**
  - University of Houston
- **B.A. Philosophy, Minor in Environmental Sciences, 2001**
  - University of Virginia

**Experience:**

- **June, 2017- June, 2019 – Senior Research Geophysicist at Multi-Physics Technologies**
  - application and modification of Python automated machine learning algorithms using novel attribute configurations and scoring methods for well log / petrophysical properties prediction and resolution enhancement
  - development and application of Python tools for seismic / well log signal analysis and advanced plotting
  - development of Matlab libraries for seismic inversion, modeling, filtering, spectral analysis and attributes
  - Matlab development of spectral extrapolation and frequency/phase decomposition seismic attributes
  - high-resolution rock properties inversion and reservoir characterization using onshore 3D seismic data and well logs
- **Dec, 2012- June, 2016– Geophysicist at EMGS**
  - applied joint QI utilizing seismic, petrophysical and EM data for reservoir characterization - including inversion, modeling, multi-attribute properties prediction, well-seismic tie, wavelet extraction and time-depth conversion
  - using Matlab, originated and applied methods for integration of seismic and EM data, including construction of resistivity models from seismic / velocity data and impedance models from EM data using polynomial regression
  - using Python, investigated and quantified empirical rock physics relationships between acoustic and electric log data with respect to porosity and lithology effects
  - generated seismic attributes (structure and stratigraphy) and performed seismic interpretation / prospect generation for integrated interpretation projects
  - executed 2.5D/3D EM inversion and sensitivity studies for client projects
- **Feb, 2010- Oct, 2012 – Geophysicist at Lumina Geophysical**
  - using Matlab, developed and supported internal software modules for seismic attribute and inversion processes, facilitated technology transfer from R&D to operations group
  - developed attribute and inversion workflows and completed projects for clients using those workflows for both post-stack and pre-stack seismic data
  - executed seismic reservoir characterization and quantitative interpretation projects, comprising data loading and quality control, seismic data conditioning (post-stack and pre-stack) using structural noise filters, wavelet extraction and frequency/phase calibration, seismic tie to well logs for time-depth calibration, spectral decomposition, multi-attribute analysis and inversion, extended resolution seismic inversion on post-stack, pre-stack, and modeled seismic data, AVO modeling and pre-stack inversion, reservoir properties prediction, horizon mapping and volume visualization, well log interpretation of pay signatures in conjunction with seismic data, integration of reservoir characterization studies for prospect generation and maturation
  - created publications and generated technical marketing materials
- **May, 2009 - Aug, 2009 – Intern at Shell E&P**
  - using Matlab, applied seismic attributes for carbonate / clastic characterization on Brazil team
- **May, 2008 - Aug, 2008 - Intern at Shell BTC**
  - using Matlab, developed rock physics models and acoustic tomography experiments to calibrate laboratory measurements - work resulted in proposals for novel hardware and software implementations
- **Fall, 2007, Spring, 2008 – Teaching Assistant**
  - delivered Structural Geology lab lectures and helped guide and facilitate field trips as part of my role in Structural Geology (20 hours/week); tutored and graded for Intro to Geophysics and Structural Geology

- **May, 2007 - Aug, 2007 - Intern at Shell BTC**
  - using Matlab, developed principal component attributes for Unconventional Traps team with emphasis on detection of subtle stratigraphic features
- **Spring, 2007, Teaching Assistant**
  - instructed Geologic Field Methods lab with extensive mapping exercises and field training in Mexico
- **May, 2006 - Aug, 2006- Intern at Shell E&P**
  - mapped and evaluated amplitude DHI's for GOM Exploration over 20,000 sq. km of 3D seismic data
- **Fall, 2005, Spring, 2006 - Research Assistant**
  - using Matlab, researched seismic attribute and inversion methods for reservoir characterization
- **Summer, 2005 - Intern at Hess Corporation**
  - applied salt tectonic analysis and subsalt interpretation to improve velocity model for reprocessing

#### Refereed Publications:

- **Puryear, C. I., O. N. Portniaguine, C. M. Cobos and J. P. Castagna, 2012**, Constrained least-squares spectral analysis: application to seismic data: *Geophysics*, **77**, V143-V167. <https://doi.org/10.1190/geo2011-0210.1>
- **Puryear, C. I. and J. P. Castagna, 2008**, Layer thickness determination and stratigraphic interpretation using spectral inversion: theory and application: *Geophysics*, **73**, R37-R48. <https://doi.org/10.1190/1.2838274>

#### Other Selected Publications:

- **Puryear, C.I. and A. Pant, 2019**, Improved Reservoir Delineation in Complex Geological Settings Using CLSSA: a Case Study from Offshore Nova Scotia: 81<sup>st</sup> European Association of Geoscientists and Engineers (EAGE) Extended Abstracts DOI: [10.3997/2214-4609.201900687](https://doi.org/10.3997/2214-4609.201900687)
- Leiceaga, G. G. and **C.I. Puryear, 2019**, Spectral extrapolation and acoustic inversion for the characterization of an ultra-thin reservoir: 89<sup>th</sup> Annual International Meeting of the Society of Exploration Geophysicists Expanded Abstracts <https://doi.org/10.1190/segam2019-3209484.1>
- **Puryear, C. I., J. Rasmussen, L., Sanchez, R. Walker, R. Reddig and L. Lorenz, 2016**, Background Resistivity Prediction from Seismic Velocities: 78<sup>th</sup> European Association of Geoscientists and Engineers (EAGE) Conference and Exhibition Extended Abstracts DOI: [10.3997/2214-4609.201600944](https://doi.org/10.3997/2214-4609.201600944)
- **Puryear, C. I., J. P. Castagna, O. N. Portniaguine, and C. Cobos, 2012**, Constrained least-squares spectral analysis: application to seismic data: 82<sup>nd</sup> Annual International Meeting of the Society of Exploration Geophysicists Expanded Abstracts <https://library.seg.org/doi/abs/10.1190/segam2012-0822.1>
- Tai, S., **C.I. Puryear** and J. P. Castagna, **2009**, Local frequency as a direct hydrocarbon indicator: 79<sup>th</sup> Annual International Meeting of the Society of Exploration Geophysicists Expanded Abstracts. <https://doi.org/10.1190/1.3255284>
- **Puryear, C. I., S. Tai, J. P. Castagna, R. Masters and F. Dwan, 2008**, Comparison of frequency attributes from CWT and MPD spectral decompositions of a complex turbidite channel model: 78<sup>th</sup> Annual International Meeting of the Society of Exploration Geophysicists Expanded Abstracts. <https://doi.org/10.1190/1.3054830>
- **Puryear, C. I. and J.P. Castagna, 2006**, An algorithm for calculation of bed thickness and reflection coefficients from amplitude spectrum: 77<sup>th</sup> Annual International Meeting of the Society of Exploration Geophysicists Expanded Abstracts. <https://doi.org/10.1190/1.2369866>

#### Software Proficiency:

- Matlab (12 years), Python (3 years), Petrel (5 years), Hampson-Russell (5 years), DUG Insight (2 years), GeoTeric (2 years), Word, Excel, PowerPoint

#### Professional Growth & Service:

- Geophysics (SEG peer-reviewed publication) reviewer – 2012-2018

#### Awards and Honors:

- **University of Houston**
  - Outstanding Teaching Assistant - 2008
  - Houston Geological Society Dobrin Outstanding Student - 2007
  - University of Houston Outstanding Geophysical Graduate Student – 2007
- **Society of Exploration Geophysicists**
  - 1<sup>st</sup> place SEG Challenge Bowl Finals San Antonio, 2007
  - 1<sup>st</sup> place Gulf Coast SEG Challenge Bowl, 2007



# Corpus Christi Geological Society

## Summer/Fall 2020 Semester

(Must be postmarked by March 22, 2020)

## Scholarship Application Guidelines

1. Applicant must be majoring in Earth Sciences and enrolled for the award semester (i.e. Summer/Fall 2020) at a college in the local area. Applicant must be a member of the Corpus Christi Geological Society.
2. Priority consideration will be given to students attending field camp this summer; then to undergraduates.
3. Fill out the application form clearly, completely, and sign it.
4. Short essay clearly explaining how this scholarship will assist you in achieving your geologic career goals and the reasons your application should be considered by the Committee.
5. One Faculty recommendation – Form attached.
6. Applicant must provide a transcript from current school. Please make sure it has your name on it. A web printout is acceptable.
7. **Applications must be postmarked by: March 22, 2020**  
Application packet may be emailed in a shareable format (i.e. pdf, docx, etc) to [bissells@swbell.net](mailto:bissells@swbell.net). *If you want to email your application – contact me for the order of documents submitted.*

Mail completed application to: Dawn Bissell, CCGS Scholarship Committee, 253 Circle Drive, Corpus Christi, TX 78411

Send an email to [bissells@swbell.net](mailto:bissells@swbell.net) once you've mailed your application. We need **YOUR** email address. *Award notifications will be sent via email!!!*

Please read requirements carefully and submit only complete applications. Applicants who have received a CCGS scholarship in the past are eligible to apply again.

Scholarships will be awarded based on merit and need. The award amounts may vary with the minimum individual award being \$500.

Award recipients will be recognized at the monthly luncheon on April 15, 2020 and are encouraged to attend.

Board Members:

Dawn Bissell      Austin Nye - CCGS President      Brent Hopkins - Treasurer  
BJ Thompson, Sebastian Wiedmann, Casey Mibb



# Corpus Christi Geological Society

Summer/Fall 2020 Semester

(Must be postmarked by March 22, 2020)

## Scholarship Application

Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_

Mailing address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

**Active Email:** \_\_\_\_\_

*Award notifications will be sent via email!!! Email [bissells@swbell.net](mailto:bissells@swbell.net) once you've submitted your application. I need **YOUR** email address.*

Daytime Phone: \_\_\_\_\_ Alternate Phone: \_\_\_\_\_

University Attending in Summer/Fall 2020: \_\_\_\_\_

Department: \_\_\_\_\_ Major: \_\_\_\_\_

Scholarship is for class level (circle one):

Freshman    Sophomore    Junior    Senior    Graduate Student

Total Hours Completed: \_\_\_\_\_ Overall GPA (Minimum 2.5): \_\_\_\_\_

Total Hours - Geology: \_\_\_\_\_ Geology GPA (Minimum 3.0) \_\_\_\_\_

Hours Planned for Scholarship Semester: \_\_\_\_\_ Geology Hours: \_\_\_\_\_

Will this scholarship be used toward field camp?      Yes      No

Prior recipient of CCGS Scholarship?      Yes      No

Are you a student member of CCGS?      Yes      No

(If no, email [membership@ccgeo.org](mailto:membership@ccgeo.org) with your contact information. Must be a member of CCGS.)

Applicant Signature \_\_\_\_\_ Date \_\_\_\_\_

Mail application, along with essay, faculty recommendation form, and transcript to:  
Dawn Bissell, CCGS Scholarship Committee, 253 Circle Drive,  
Corpus Christi, TX 78411. Application **must be postmarked by March 22, 2020**

**Email [bissells@swbell.net](mailto:bissells@swbell.net) once you've mailed your application.**

**Award notifications will be made via email!!!**



Corpus Christi Geological Society  
Summer/Fall 2020 Semester  
(Must be postmarked by March 22, 2020)  
Faculty Recommendation Form

Student's Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_

University Currently Attending: \_\_\_\_\_

Faculty Name: \_\_\_\_\_

Do you recommend this student for this scholarship? Yes      No

Comments:

---

Faculty Signature

Date

---

University

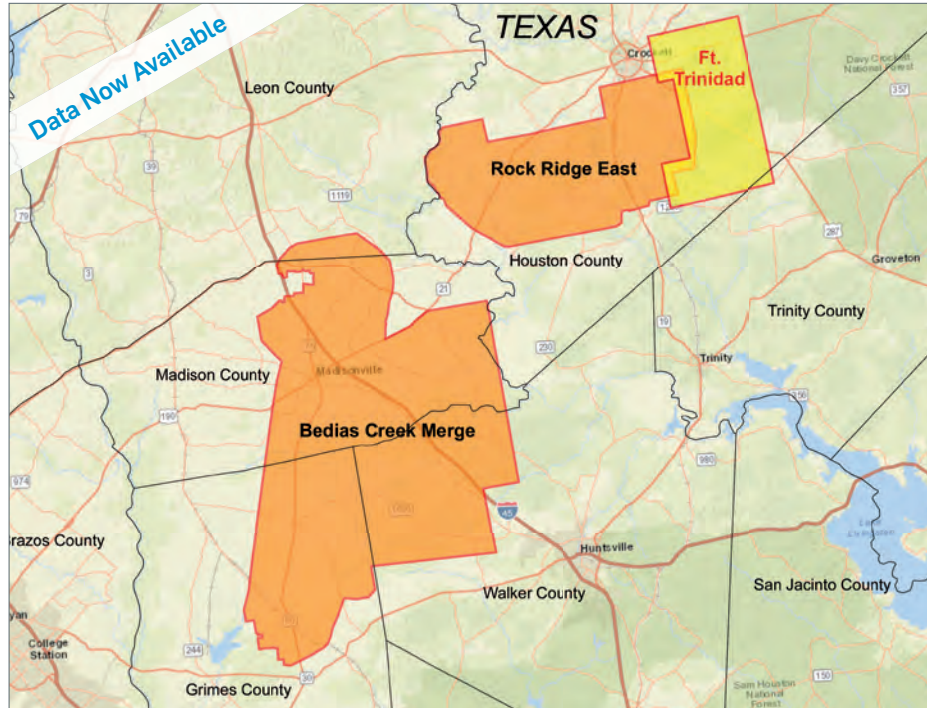
Mail/Email **by March 22, 2020**.to Dawn Bissell, CCGS Scholarship Committee  
253 Circle Drive, Corpus Christi, TX 78411 Email [bissells@swbell.net](mailto:bissells@swbell.net)





