

BULLETIN

**Corpus Christi
Geological Society**



and

**Coastal Bend
Geophysical Society**



**November
2015
ISSN 0739 5620**

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Thanks! Mike Lucente

www.coastalbendbloodcenter.com



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

2015-2016

www.ccgeo.org

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2015-2016

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Education			

**Visit the geological
Web site at
www.ccgeo.org**

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CCGS/CBGS JOINT MEETING SCHEDULE 2015-2016

September 2015							October 2015							November 2015						
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S	S	M	T	W	Th	F	S
		1	2	3	2	5					1	2	3	1	2	3	4	5	6	7
6	7	8	9	10	11	12	4	5	6	7	8	9	10	8	9	10	11	12	13	14
13	14	15	16	17	18	19	11	12	13	14	15	16	17	15	16	17	18	19	20	21
20	21	22	23	24	25	26	18	19	20	21	22	23	24	22	23	24	25	26	27	28
27	28	29	30				25	26	27	28	29	30	31	29	30					

Sept. 10, 2015
5:30p.m.—8:30p.m.
Kickoff BBQ
Hoegemeyer’s Barbeque Barn

Oct. 28—11:30a.m.—1:00p.m.
Speaker: Neil Peake, CCG Geo
Consulting Seismic Reservoir
Characterization.
“Unconventional Reservoirs:
An Integated Workflow
Incorporating Surface Seismic,
Mineralogy, & rock Properties
in the Haynesville Shale.”

Nov. 18—11:30a.m.—1:00p.m.
Speaker: Lorenzo Garza & Joe
Stasulli, Railroad Commission of
Texas. “Horizontal Drilling in Texas:
A Tale That Begins in the Austin
Chalk, but Whose Ending Has Yet
To be Written.”

December 2015							January 2016							February 2016						
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						1	2		1	2	3	4	5	6
6	7	8	9	10	11	12	3	4	5	6	7	8	9	7	8	9	10	11	12	13
13	14	15	16	17	18	19	10	11	12	13	14	15	16	14	15	16	17	18	19	20
20	21	22	23	24	25	26	17	18	19	20	21	22	23	21	22	23	24	25	26	27
27	28	29	30	31			24	25	26	27	28	29	30	28	29					
							31													

Dec. 9—11:30a.m.--1:00p.m.
Speaker: Dmitri Bevc, Ph.D.,
Chevron, SEG Distinguished
Lecturer “Full Wave-Form
Inversion: Challenges,
Opportunities and impact”

Jan. 20--11:30a.m.—1:00p.m.
Speaker: Charles Sicking, VP
of R&D/Chief Geophysicist,
Global Geophysical Services,
Inc. “Predicting Frac
Performance and Active
Producing Volumes Using
Microseismic Data”

Feb. 17—11:30a.m.—1:00p.m.
Speaker: Collegiate Month.

CCGS/CBGS JOINT MEETING SCHEDULE 2015-2016

March 2016							April 2016							May 2016						
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						1	2	1	2	3	4	5	6	7
6	7	8	9	10	11	12	3	4	5	6	7	8	9	8	9	10	11	12	13	14
13	14	15	16	17	18	19	10	11	12	13	14	15	16	15	16	17	18	19	20	21
20	21	22	23	24	25	26	17	18	19	20	21	22	23	22	23	24	25	26	27	28
27	28	29	30	31			24	25	26	27	28	29	30	29	30	31				

March 16—11:30a.m.—1:00p.m. Speaker:
 April 20—11:30a.m.—1:00p.m. Speaker:
 May 18—11:30.m.—1:00p.m. Distinguished Speaker:

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 Tuesday—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
Austin Chapter of SIPES.....	First Thursday
Houston Geological Society Luncheons.....	Last Wednesday
Central Texas Section of Society of Mining, Metallurgy & Exp.....	2 nd Tues every other month In San Antonio

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PRESIDENT'S LETTER

AND NOW THE BAD NEWS

My last President's letter was upbeat. I called a bottom and I'm sticking with it, but we are way down from the highs and will likely have a lackluster comeback due to world economic issues and how they resolve.

This part of the recovery is the toughest. Reality has set in. Budgets are slashed. Hourly pay rates are cut. Royalty and working interest income have come way down. The phones have stopped ringing. What do we do?.....We survive. We tighten our belts, we review every expense. We high grade our drilling deals with a sprinkling of reality dust. We take another look at that development well on the books. We work harder and smarter.

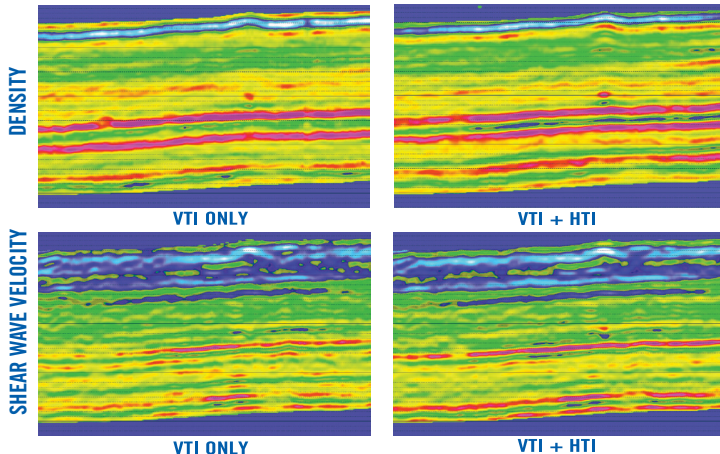
This Geological Society is faced with the same issues. Donations are down and advertising is way off from last year. Many members have not paid their dues - this is active and on-going. Also, I will ask again that any donations, no matter how small, to the Corpus Christi Geological Society General Fund would be greatly appreciated and help us balance our budget without making severe cuts beyond what we are doing now.

STAY TOUGH OUT THERE!

Sincerely,

Michael E. Lucente—CCGS President

is ANISOTROPY a PAIN in your ATTRIBUTES?



Azimuthal velocity variations in the earth, characterized as HTI anisotropy, manifest as small shot-receiver azimuth related timing distortions in 3D seismic data, especially on the higher (>30 degree) angular offsets. If not properly corrected during imaging, these timing distortions will negatively impact pre-stack inversion and the accuracy of rock property attributes, especially shear velocity and density attributes.

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Contact us at GATHERS@globalgeophysical.com



CBGS PRESIDENT'S LETTER

News -

TAMUK is developing a Geophysics program. I would like to have help to raise funds for their geophysical labs. Any ideas on fund raising would be appreciated.

Business -

See any good talks at the SEG convention? Let me know.

Education -

- GSH

Webinar: Simplifying and Lowering the Cost of Shear Wave Reflection

Seismology, Dr Bob Hardage, BEG

CBGS has a revenue sharing agreement with GSH, so please mention CBGS if you register for any GSH events.