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# **Spectral extrapolation and acoustic inversion for the characterization of an ultra-thin reservoir**

Gorka Garcia Leiceaga

Charles Puryear



September 17, 2019

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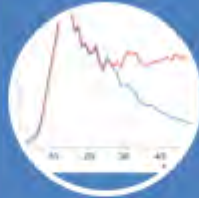
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- Evaluate Spectral Extrapolation (SE) method
- Reservoir characterization
  - Part of a downthrown, three-way closure
  - Environment of deposition – fluvio-deltaic sands/shales
  - Salt dome nearby



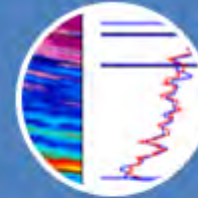
### Seismic Conditioning

- Noise attenuation
- Gather flattening
- Signal processing



### Spectral Extrapolation

- Spectral inversion
- Frequency domain operator



### Seismic Inversion

- Wavelet extraction
- Prior model
- Acoustic impedance



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- **Current methods available for boosting seismic frequencies post migration include:**
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  - **SE can boost frequencies within the input seismic band**
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  - **Constrain it to match the input seismic**

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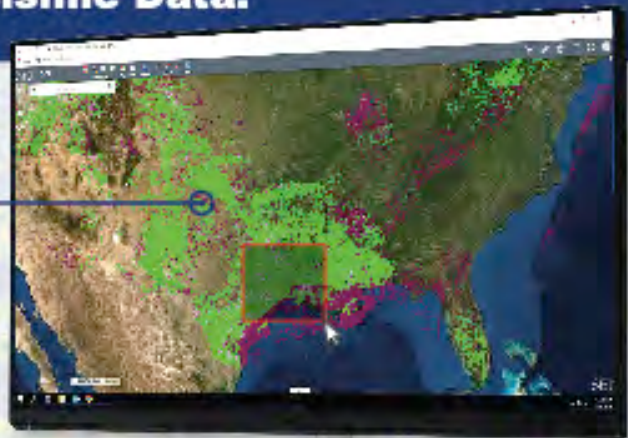
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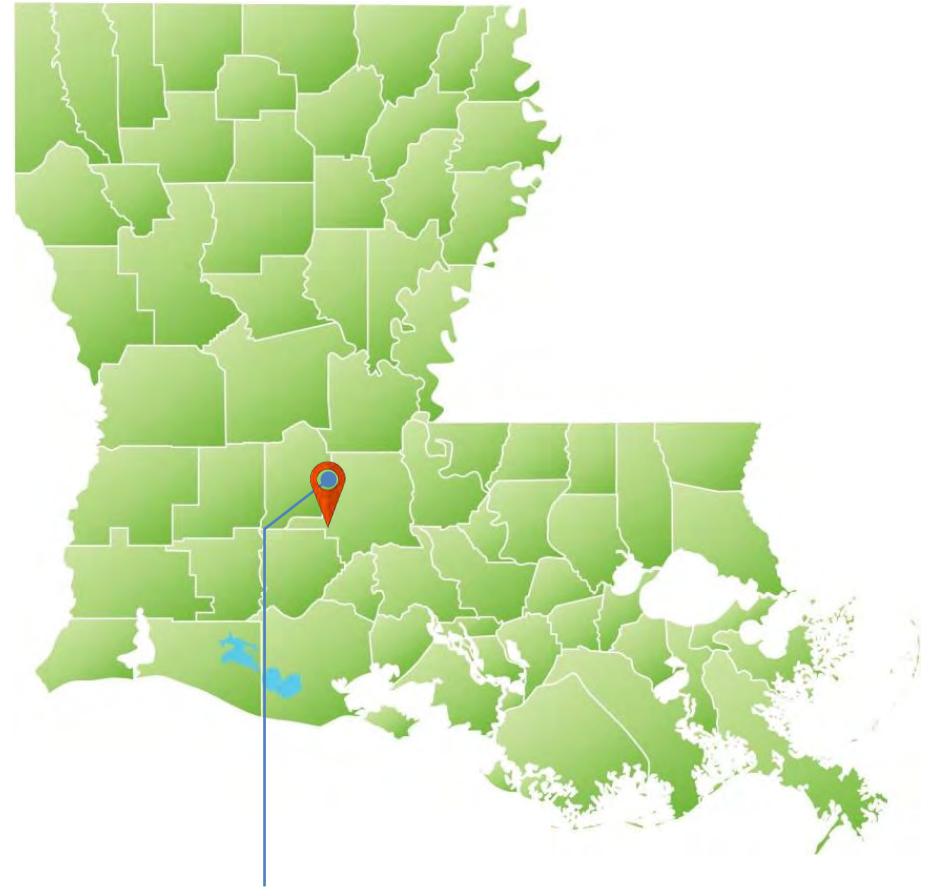


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45  
years  
1973-2018

- Well was drilled in 2004
- Two reservoirs
- TVD ~ 15,000 ft.
- During the recompletion, the operator lost tools in the hole and subsequent fishing operations resulted in catastrophic collapse of the casing



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**Austin Office:**

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512.457.8711

Contact: Bill Walker, Jr.

[bwalker@stalkerenergy.com](mailto:bwalker@stalkerenergy.com)

**Houston Office:**

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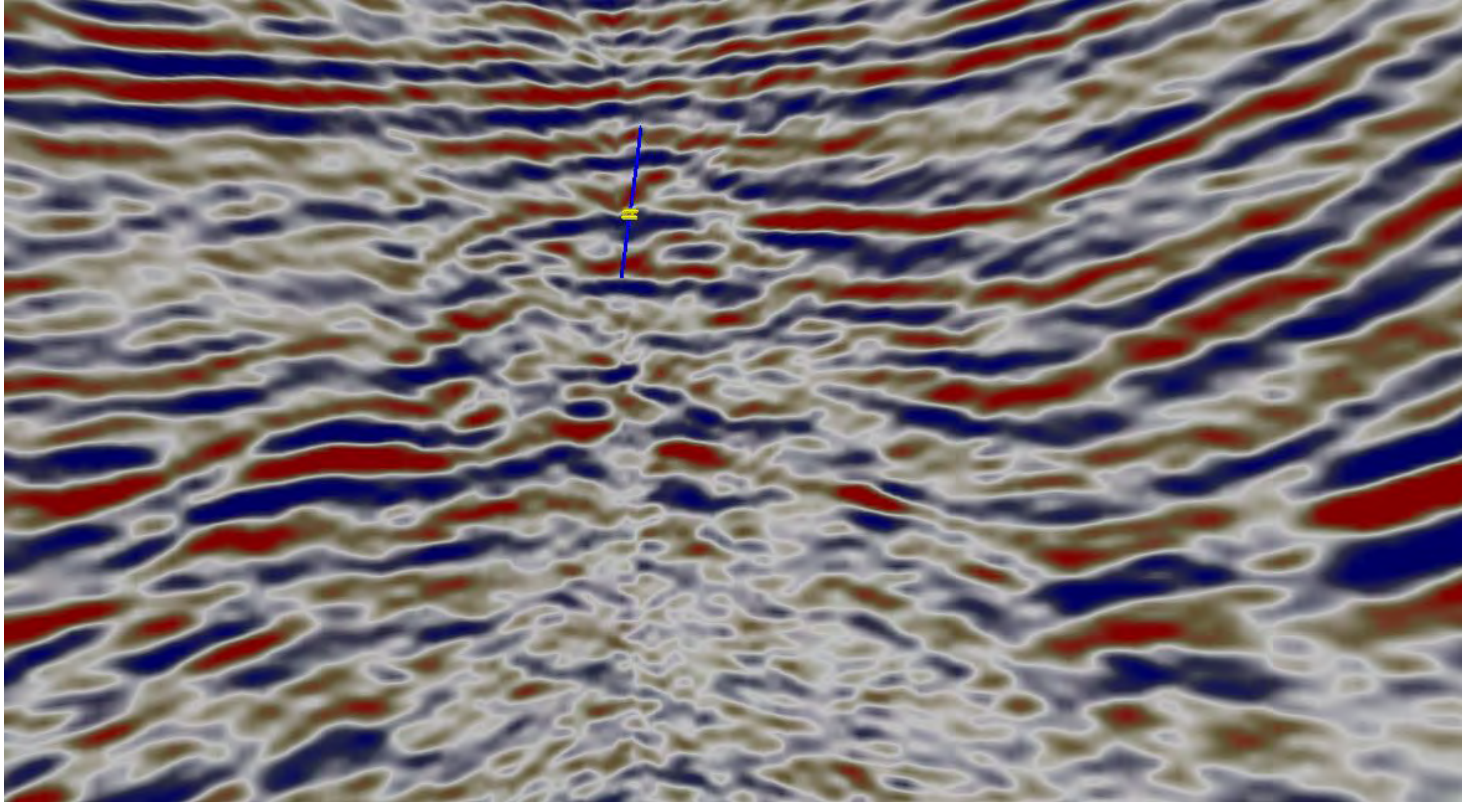
Houston, Texas 77019

713.522.2733

Contact: Todd Sinex

[tsinex@stalkerenergy.com](mailto:tsinex@stalkerenergy.com)

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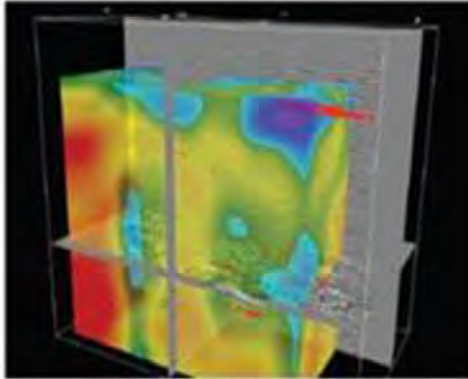


- Conventional seismic displayed
- Well trajectory shown in blue with top/base of reservoir

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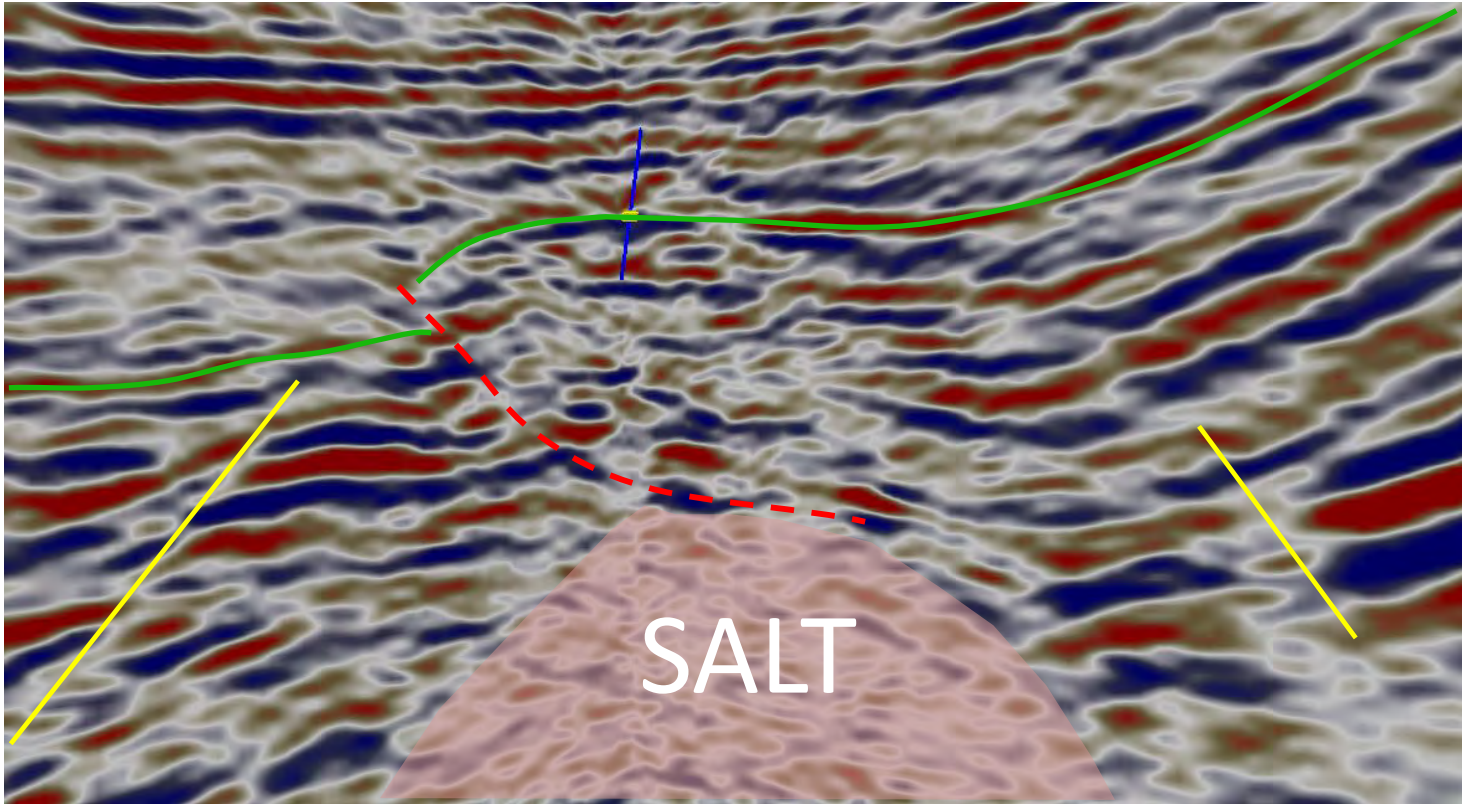
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- Salt behaves as a detachment surface, forming a thrust fault

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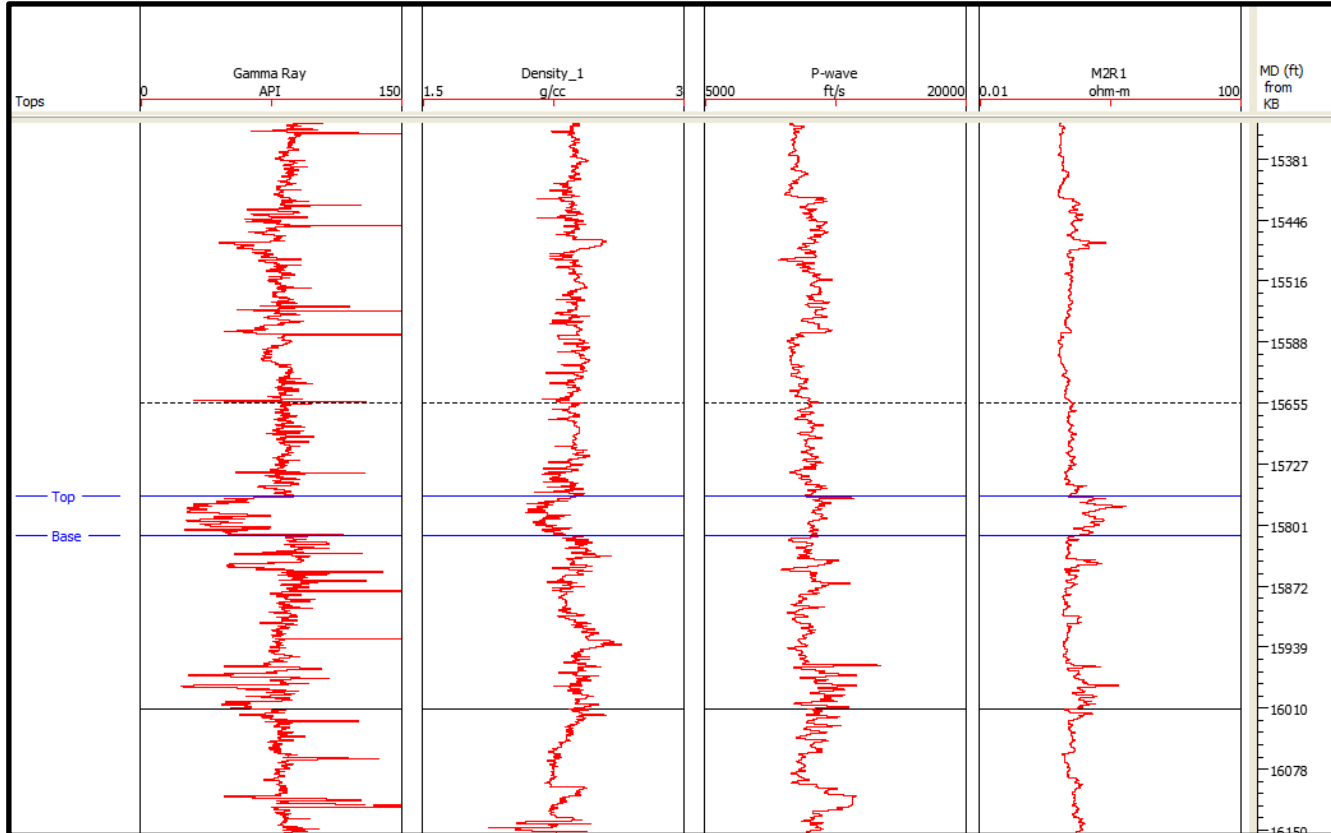
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- Receive critical updates and information about the energy industry.
- Enhance communication and leadership skills.
- Make friends for life!

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- Reservoir thickness = 27 ft.
- Gas-charged

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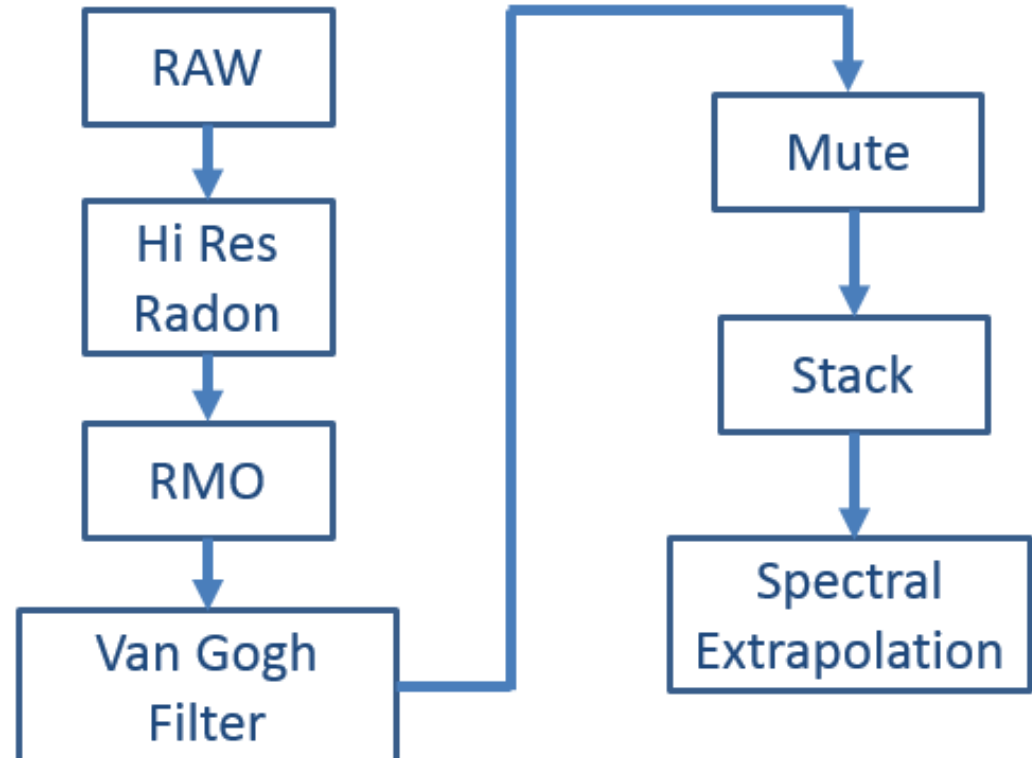
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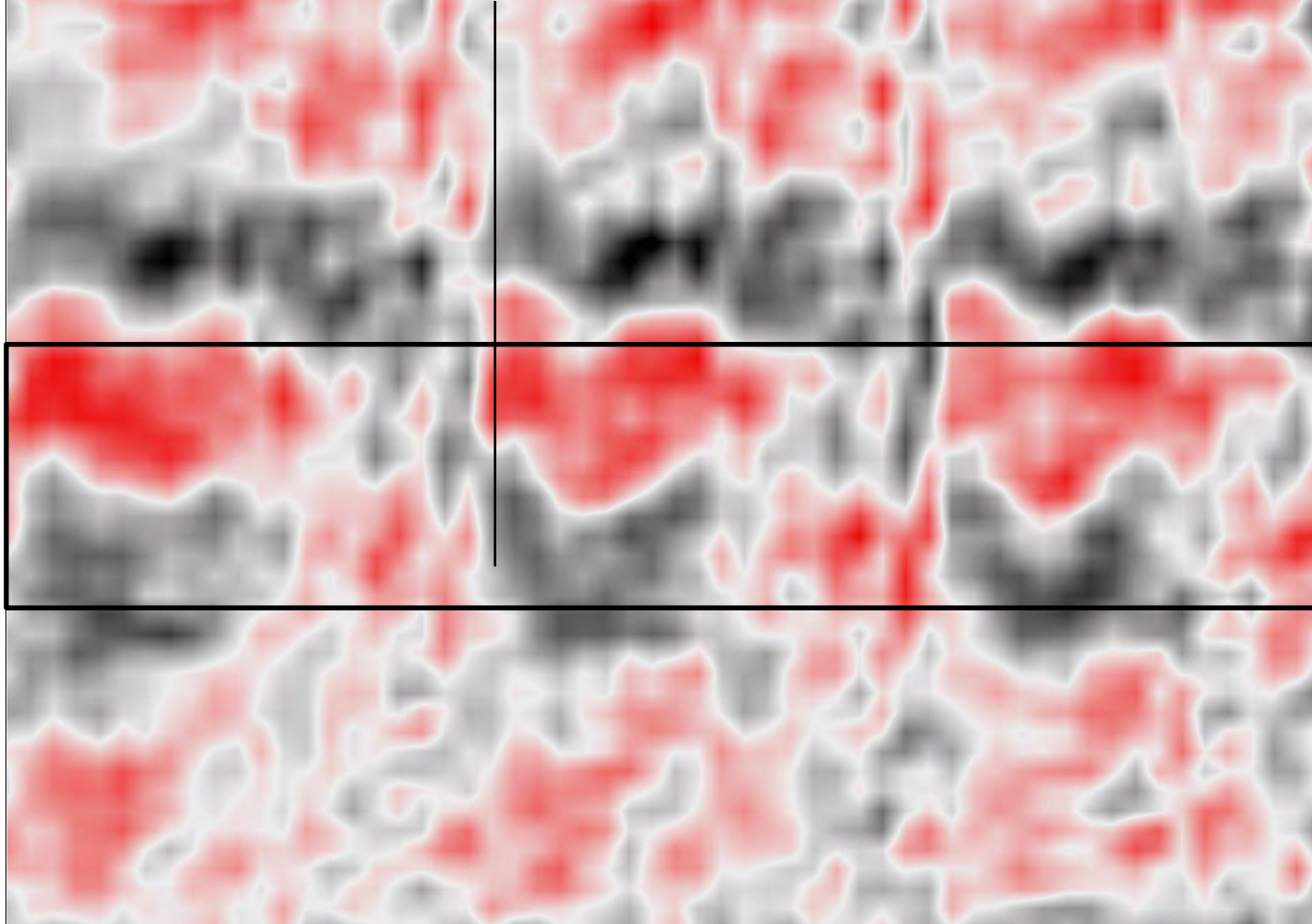
## Goals

- Reduce incoherent noise and remove internal multiples
- Align data prior to stacking
- Increase S/N ratio in preparation for spectral extrapolation