SEG

2014 SEG Convention Technical Program Recording: Available at the following link -[SEG Convention Technical Program Recordings](#)

SEG has 450+ eLearning courses online from \$0.99 to \$150.00(most expensive I saw)

<http://www.seg.org/professional-development/seg-on-demand>

AAPG

Practical Salt Tectonics - Houston, Texas 1-4 December 2015

[Unconventionals Update Workshop - 3-4 November 2015 |](#)

Austin, Texas

[Revitalizing Reservoirs Workshop – Gulf Coast, Southwest,](#)

[Mexico & Latin America Focus - 1-2 December 2015 | San](#)

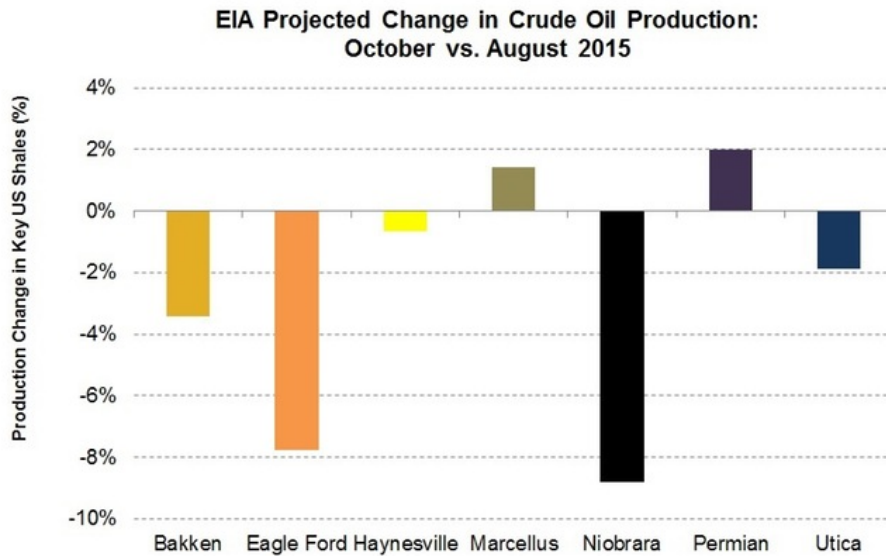
Antonio

Monthly O&G Statistics

Texas Oil and Gas Info	Current Month	Last Month	Difference	
Texas Production	MMBO/BCF	MMBO/BCF	MMBO/BCF	
Oil	87	88.4	-1.4	Aug
Gas	657	659	-2	Aug
	Current Month	Yr to date - 2015	Yr to date - 2014	
Texas Drilling Permits	864	7,407	16,719	Aug
Oil wells	222	1,828	4,890	
Gas wells	59	546	912	
Oil and Gas wells	518	4,598	10,209	
Other	0	0	0	
Total Completions	1,382	14,665	20,657	Aug
Oil Completions	1,113	11,723	17,787	
Gas Completions	172	2,006	2,170	
New Field Discoveries	2	50	27	
Other	47	936	700	

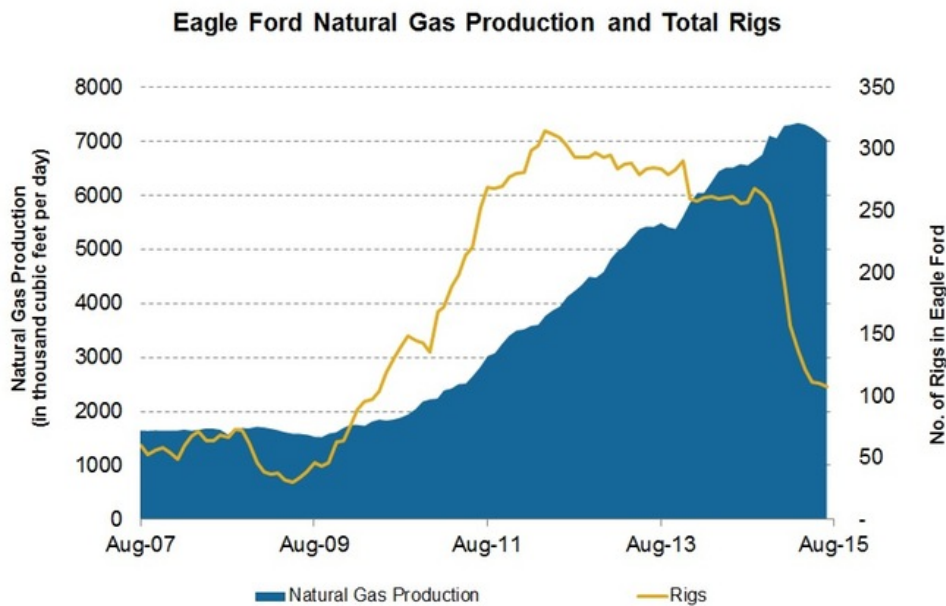
Some interesting graphs/trends. Data courtesy of Market Realist/Energy Information Admin.

Interesting - Marcellus gas production is still projected to increase. And Permian Oil/Liquids is projected to increase.



Market Realist

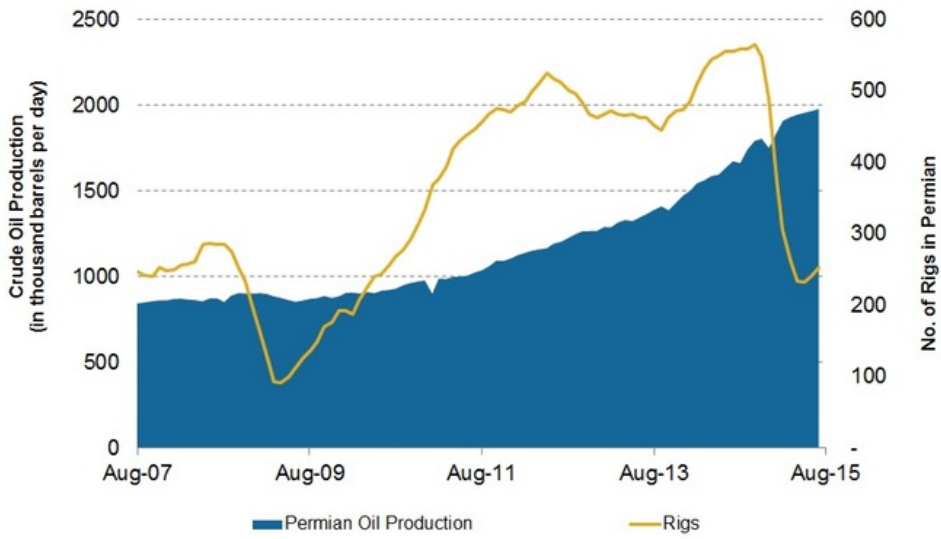
Source: Energy Information Administration