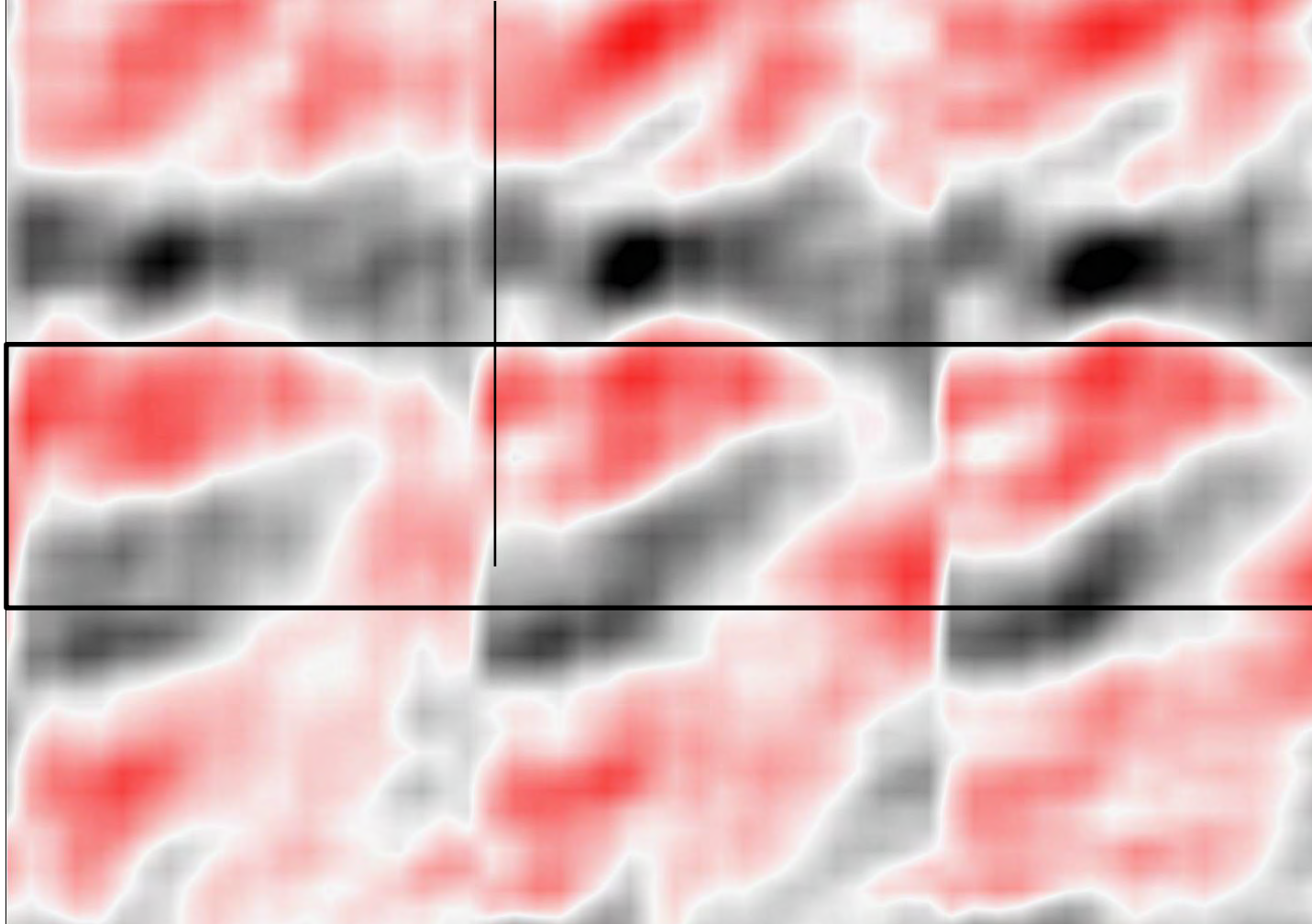
## Workflow





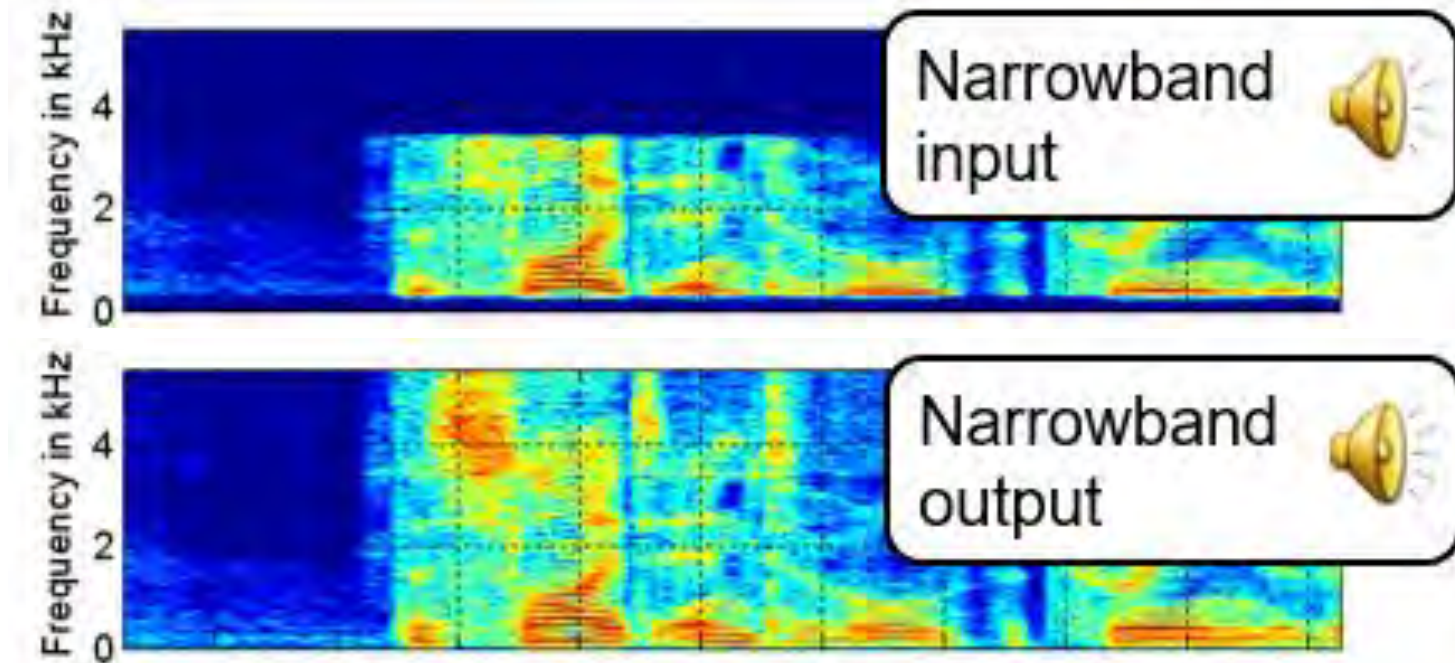


**RAW Gathers**

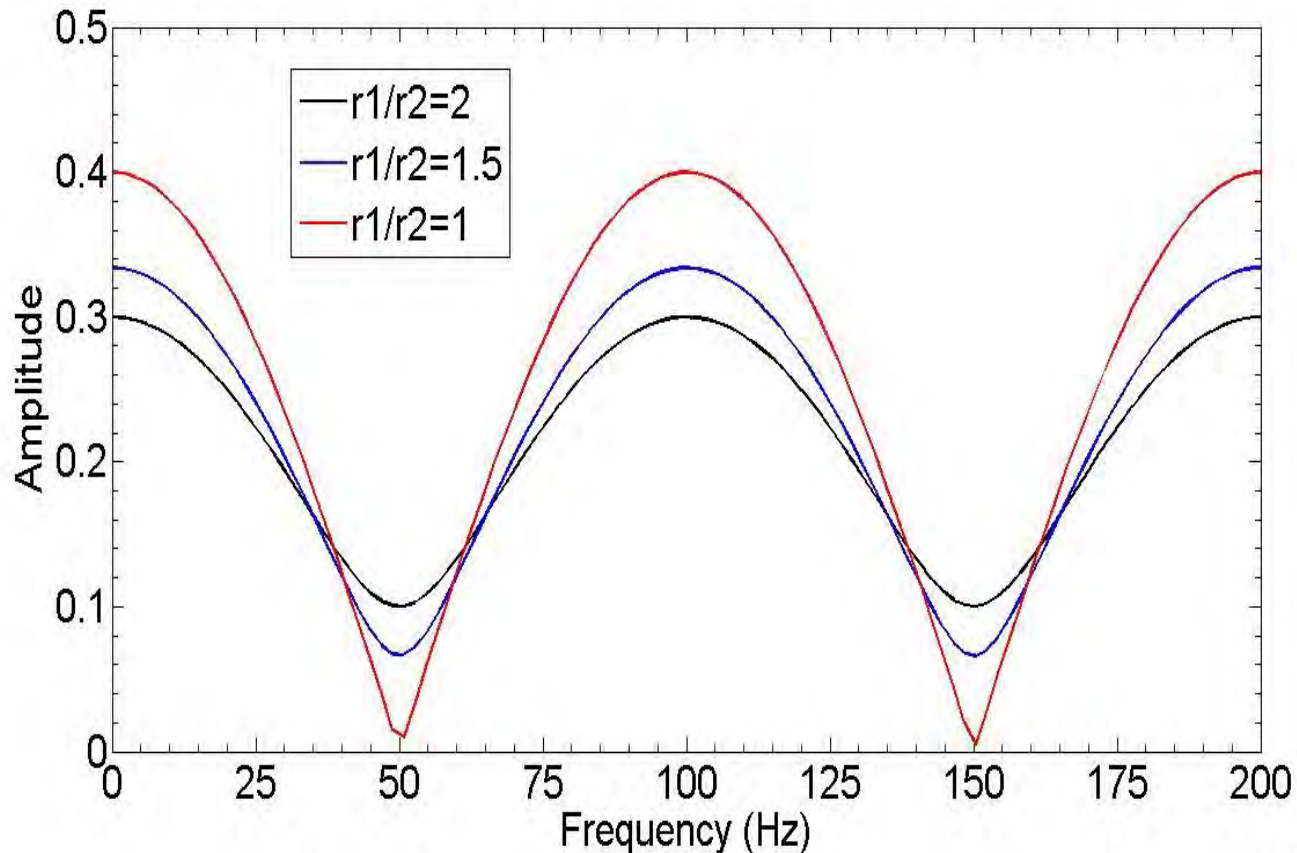


**Conditioned Gathers**

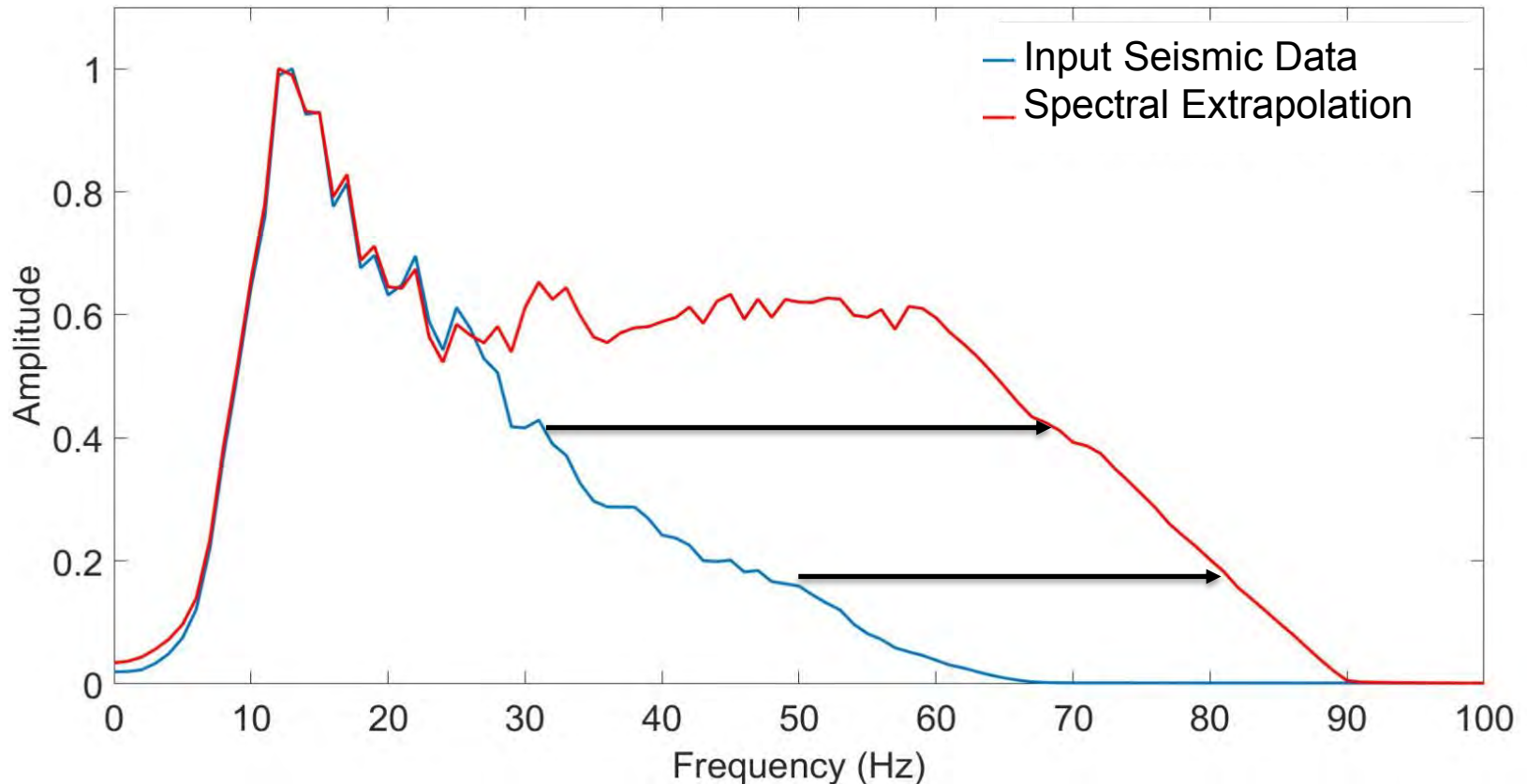
# Bandwidth Extension



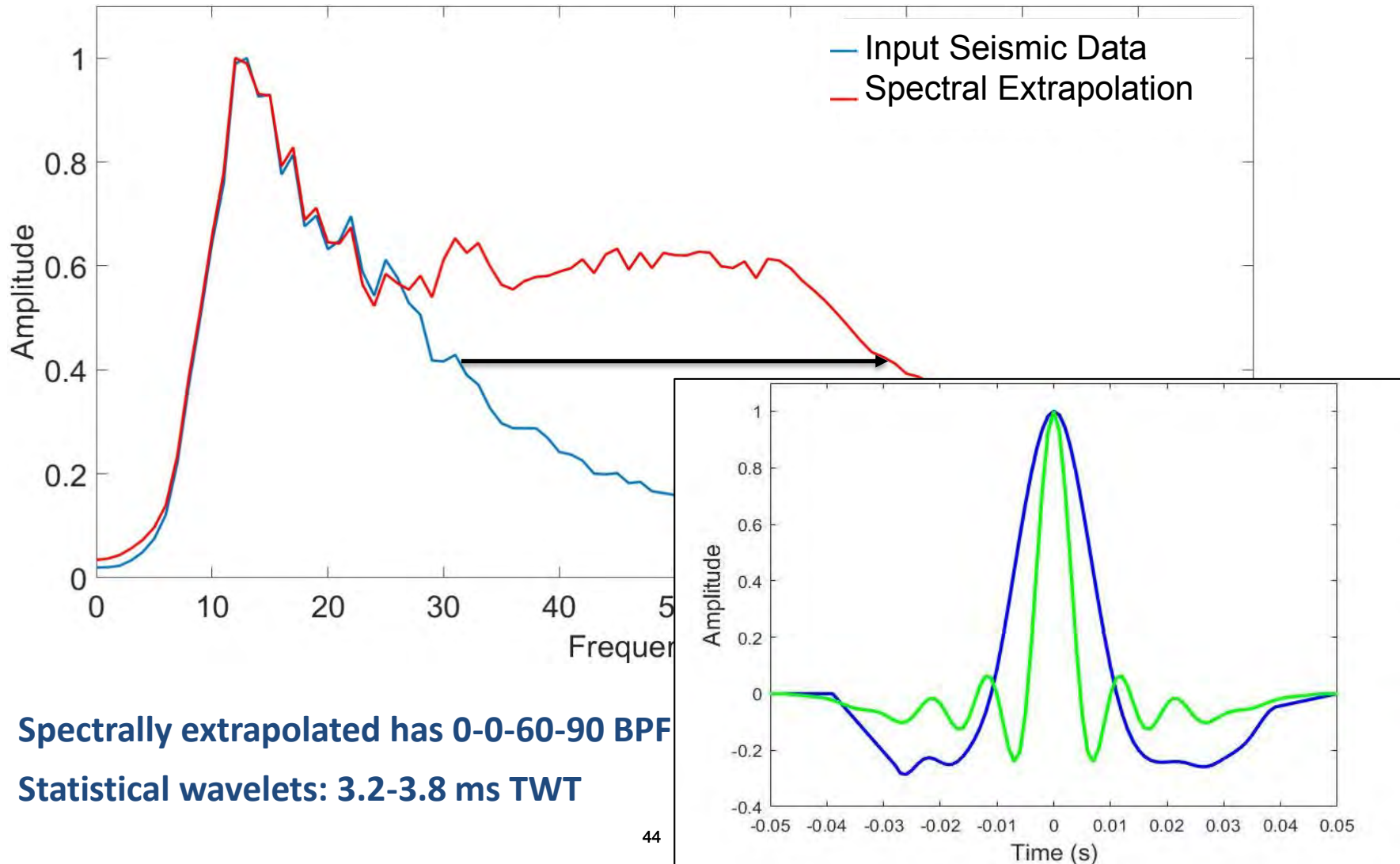
- **Bandwidth Extension is an established practice: communications and audio/speech enhancement fields**
- **Our Spectral Extrapolation (SE) method is a type of Bandwidth Extension that uses a priori seismic constraints**
- **Geophysicists have yet to fully appreciate the potential benefits of bandwidth extension**