Market Realist

Source: Energy Information Administration

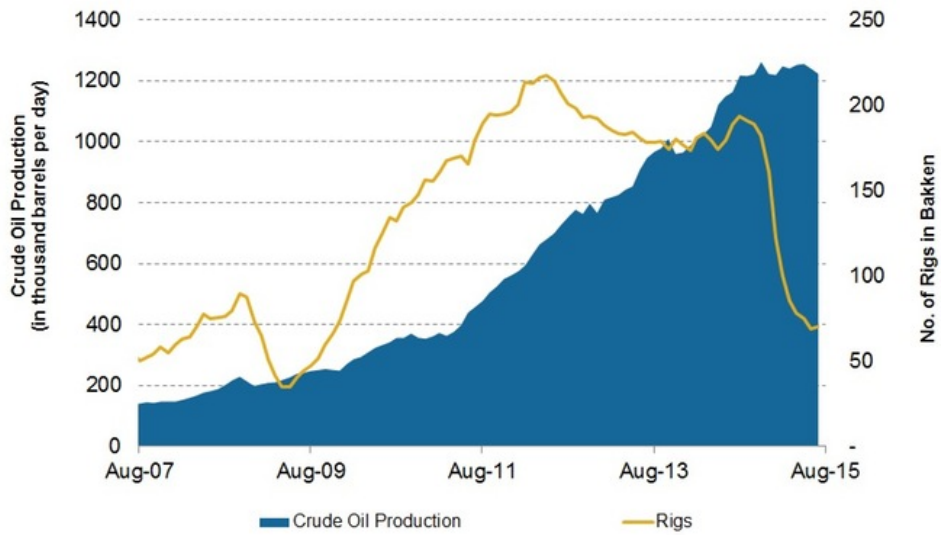
Permian Crude Oil Production and Rigs



Market Realist

Source: Energy Information Administration

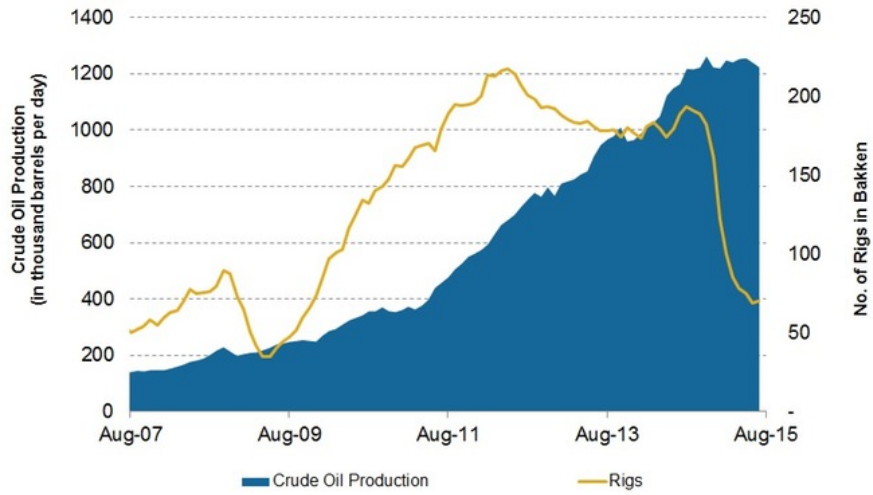
Bakken Crude Oil Production and Rigs



Market Realist

Source: Energy Information Administration

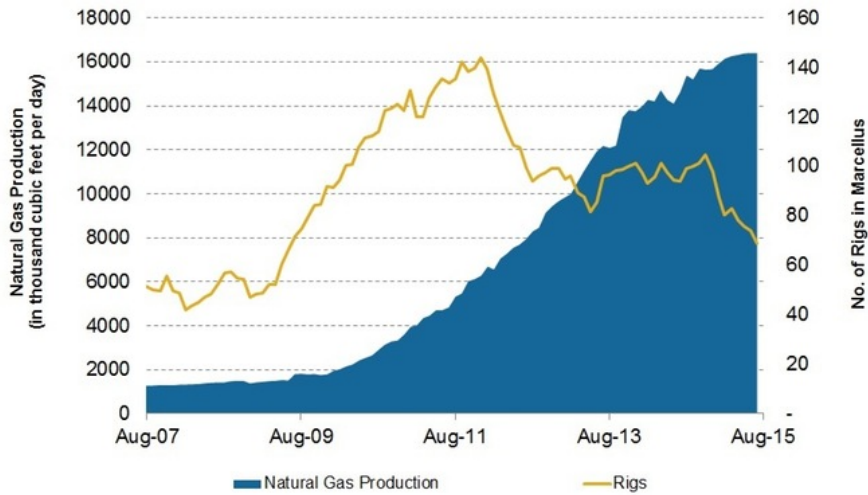
Bakken Crude Oil Production and Rigs



Market Realist

Source: Energy Information Administration

Marcellus Natural Gas Production and Total Rigs



Market Realist

Source: Energy Information Administration

--

Lonnie Blake
CBGS President

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Tom Winn (Geologist)	361-844-6992
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CORPUS CHRISTI GEOLOGICAL SOCIETY & COASTAL BEND
GEOPHYSICAL SOCIETY

LUNCHEON MEETING ANNOUNCEMENT

WEDNESDAY, NOVEMBER 18th, 2015

- Location:** Congressman Solomon P. Ortiz International Center, 402 Harbor Drive, Corpus Christi, TX 78401 <http://ortizcenter.com>
- Bar Sponsor:** To be announced
- Student Sponsor:** Core Lab (Juan Cabasos) and the CCGS
- Time:** 11:30 am Bar, Lunch follows at 11:45 am, Speaker at 12:00 pm
- Cost:** \$25.00 (additional \$3.00 surcharge without reservation; No-shows may be billed and non-RSVP attendees cannot be guaranteed a lunch); \$10.00 for students (discounted by our generous sponsors!)
- Reservations:** Please RSVP by the FRIDAY, Nov. 13th
E-Mail: wes@gislerbrotherslogging.com

Please note that luncheon RSVPs are a commitment to the Ortiz Center and must be paid even if you can't attend the luncheon.

Horizontal Drilling in Texas: A Tale That Begins in the Austin Chalk, but Whose Ending Has Yet to be Written.

Presented by: Lorenzo Garza and Joe Stasulli, Railroad Commission of Texas



A look at the beginning of the horizontal drilling story in Texas and where the industry is going in the future will be discussed. How the Railroad Commission of Texas has had to adapt and evolve to meet this new trend will be emphasized. Presenting will be representatives of Railroad Commission of Texas, Oil and Gas Division: Lorenzo Garza, Manager of the Drilling Permits Section, and Joe Stasulli, Manager of the Well Compliance Section.

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GCAGS 2016 Update

The Gulf Coast Section is the largest section of the American Association of Petroleum Geologists. There are 13 local Geological Societies that comprise the Gulf Coast Association. The object of this Association is to: provide for the discussion and publication of papers on subjects and problems coming within the scope of the Geological profession with particular emphasis on Gulf Coast Geology.

The Gulf Coast Association of Geological Societies Annual Convention was held in Houston, Texas; September 20-22, 2015. It was a well attended convention, with around 1300 attendees, lots of great vendor displays, over 70 technical talks, several short courses and field trips. We had 13 people from Corpus Christi attend the convention, and several graduated TAMUK students attended as well.

The Corpus Christi Geological Society had a booth at the 2015 Convention. People like Corpus Christi and are excited to attend a convention next year.

The CCGS will host the 2016 Convention, September 18-20, 2016. The technical meetings will be held at the American Bank Center and the Omni Hotel is the host hotel.

Several field trips are in the planning phase and we plan to offer several short courses too.

A great team has come together to organize the convention, but we will need much more help to actually 'make it happen'. The core team is:

Bob Critchlow and Rick Paige, Technical Program

Allen Lassiter, Poster Sessions

Barbara Beynon, Field Trips

Stephen Thomas, Short Courses

Lonnie Blake, Sponsorships

Jennifer Smith-Engle, Technical Editor

Sebastian Wiedmann, Publicity

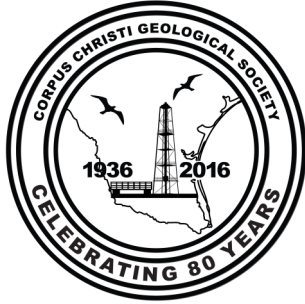
Susan Stone and Jeanie Timmerman, Registration

All of these areas will need extra help. There are also parties to plan, volunteers to coordinate, and a myriad of other activities. Let me know your area of interest, and we will get you involved.

However, the foundation of a great convention is a strong technical program. See the call for papers on the next page, and consider giving a talk or presenting a poster. Share it with friend and colleagues. Refer talks and technical works to the technical committee.

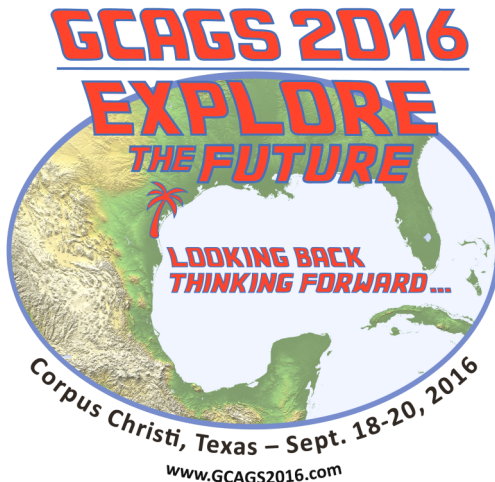
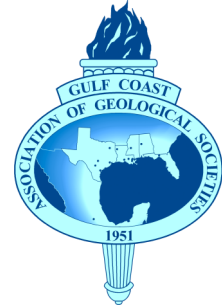
Dawn Bissell
GCAGS 2016 General Chair





CALL FOR PAPERS

66th GCAGS Convention
September 17-20, 2016
American Bank Center
Bayfront Convention Hall
Corpus Christi, Texas



We're Building Sessions in these Themes

- The Gulf of Mexico Systems
- Conventional Carbonates & Clastics
- Tight Gas Plays
- Understanding the Resource Plays
- The Changing Coastal Landscape
- Mexico and Latin America
- Advances in Geophysical Technologies
- Enhanced and Secondary Recovery
- Reservoir Prediction and Quality
- Climate from Multiple Perspectives
- Protecting and Stewarding Water Resources
- Other Sessions Developed from Submissions

And We're Planning Field Trips & Short Courses, Too.