- Frequency domain single layer response (no wavelet) with varying reflectivity ratios
- Connection between low and high frequencies
- Thickness of layer  $\sim$  to spacing between notches

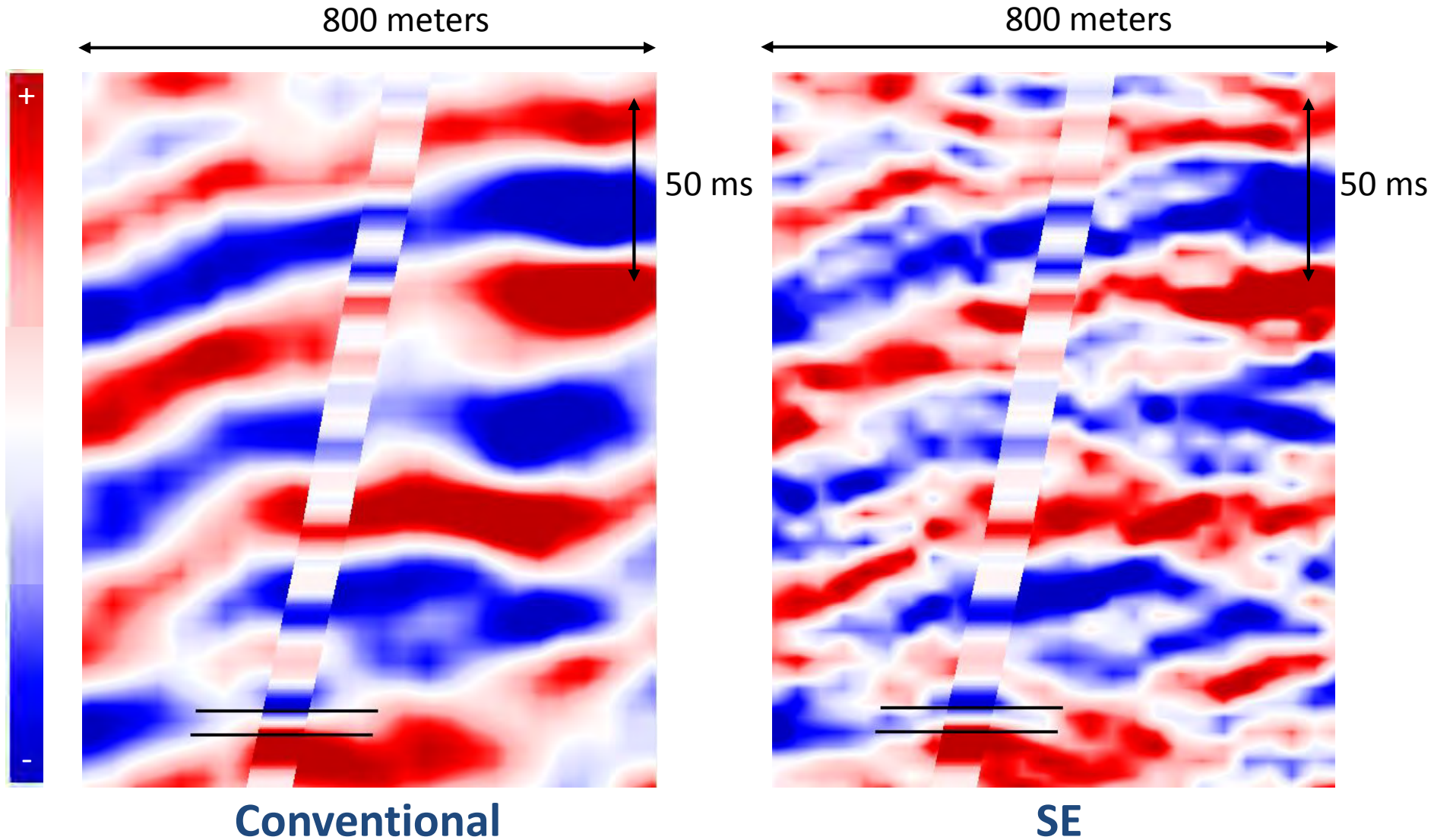


- Spectrally extrapolated data has 0-0-60-90 BPF
- Not possible to recover all high frequencies in the presence of noise and wavelet estimation errors - objective is to find the optimal spectral extrapolation limit

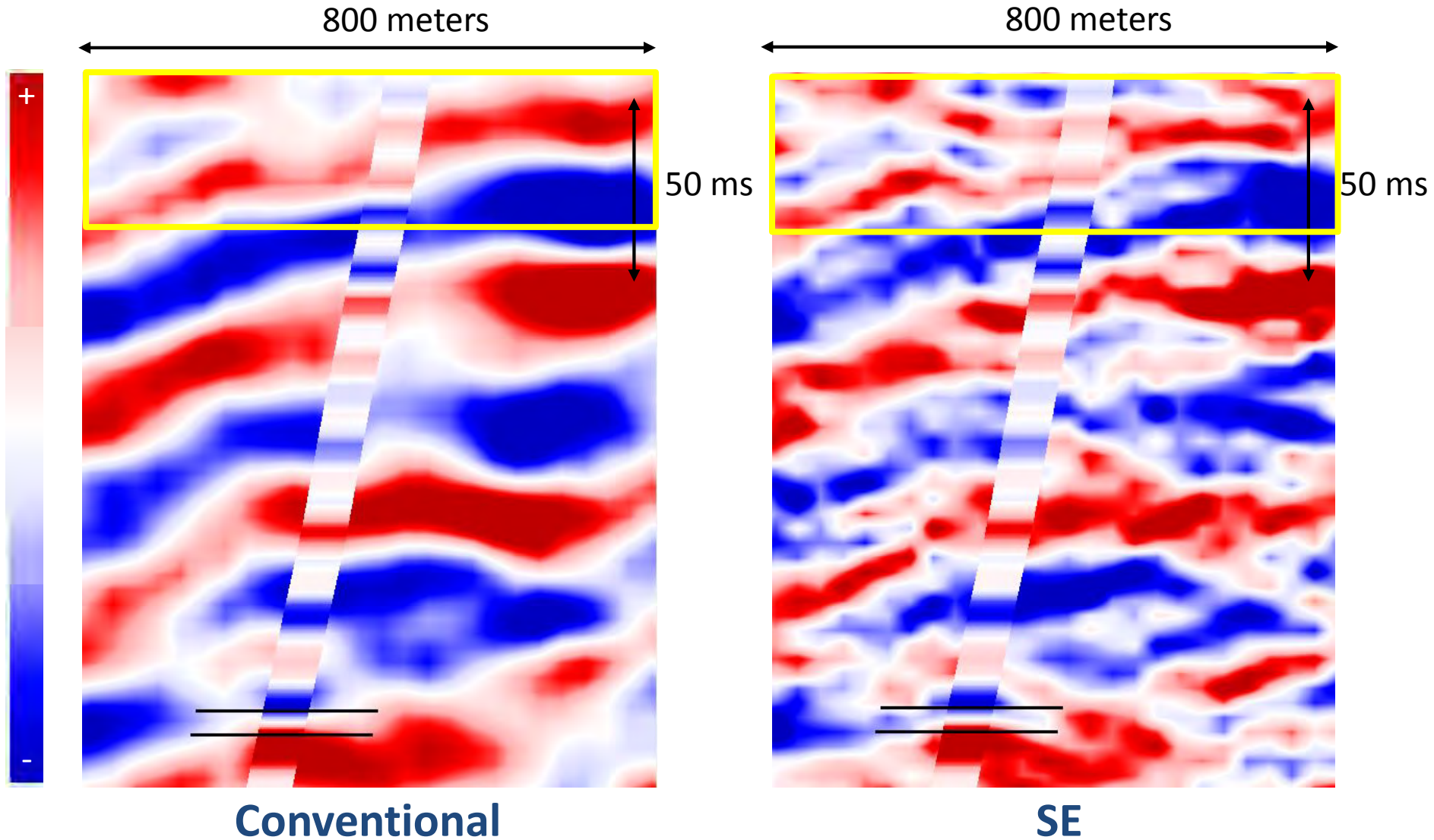


- Spectrally extrapolated has 0-0-60-90 BPF
- Statistical wavelets: 3.2-3.8 ms TWT

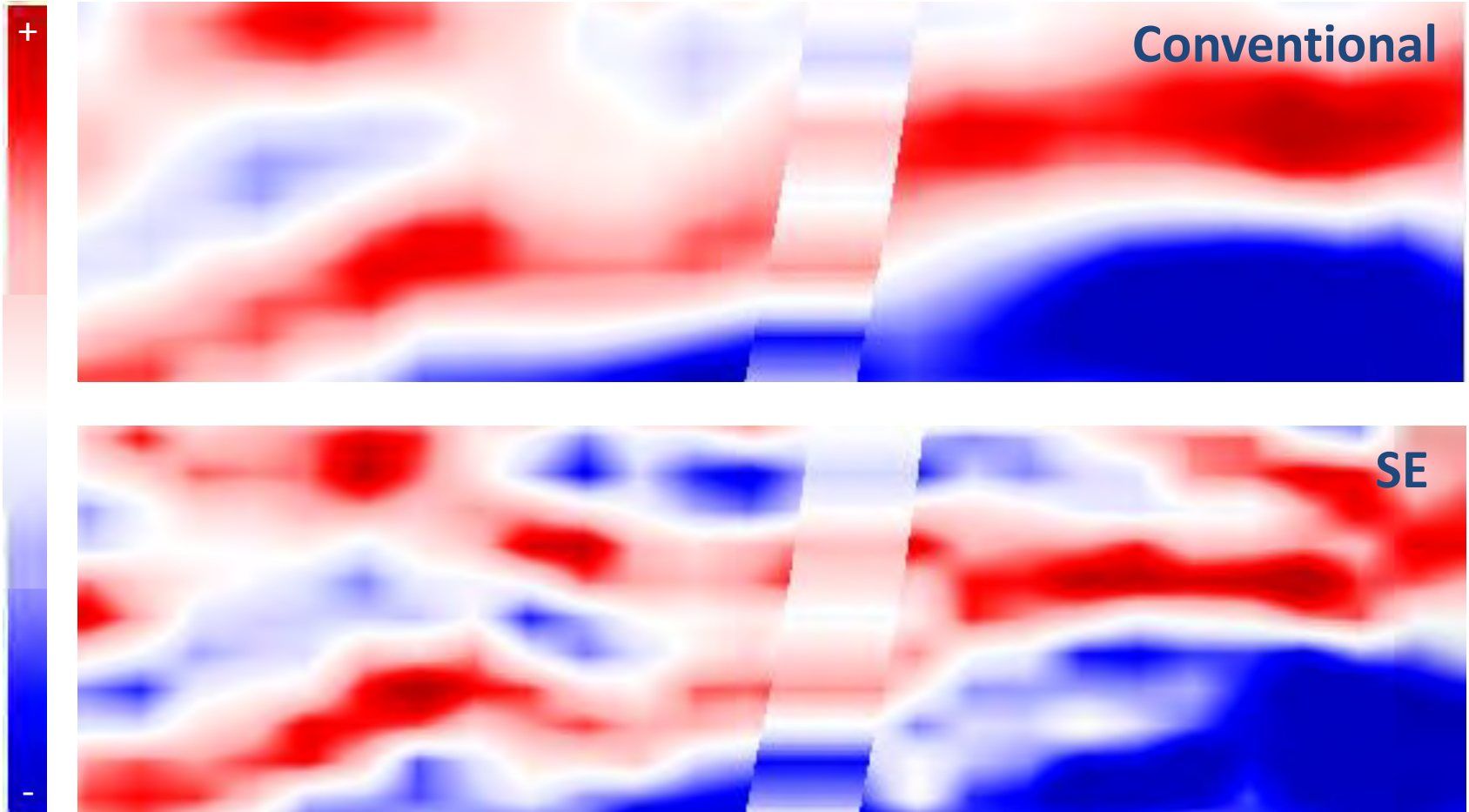
# Seismic Comparison



# Seismic Comparison

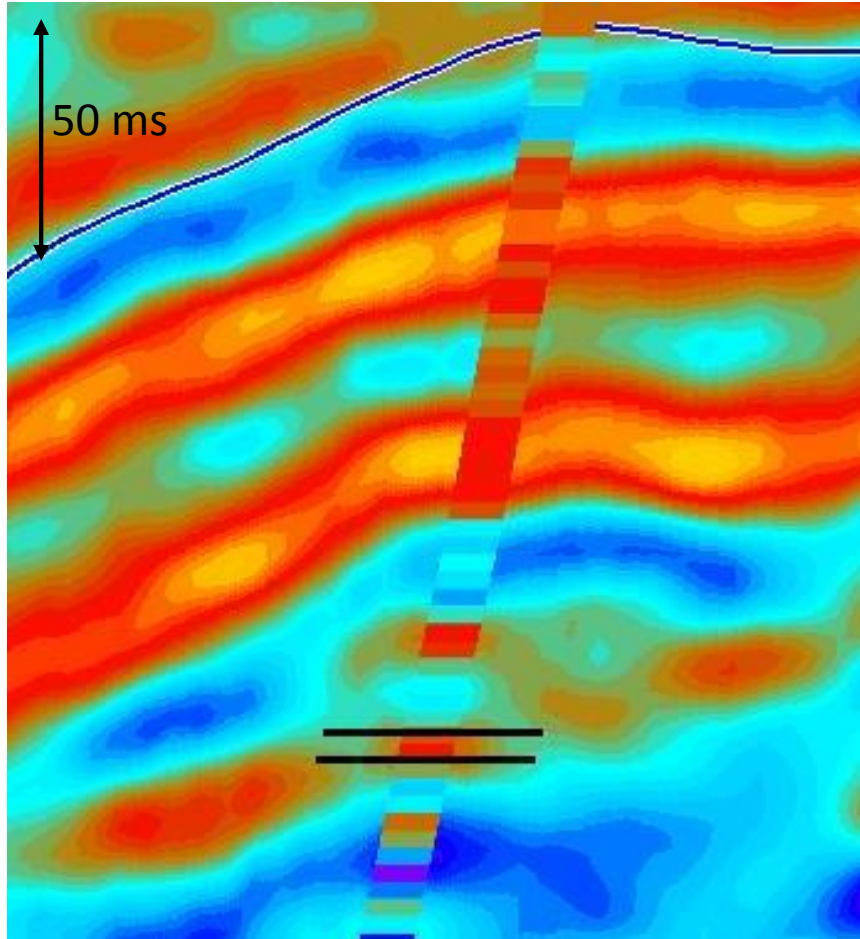




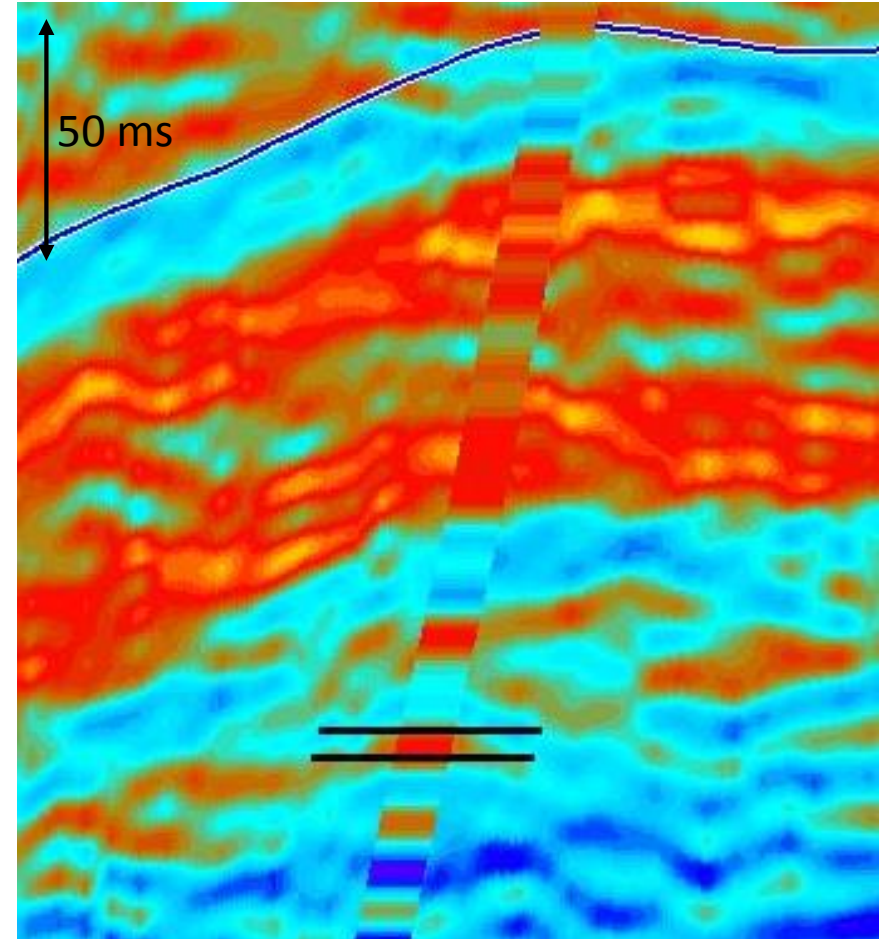


# Inversion Comparison

Acoustic impedance (4ms)



Hi-Def Acoustic Impedance (1 ms)



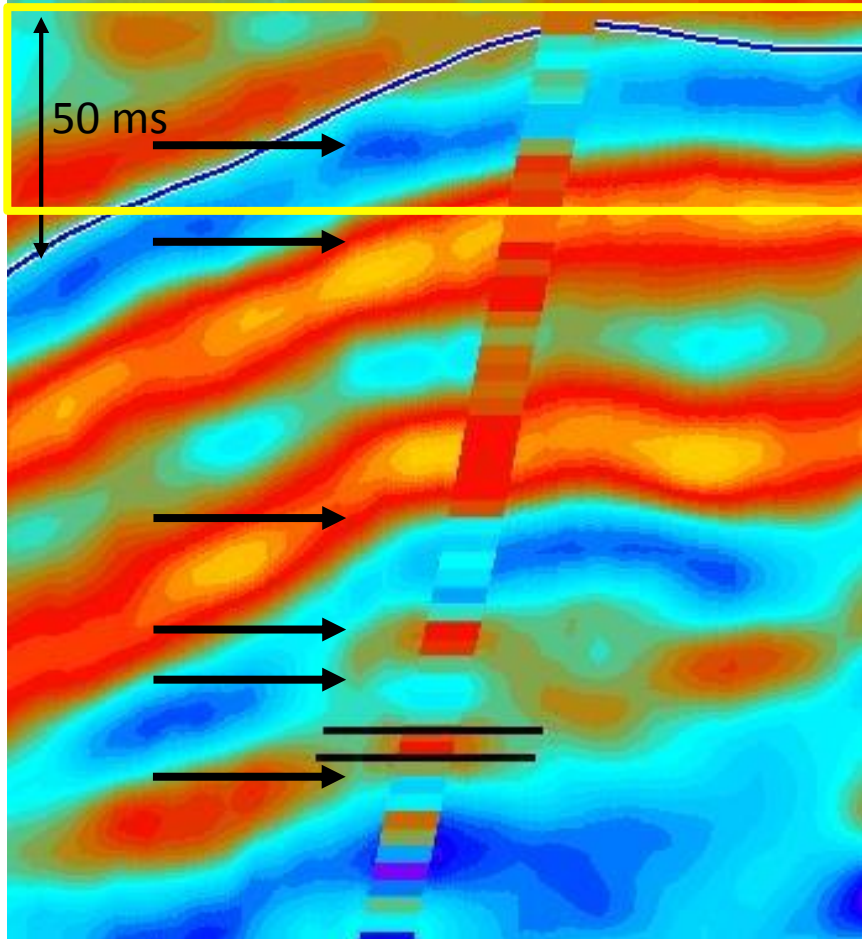
17,000

ft/s x g/cc

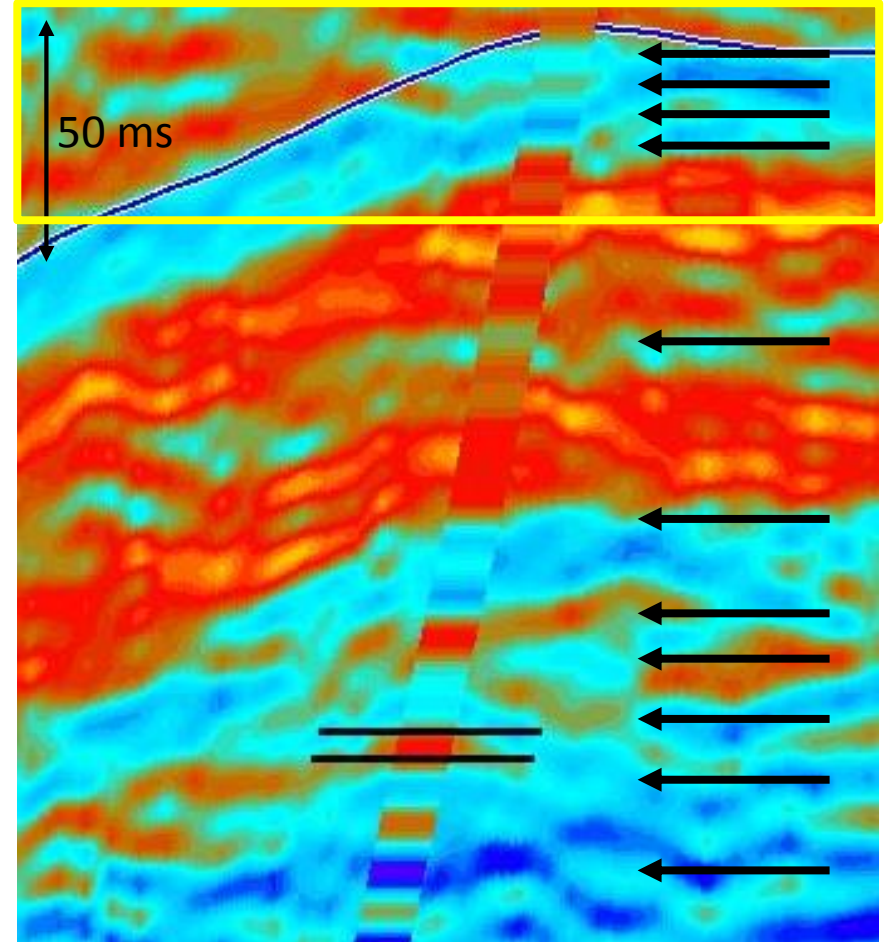
31,000



### Acoustic impedance (4ms)



### Hi-Def Acoustic Impedance (1 ms)



6

17,000

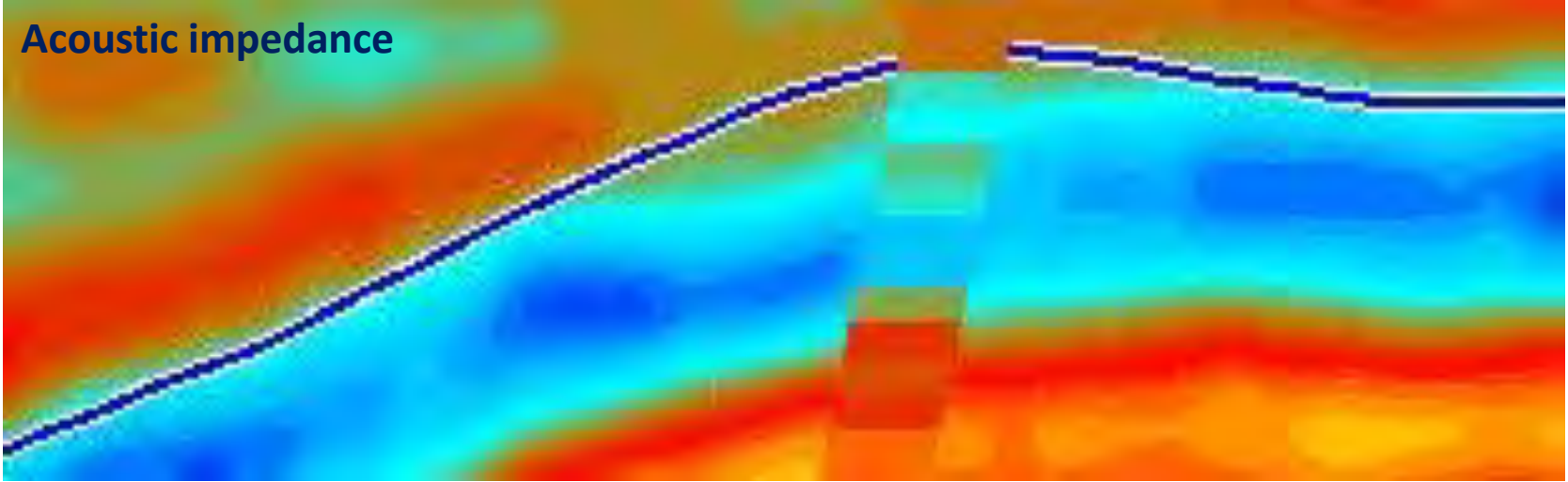
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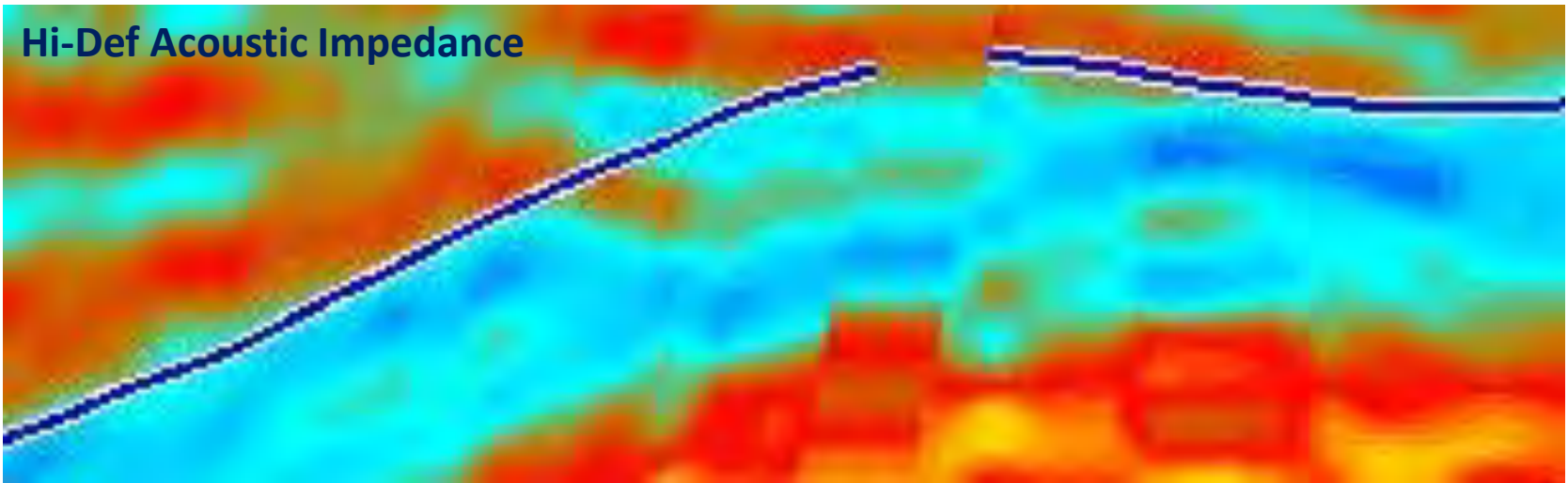