Want to Help? Have Ideas? Need Information? Contact Dawn Bissell, Convention Chairman, chair@gcags2016.com

Join the 2016 GCAGS Convention with an Oral or Poster presentation!

Please submit a 250-word abstract or summary of your planned paper or poster before **December 15, 2015** to our Technical Program Chairs, **Bob Critchlow** or **Rick Paige** at techprogramchair@gcags2016.com. Authors of accepted papers and posters will be notified **late January 2016**. Final extended abstracts, with or without figures, and full papers for publication in the *GCAGS Transactions* will be due by **March 21, 2016** to the *GCAGS Transactions* Editor, **Jennifer Smith-Engle**. Full information, instructions, size limitations, and helpful hints for abstracts, summaries, extended abstracts, and full papers can be found on

www.gcags2016.com

Thank you for your participation!


If you'd like to publish in the *GCAGS Journal* -

The Peer-Reviewed Journal of Gulf Coast Geoscience

Submit an extended abstract of at least 600 words, including 1-2 representative figures, to the *GCAGS Journal* Editor, **Barry Katz** at barrykatz@chevron.com by **December 15, 2015**. Once accepted for publication, a full manuscript should be submitted before **March 21, 2016**. Full instructions for manuscript submissions will be posted online at **www.gcags2016.com**

Convention presentations of Journal submissions are encouraged, but not required.

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Permission to republish “Autochthonously charged shale trends as environmental systems: the living basin and kerogen source analysis” slides was given by the author Woodson Godfrey

**Autochthonously charged shale trends as environmental systems:
the living basin and kerogen source analysis.**

Presented by Woodson Godfrey, Paleosource

Compiling results from several years of basin sourcing projects it became evident that the most effective and accurate way of predicting and finding the desired hydrocarbon product was the reconstruction of the living basin. An environmental “checklist” was derived of features common to known successful resource plays. All of the criteria for energy production, fixation, conversion and storage correspond to the convergence of larger scale paleoenvironmental trends and conditions, which form a powerful tool for predicting new and better exploiting known resource plays..

About Woodson Godfrey: “While still in graduate school, my first professional work in the energy industry was as a consultant on the Paleogene Project for Amoco, where I was supervised by the incomparable Ted Karmen. Thereafter, a freshly minted MS from LSU in hand, I joined Shell Offshore in New Orleans, which served as a ten year apprenticeship in deep-water Plio-Pleistocene and Miocene, the offshore Mesozoic and the onshore Paleogene. Ten years later, I did a brief stint as internal Consulting Biostratigrapher for Conoco which, while it afforded a wide scope of possible assignments, was too far removed from direct contact with the work of my profession for my liking. I became a self-employed consultant twenty three years ago and have since then worked extensively not only the ages and trends above, but also the Jurassic, Permian, Pennsylvanian, Mississippian and Devonian in the Appalachian fold-belt, southwestern United States and, of course, the Gulf of Mexico. I would like to think the fun is just beginning.”

**Autochthonously charged
shale trends as
environmental systems:
the living basin and
kerogen source analysis.**

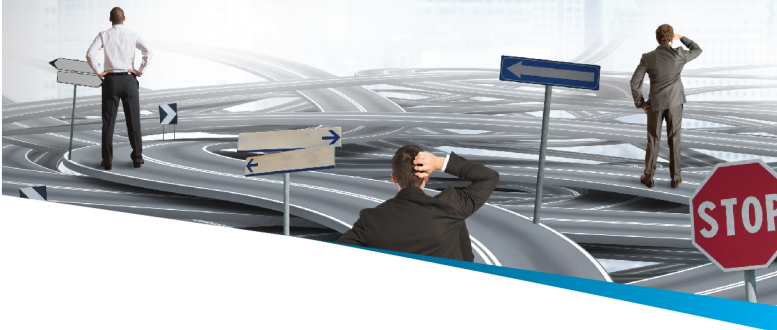
This slide show and talk was originally presented at the CCGS Luncheon for December 10, 2014.

As it states above, this is meant to apply to autochthonously charged resource basins and their carbon or kerogen sources only. Strictly speaking, this is an anecdotal thesis and not a completed systematic study, although it appears consistent with the facts gleaned from multiple smaller studies.

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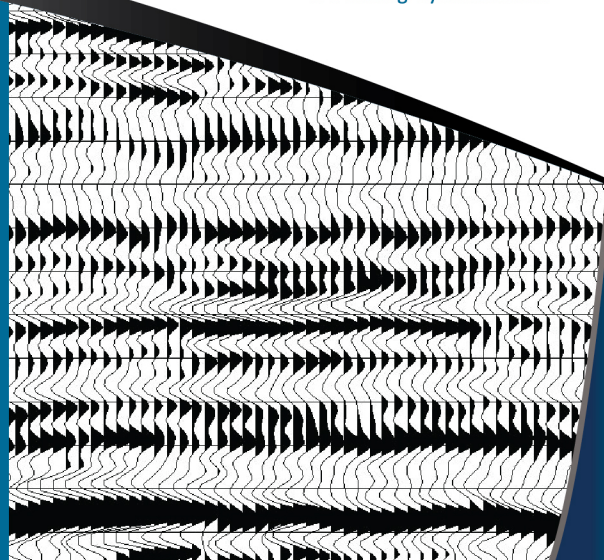
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This pictures an outcrop of the Marcellus Shale. Even at this resolution one can see a dominant feature of the Marcellus: extremely fine lamination on a millimeter by millimeter scale of graded beds. Even in thin section, the alternation of high and low energy deposition is apparent .

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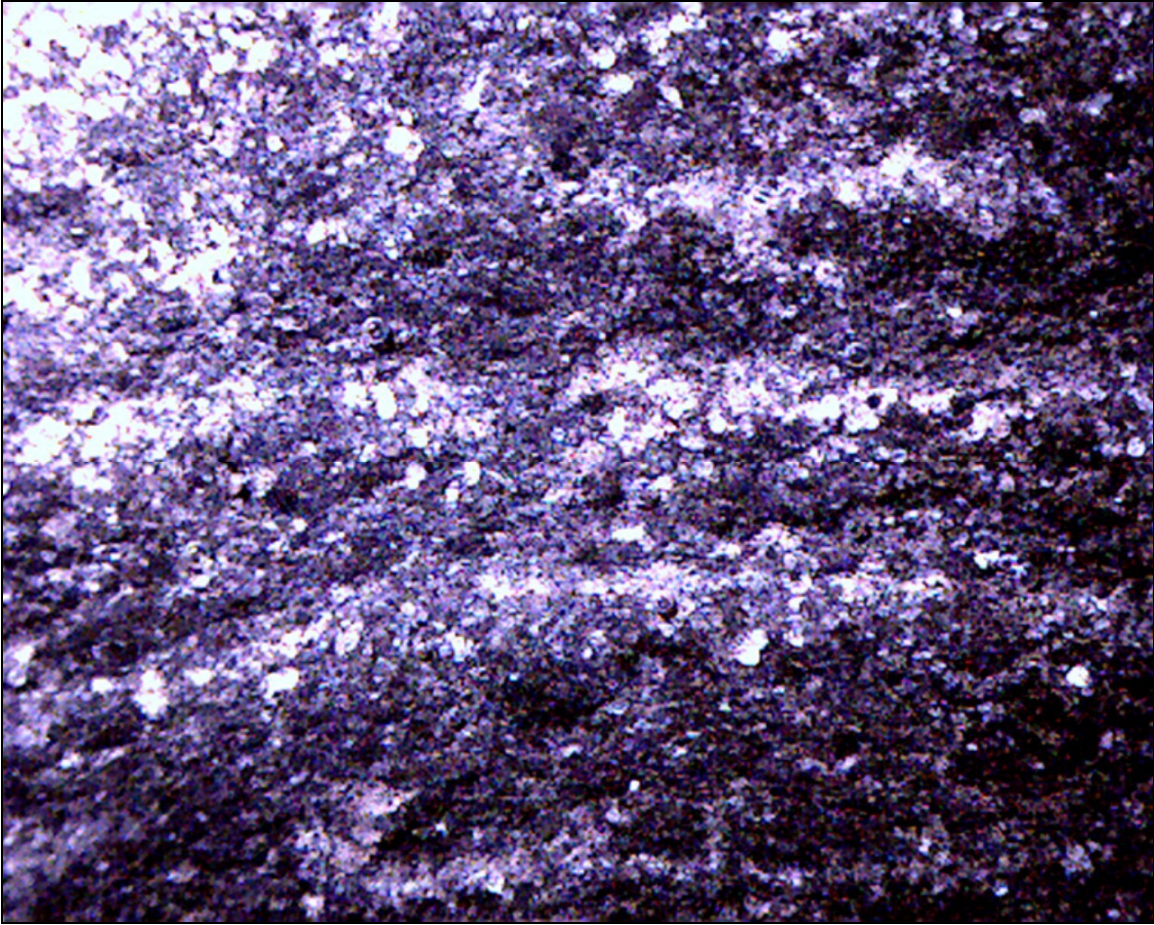
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Slide 3



This is a stereoscopic view of a hand sample from the Lower Eagleford Formation. The dark bands are illitizing smectite clays in a calcite matrix and the finer, white bands are the recrystallized tests of planktonic foraminifera. This **microlamination** is an alternation of higher depositional energy from a terrigenous source with lower energy depositional bands from the water column. This was originally taken at 8x.

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Slide 4

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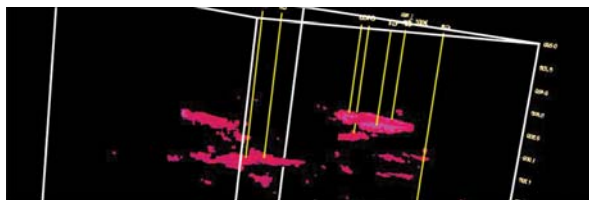
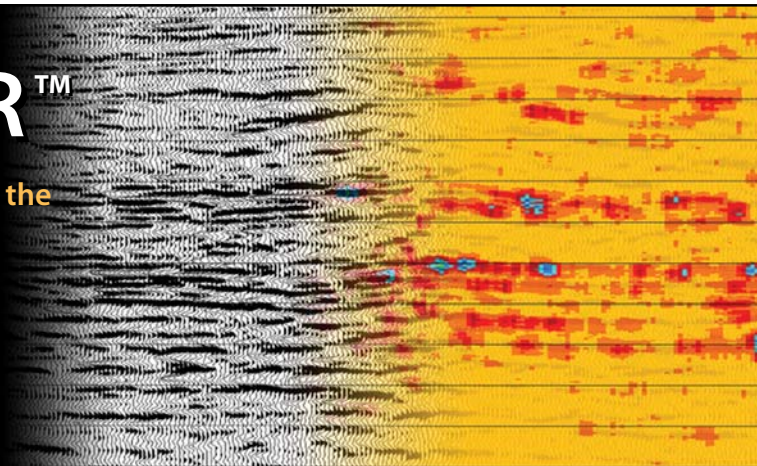


This borrowed slide of the Marcellus Formation simply represents the scale at which we commonly view the microlamination that is found in all of the shale plays that I've studied so far. The lithology is often variable between predominantly calcite with shale, as in the Eagle Ford Fm, to fine clastics, as in the Marcellus Fm. The question arises as to the cause of this consistent character regardless of sediment source.

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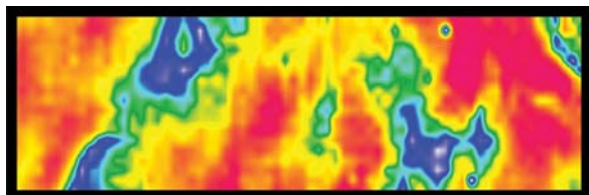
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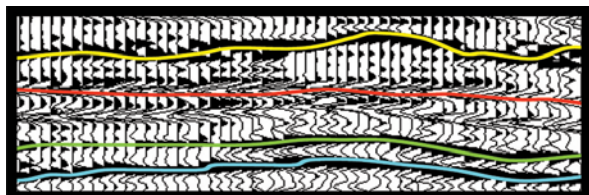
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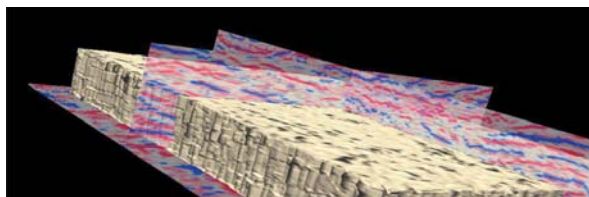
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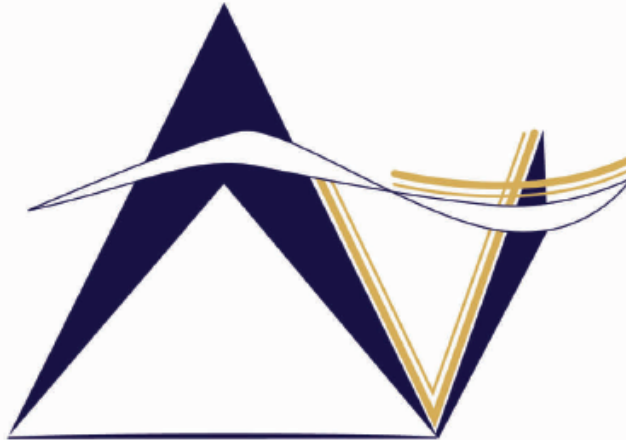
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- Microlamination and graded beds
- Clastics and calcareous sediments
- Biogenics common
- Intermittent anaerobism
- Alternating sedimentary regimes

The observations:

1. Microlamination is common or universal to autochthonously charged formations whether characterized as shale plays, resource plays or source rocks.
2. This presence of calcite or other carbonates or clastics provides a seal or sealing matrix and makes the formation a candidate for fracking.
3. Biogenics, predominantly from terrigenous or near-shore sources abound in the form of molluscs or other bivalve invertebrates, echinoderms, plant remains, ostracods and other sources, abound in working shale plays.
4. Dark shales are often characterized as intermittent periods of anaerobism, often in direct contact with extremely aerobic fauna (note the Eagle Ford sample above). Even these “anaerobic laminae” may contain fauna of typically aerobic sources.
5. Lastly, there is a clear alternation in the energy regimes represented in the **microlaminae** of shale plays/resource plays.