11

Acoustic impedance



Hi-Def Acoustic Impedance

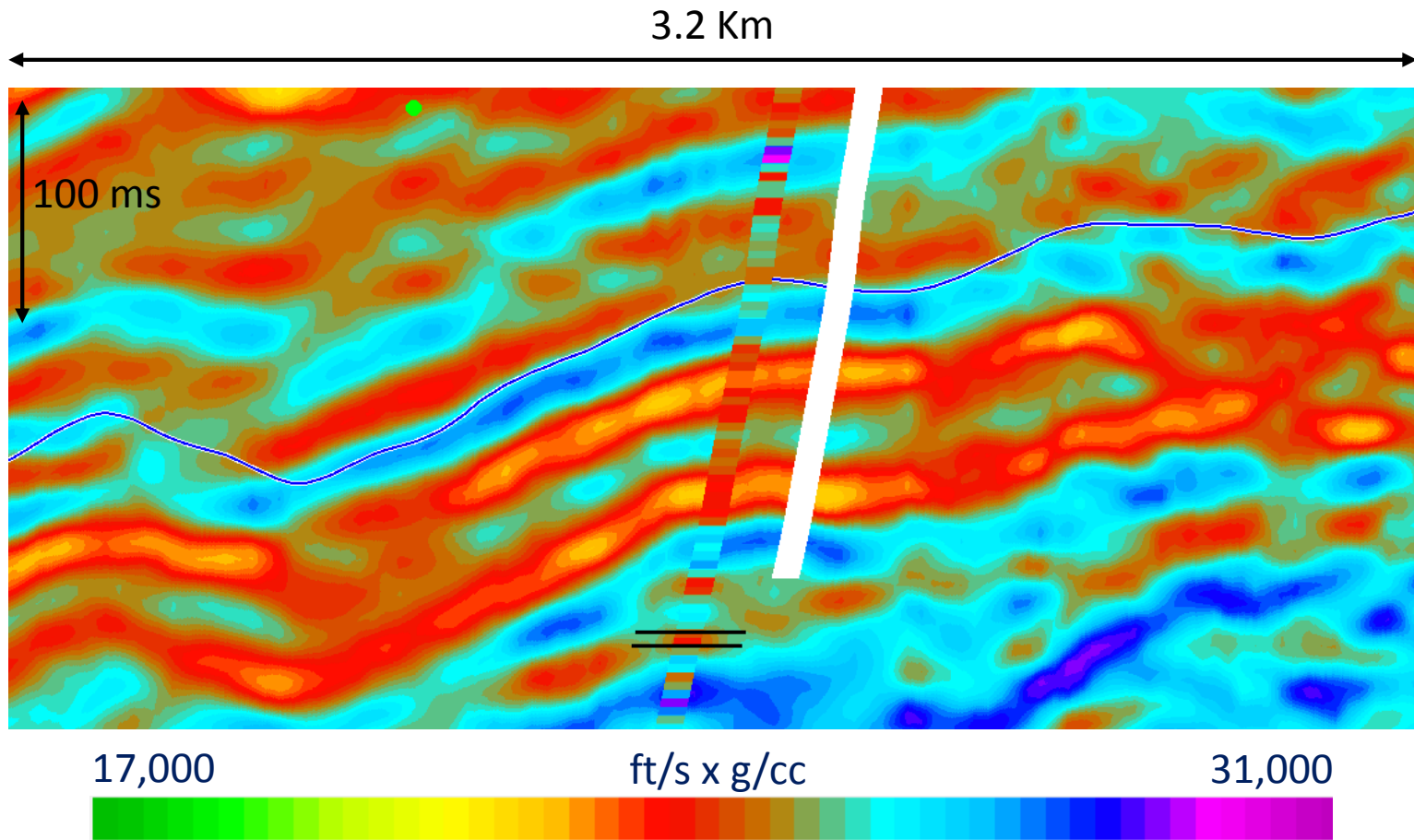


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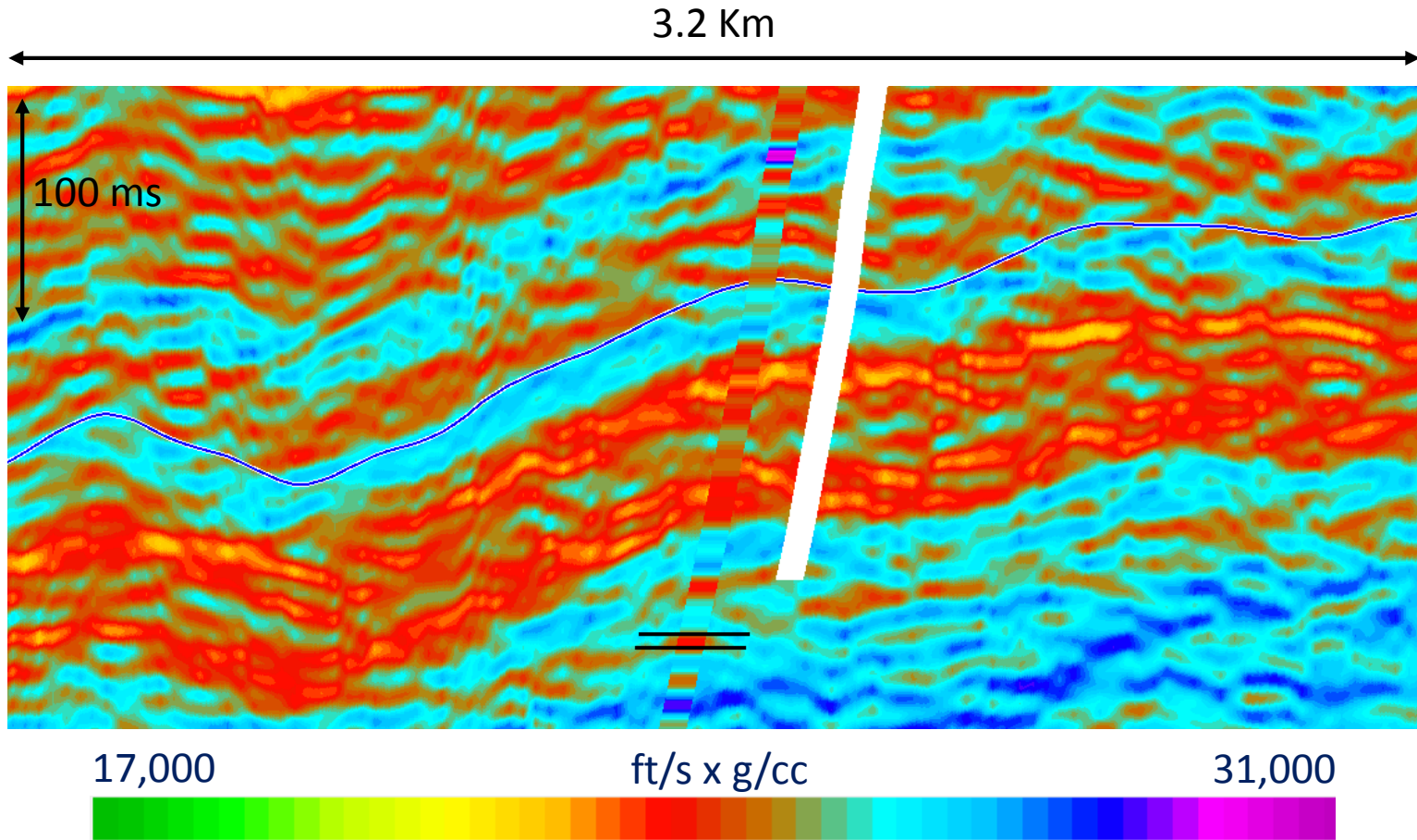
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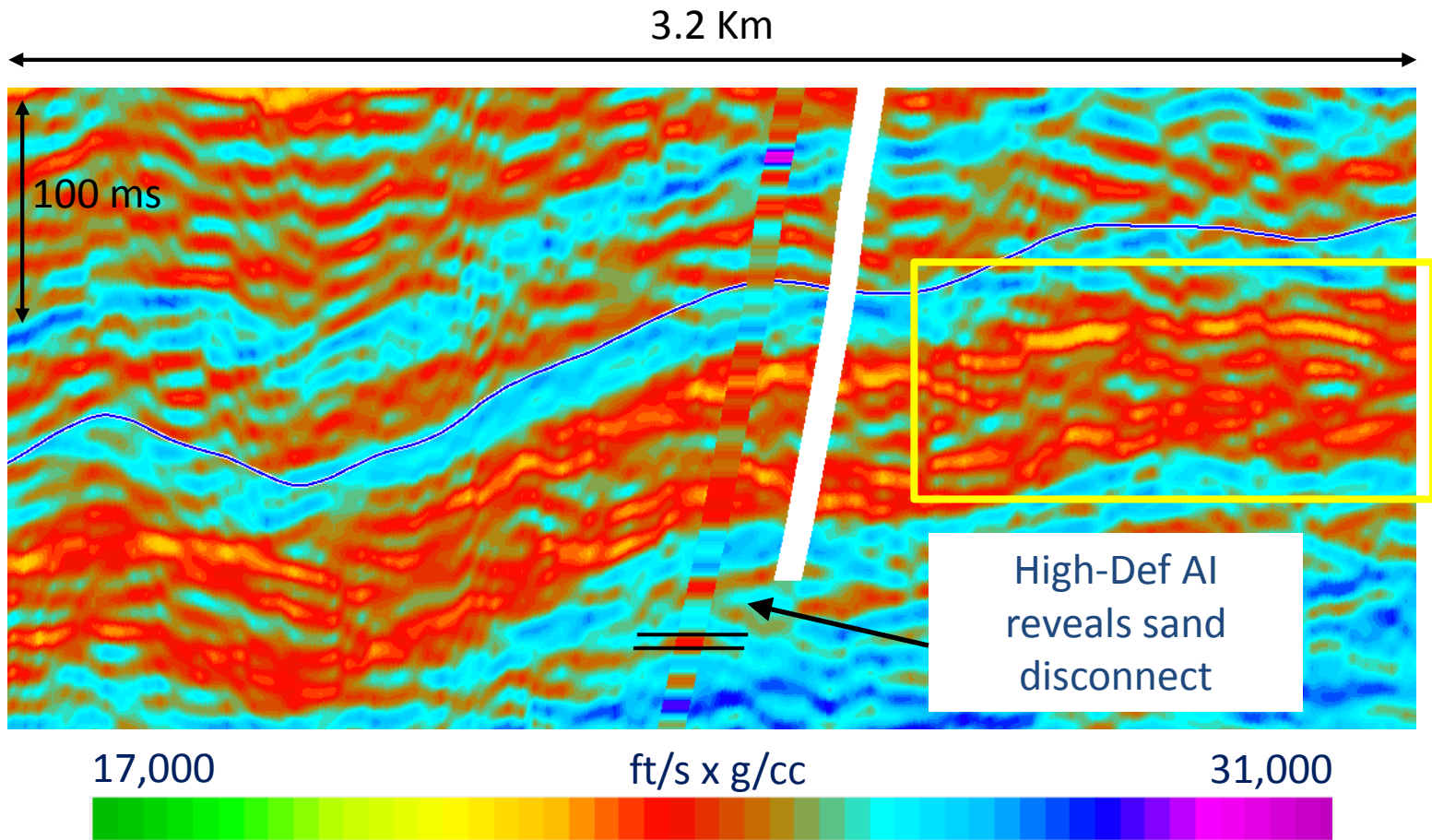