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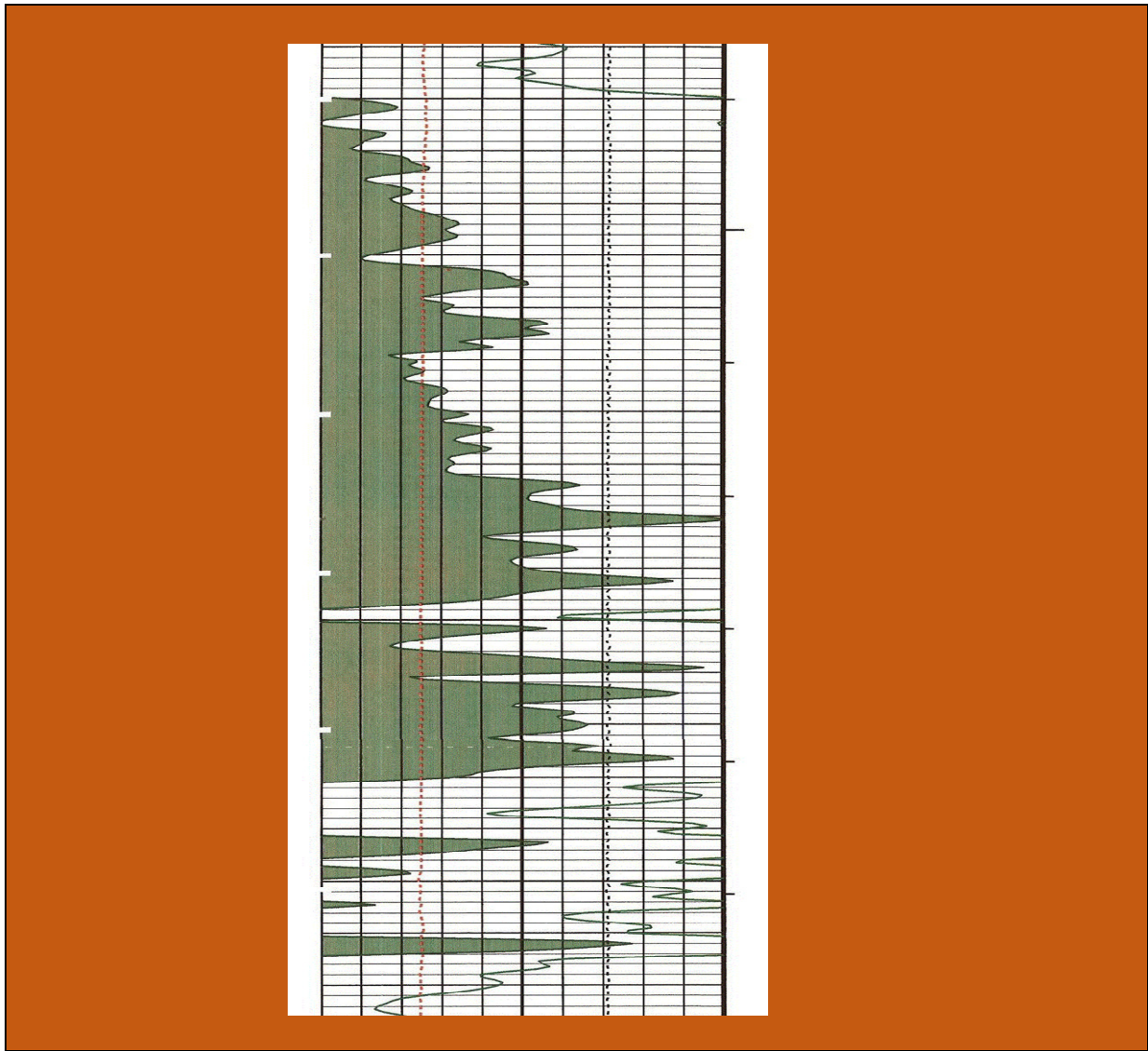
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Slide 6



The way we most frequently encounter the microlamination of shale/resource plays is in the pattern of gamma ray character as pictured here. As a matter of note, spectral gamma ray logs are preferred for basin analysis. The provenance of clastics provides a clearer picture of the source and, as you will see, of the expectations of product to be harvested from that basin.

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Slide 7

Source: science.kennesaw.edu



The borrowed picture of this fresh to brackish water marsh/swamp/wetlands is my proposed answer to the source of all the above observations. All of the characters listed on summary slide ten (10) are attributable to the succession of rain forest/wetlands and freshwater marsh to brackish and saline swamps along the marine coastline.



Coastal swamps and wetlands are the most productive biological systems on Earth and the most effective carbon sequestration system, as well. They slow the progression of clastic sediments to the basins they surround, allowing for biotic processes that degrade organic matter (kerogen), providing an aerobic/anaerobic chemical cauldron prior to delivery via riverine “flushing” to the final basinal destination (microlamination and alternating sedimentary energy).

Slide 9

Source: freshwater_marshes_usgov or www.ebabylone.com



The period of slowing or sequestration of sediments in the complex communities expose clays (shales) to long chain organic molecules that predetermine the final product options (kerogen type) available within a basin. Bonding that occurs between shale and organics also determines the nature of kerogen distribution to the basin and within the strata.

Marsh Effects

- Retention/ sequestration of clastic sediments
- Source of primary energy “fixing” – synthesis
- Ecosystem/ community for converting energy to complex organics –
metasynthesis
- Central site of anaerobic environments

The first and second lines are issues addressed. Let's discuss the basis of the kerogen machine and the issues of intermittent anoxia.



A number of the biological components that produce high quality (Type 2 and 1) kerogens are concentrated and synthesized around coastal marshes. Even planktonic flora (basically bacteria) and faunas are concentrated around areas with dense concentrations of nutrients. In a typical large basin, floating algae are concentrated around the basin margins where nutrient access is greatest (and wind current distribution helps here, too). Algae and anchoring vascular plants, photosynthesis and bacterial degradation are only part of the burgeoning kerogen producing community.



Swamps and wetlands are complex and internally diverse systems, harboring oxidizing and anaerobic environments simultaneously with a great amount of interdependence. Photosynthetic products (including lignin or humic material) provide not only fuel for bacterial degradation, but constitute a base for a complex food chain that often supports the whole of a basinal ecosystem and determines its fossil kerogen.



Forming complex, energy rich macromolecules, such as fat and protein, has a lot assistance. Thousands of extant species of molluscs, arthropods, protozoans and fungi and algae and so on contribute to the organic soup of wetland systems and the resultant kerogen. All of these species potentially feed into components of the fossil record, both directly and indirectly.



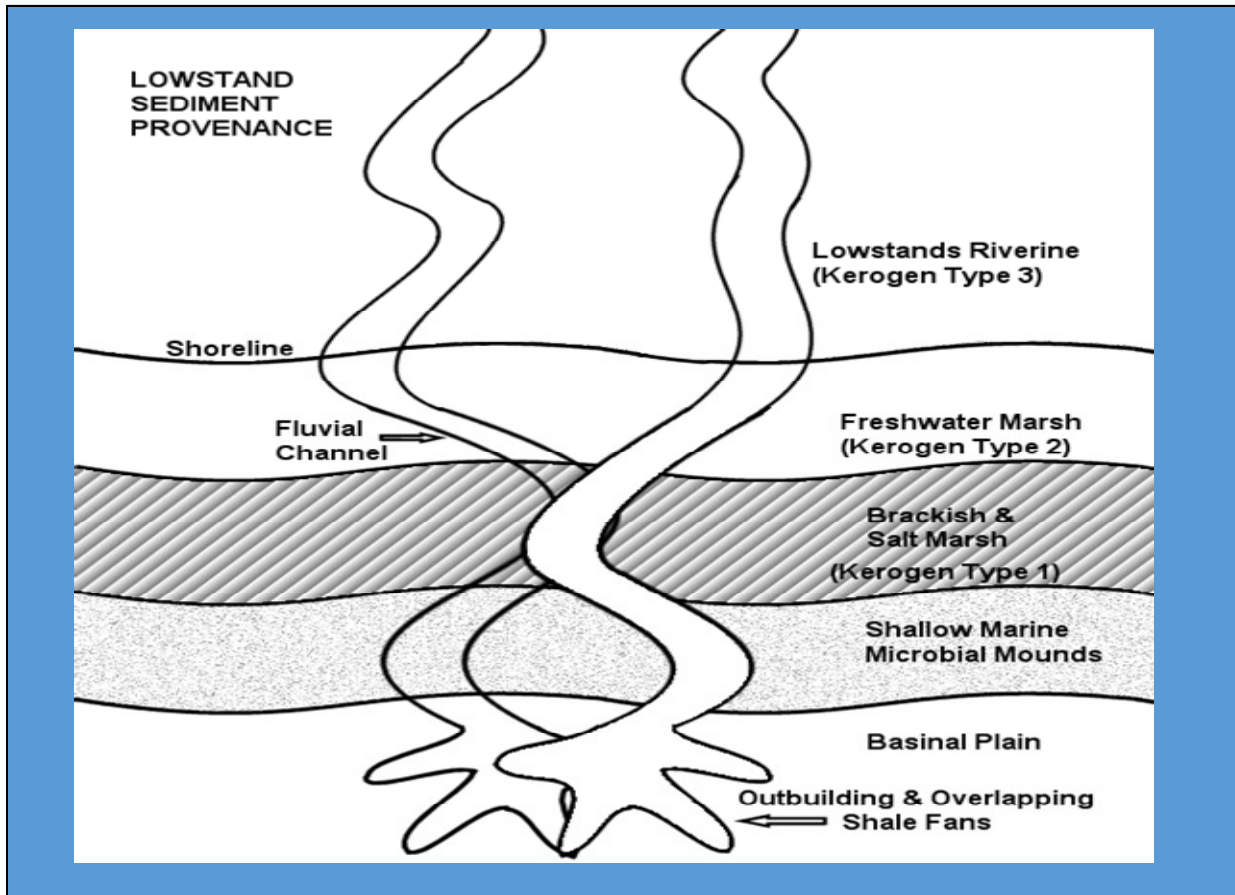
Most of the anaerobic or anoxic shale laminae found in the basin are not necessarily *in situ*, but are formed along basin margins in the swamps that harbor the organics and associated shales. The anaerobic products here, often electrostatically bound to shales, are delivered fully cooked to their final resting place. The occurrence, volume and quality of the anoxic products here can be readily confirmed by donning waders. When you step into anoxia, you'll know it.

- Seasonal and atmospheric events produce depositional energy changes
- Seasonal and atmospheric events distribute sediments and products of anaerobism and metasyntesis
- Primary requirement - pluviogenesis
- Advantage to exploration – prediction of product by kerogen type
- Foundered (least altered) kerogen

Seasonal and atmospheric events provide the means to flush clastics and organics from the swamps where they have rested and formed; these events being rainy seasons, flooding, storms and tidal currents. The seasonal or intermittent nature of such events is reflected by the microlamination, graded beds and energy and source alternation reflected in shale play deposition.

It should be well in evidence that the primary factor without which all others are moot is rain. A freely moving and energetic hydrologic cycle is the best single indicator of potential for the formation of a shale play. Rain formation or **pluviogenesis** is critical, whether locally or globally, to shale/resource play formation. This leaves us, again, with paleontologic and additionally isotopic records pointing the manner and quality of kerogen formation.

This is the essential payoff to understanding these wetlands systems for the explorationist – an abundance of clues to the specifics of source, kerogen quality (type) and best distribution models; a predictive method of product and location.

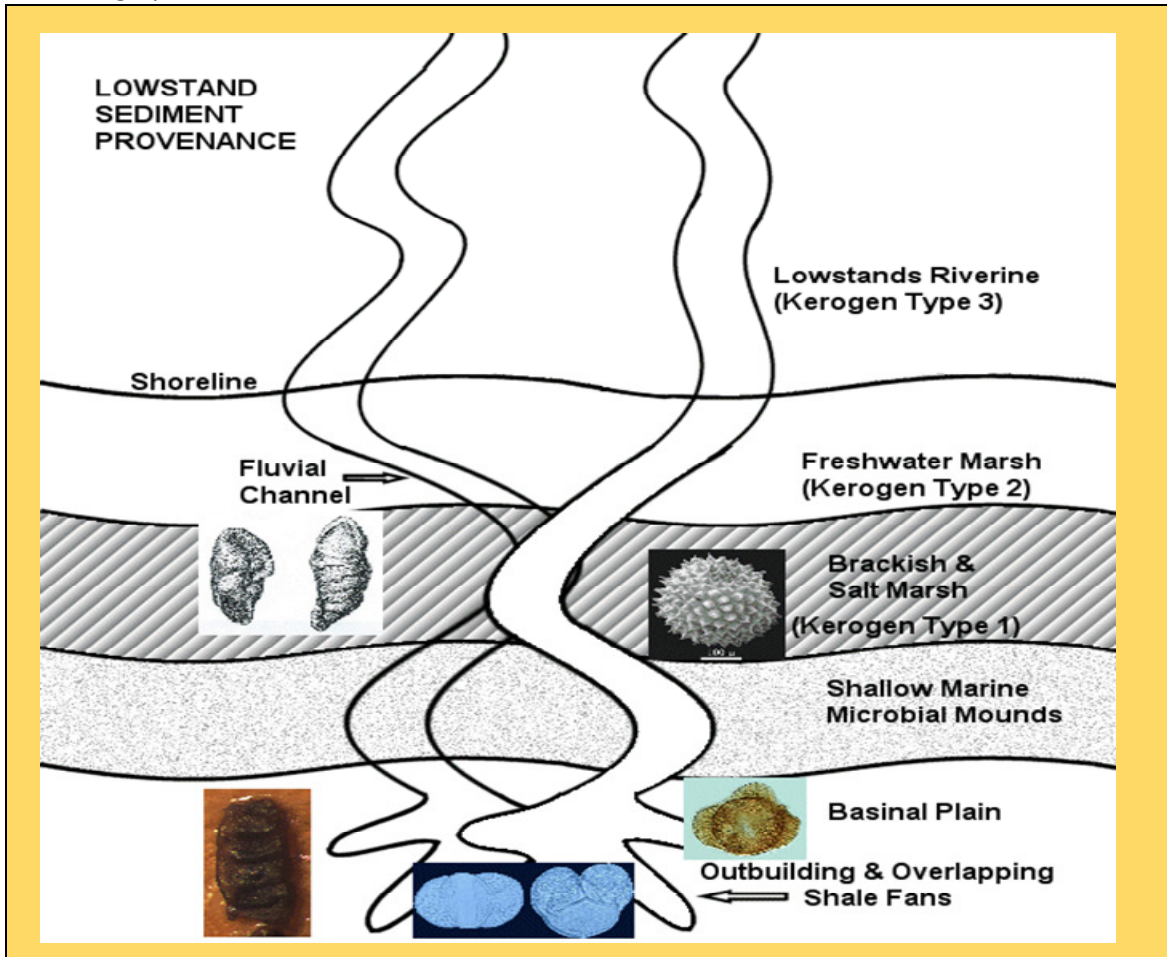


A typical lowstand sediment distribution model, highly generalized. The kerogen types most directly associated with the given biologic zone are listed. The first and foremost aspect of relative lowstand depositional systems is the tendency to minimize broad distribution of sediments from the transitional brackish and saline swamps, favoring a basinward movement and dominance of type 3 and, somewhat less, type 2 via channel and debris flows (outbuilding). This is typical of such plays as the Pearsall Group, associated with a long term relative low period in sea level. This typically yields gas with liquids. Some debris flows yield more limited source results, such as the Fayetteville, which produces only dry gas from humic sources of lowland plants.