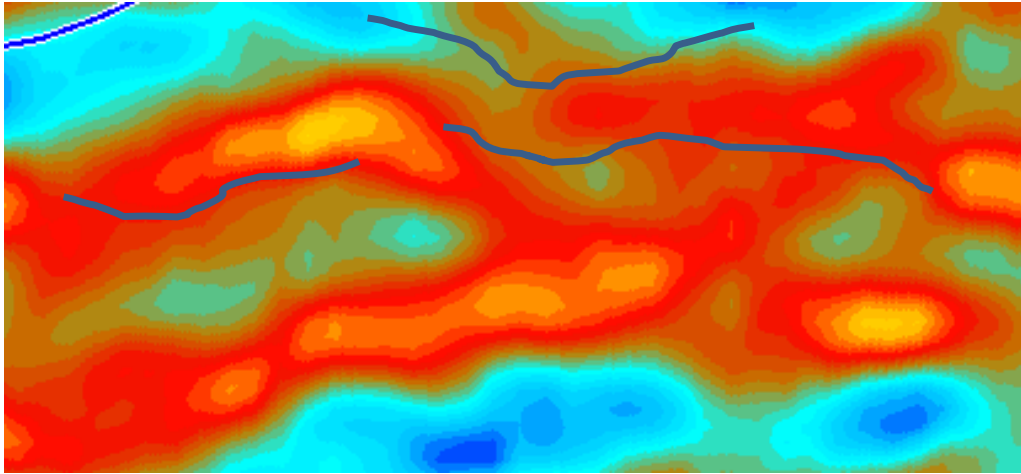
- Conventional AI
- Path of well drilled in 2010 shown



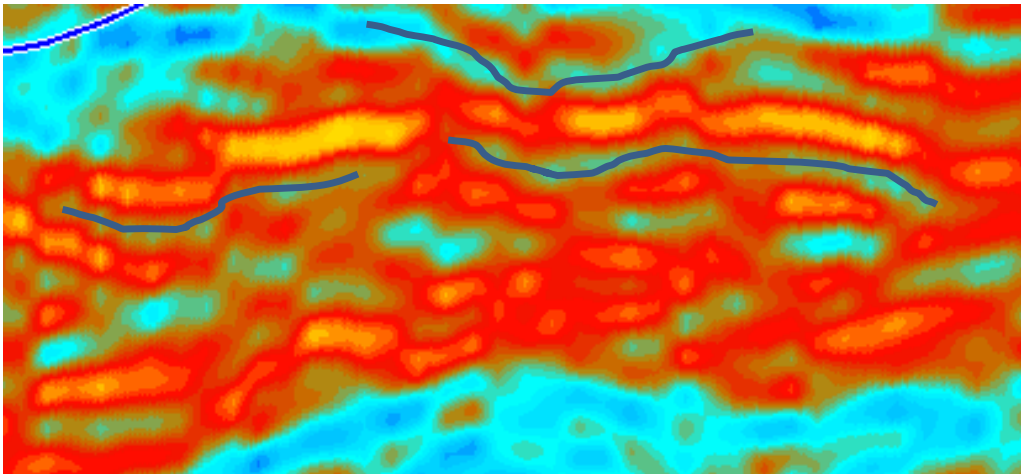
- High-Definition AI
- Path of well drilled in 2010 shown



- High-Definition AI
- Path of well drilled in 2010 shown



**Conventional AI**



**High-Definition AI**

- **High-Def AI reveals stratigraphic detail masked by the seismic**



- **High-definition AI shows the potential of Spectral Extrapolation, more than doubling the frequency content**
- **Increased layer detail is validated by match at the well**
- **Must be aggressive with the removal of noise during seismic conditioning**
- **Wavelet used in the inversion was statistical**
- **Well contribution in LFM and wavelet phase**
- **SE enables us to see more detail, but also amplifies irregularities in the input seismic**
- **Acoustic inversion algorithm mitigates artifacts observed in seismic**
- **An interpreter must be able to extract the useful information and understand the “side effects” of boosting the frequency of seismic data**

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Gorka Garcia Leiceaga

Charles Puryear



September 17, 2019

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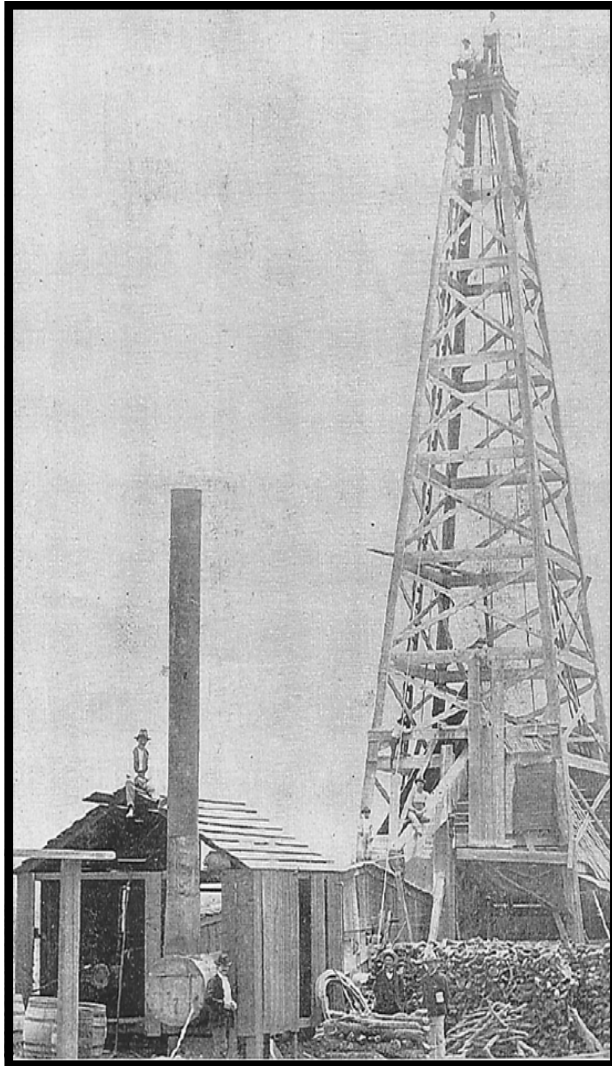
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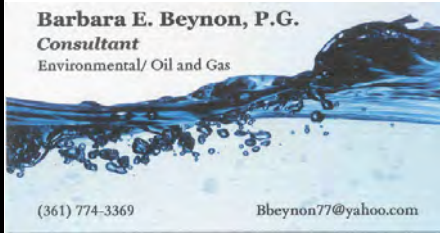
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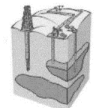
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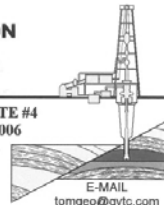
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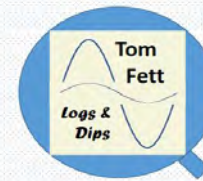
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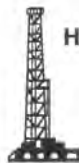


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**James R. Jones**  
 Geologist

7434 Long S Drive  
 Corpus Christi, TX 78414  
 361-779-0537  
 jrjones5426@aol.com



**EOG Resources, Inc.**  
 539 N. Carancahua  
 Suite 900  
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**Randy Lambert**  
 Geological Advisor

Fax: (361) 844-1546  
 randy\_lambert@eogresources.com



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**WALTER S. LIGHT, JR.**  
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 PETROLEUM GEOLOGIST

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 US MOBILE: +713 823 8288  
 UK MOBILE: +44 (0)794 424 0106  
 EMAIL: wthunderx@aol.com



**emerald bay**  
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 patrickm@emeraldbayexp.com  
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 mark@millersmithgas.com  
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 Suite 400  
 Corpus Christi, Texas 78476



**Mark Mixon**  
 Account Manager

mmixon@lmkr.com  
 P: +1 281 495 5557  
 D: +1 281 848 3310  
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Sr. Account Manager  
Log Analyst  
Permian Wireline Services

O 432-685-8965  
M 432-215-1899  
dennis.moore@bhge.com  
6 Desta Dr  
Suite 5300  
Midland, TX 79705

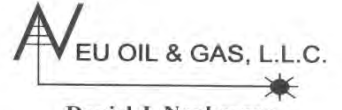
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361.946.2581 mobile

Contact Address  
1701 Southwest Parkway, Ste. 109  
College Station, Texas 77840  
866.946.2581 phone  
866.946.2580 fax

pmueller@muelexp.com  
www.muelexp.com



J. Paul Mueller, Jr.  
President



**Daniel J. Neuberger**  
Geologist and President

Austin Office:  
712 Windsong Trail  
West Lake Hills, Texas 78746

Office (361) 548-7723  
Home (512) 306-1223  
dan@neuoilandgas.com

Patrick Nye  
President  
patrick@nyexp.us

Office: (361) 452-1435  
Cell: (361) 658-1089  
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Home: 713-784-7911  
Cell: 713-899-5164

E-mail: bobrien@saxetpetroleum.com



**Ken Orlaska**  
Account Manager

281-497-8440  
Direct: 281-249-5051  
Fax: 281-558-8096  
Cell: 832-455-1818  
e-mail: korlaska@geotrace.com  
12141 Wickchester Lane, Suite 200  
Houston, Texas 77079  
www.geotrace.com



**Herradura  
Petroleum, Inc.**  
JEFF OSBORN  
Geologist

711 N. Carancahua, Ste. 1750  
Corpus Christi, Texas 78475  
e-mail: jeff@herradurapetroleum.com

Office: 361-884-6686  
Fax: 361-884-9102  
Cell: 361-537-2349

**Richard M. Parker**  
Consulting Geologist

Adjunct Professor - Geosciences  
Texas A&M University - Kingsville  
Registered State of Texas Board of Professional Geoscientists  
License # 6056

12802 Mas Rd.  
Brookside Village, Texas 77581  
Email: rparkerstar@sbcatobol.net  
Email: Richard.Parker@tamuk.edu

713-724-4380 Cell 1  
713-206-3158 Cell 2  
281-412-0745 Home  
361-593-4072 A&M



Beth Priddy  
Geologist

361-443-5593  
xterrageoconsulting@gmail.com

P.O. Box 756  
Corpus Christi, TX 78403



**BRENT PROPST, P.G.**

Business Development Manager  
Cell: (832) 643-5158 • bpropst@paragongeo.com

Houston, Texas

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**Richard M. Rathbun, Jr.**  
Certified Professional Geologist 2344 / AIPG

921 Barracuda Pl.  
Corpus Christi, Texas 78411

(361) 903-8207  
rathbunrsmoc@gmail.com



**Barry J. Rava**  
President

Mobile: 281-235-7507  
Office: 713-621-7282

barry@icarusog.com  
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210-200-0300 - Cell  
361-884-0863 - Fax  
firstrockinc@msn.com



**Alvin Rowbatham**  
Sales, Gulf of Mexico

Main +1 713 789 7250

Direct +1 281 781 1066

Fax +1 713 789 7201

Mobile +1 832 372 2366

alvin.rowbatham@iongeo.com

2105 CityWest Blvd. | Suite 900  
Houston, TX 77042-2839 USA



**Doug Sartoris**

Exploration Geologist / Managing Partner

800 North Shoreline Blvd.  
Suite 2570 South  
Corpus Christi, TX 78401

Office: 361-884-1130  
Cell: 361-548-1130  
doug@dsxenergy.com

**Robert V. Schneider, D.Sc**  
Geophysicist

Quantitative Geophysical Interpretation  
Seismic Attributes  
AVO analysis, Modeling and Inversion  
Well-to-Seismic Tying  
Seismic Processing QC

Kingdom Suite  
Hampson-Russell  
Paradise  
Insight Earth

rvschneiderdsc@gmail.com  
Mobile: +1 713.447.2381

www.linkedin.com/in/RobertVSchneider

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**Crossroads Exploration**  
Gloria D. Sprague  
Geologist

388 CR 4012 Office: 936-254-3600  
Timpson, Texas 75975 Mobile: 936-488-9428  
gsprague4532@att.net

**DAHCO EXPLORATION, LLC**

**ROBBY STERETT**  
GEOLOGIST

P.O. Box 907  
Corpus Christi, Texas 78403

Office (361) 887-2981  
Cell (361) 739-5618  
EMAIL: RSTERETT@DAHCO.LLC

Charles A. Sternbach, Ph.D  
President

**Star Creek Energy Company**  
Oil and Gas Exploration

800 Wilcrest Drive, Suite 230  
Houston, Texas 77042  
office: 281.679.7333  
cell: 632.567.7333  
carbodude@gmail.com



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**THOMAS W. SWINBANK**  
CERTIFIED PETROLEUM GEOLOGIST  
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STRIKE OIL & MINERALS CORP.  
P.O. BOX 1839 GEORGETOWN, TEXAS 78627  
PHONE/FAX 912-868-7510  
HOME 912-863-7803  
CELL 912-876-8988

Dennis A. Taylor  
President and Chief Geologist  
dennis@amshore.com



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GEOSCIENTIST  
TX LICENSE #2289

7214 Covert #9 (361) 991-7451  
Corpus Christi, TX 78413 jimmermann74@msn.com

**Jim Travillo**  
Consulting Petroleum Geoscientist

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2006 Highlands Circle  
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Cell: 713.823.9332  
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Certified Petroleum Geologist  
lwalker@stalkerenergy.com

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AUSTIN  
512.457.8711  
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**SEBASTIAN P. WIEDMANN**  
GEOSCIENTIST

WILSON PLAZA WEST  
606 N. CARANCAHUA, SUITE 500  
CORPUS CHRISTI, TEXAS 78401  
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