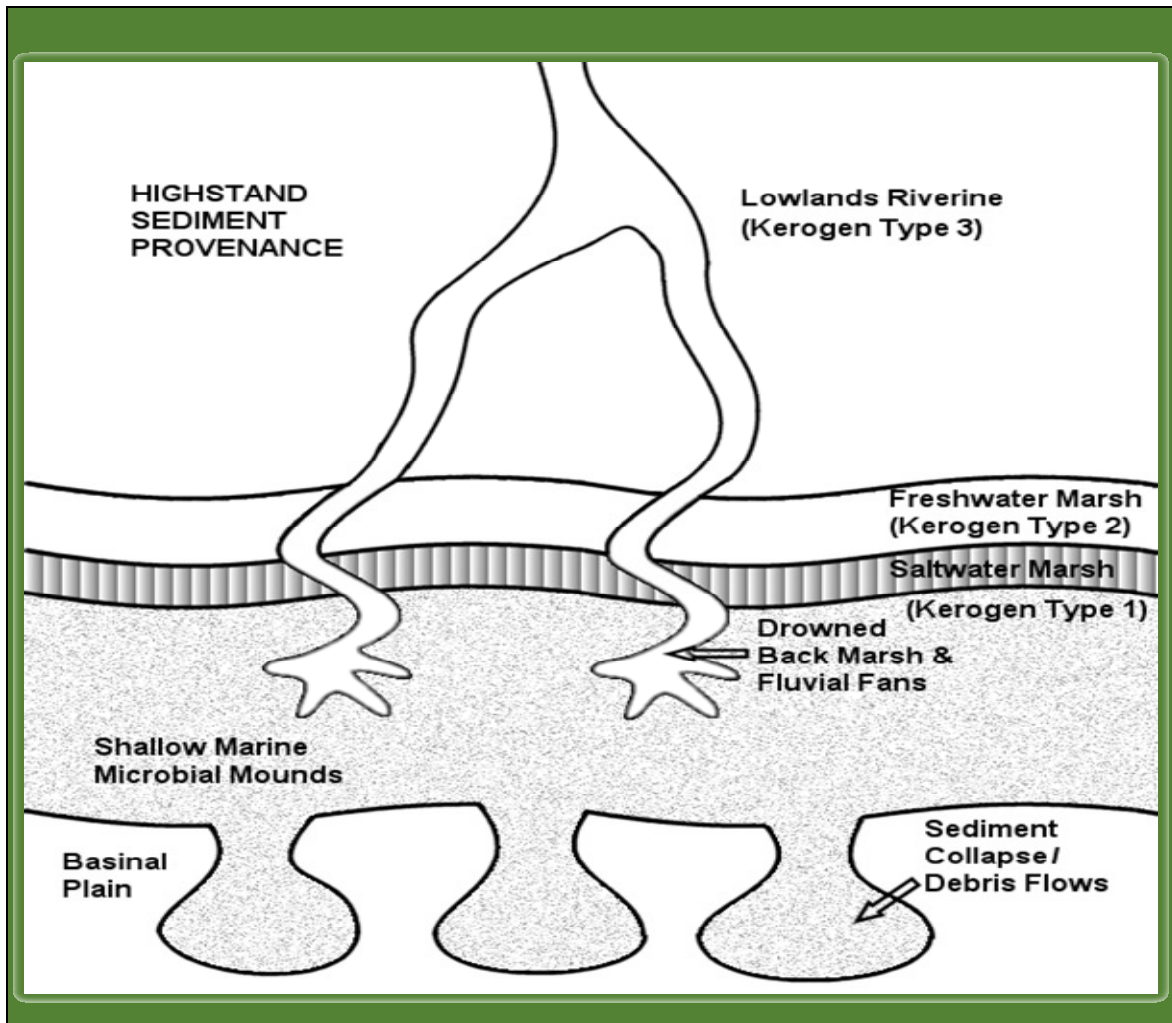
Slide 17

Sources: Starting in upper left, going clockwise -

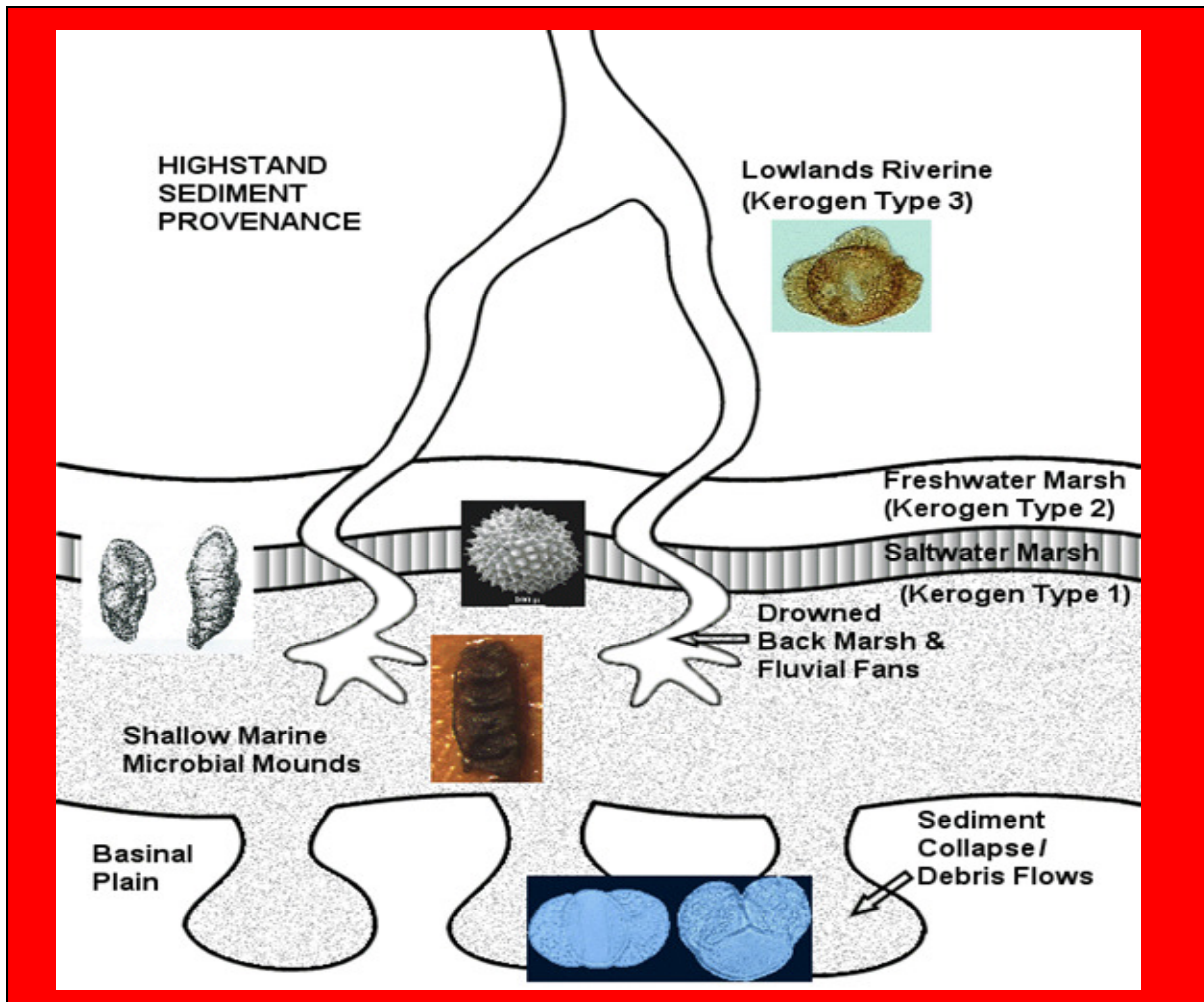
H.B. Brady 1876 "Monograph of Carboniferous and Permian Foraminifera" London Paleontographical Society 167 p. Plate VIII. --- Schaechter.asmblog.orgb --- www.sciteclibrary.ru --- imgarcade.com ---
foram micrograph, no reference.



The lowstand depositional system is reflected by fossils, both faunal and floral. The pictures are examples the dominance of both in situ species, within their environments of origin (upper boxes) and reworked species (lower boxes) riding channel currents/ sediments. The distribution and dominance patterns of these **thanatocoenoses** (death assemblages) are clues to sediment/kerogen origins and the direction from which it comes, leading to predictive method for finding its maximum accumulation (sweetspot) and the product to be found (oil, gas, condensate).

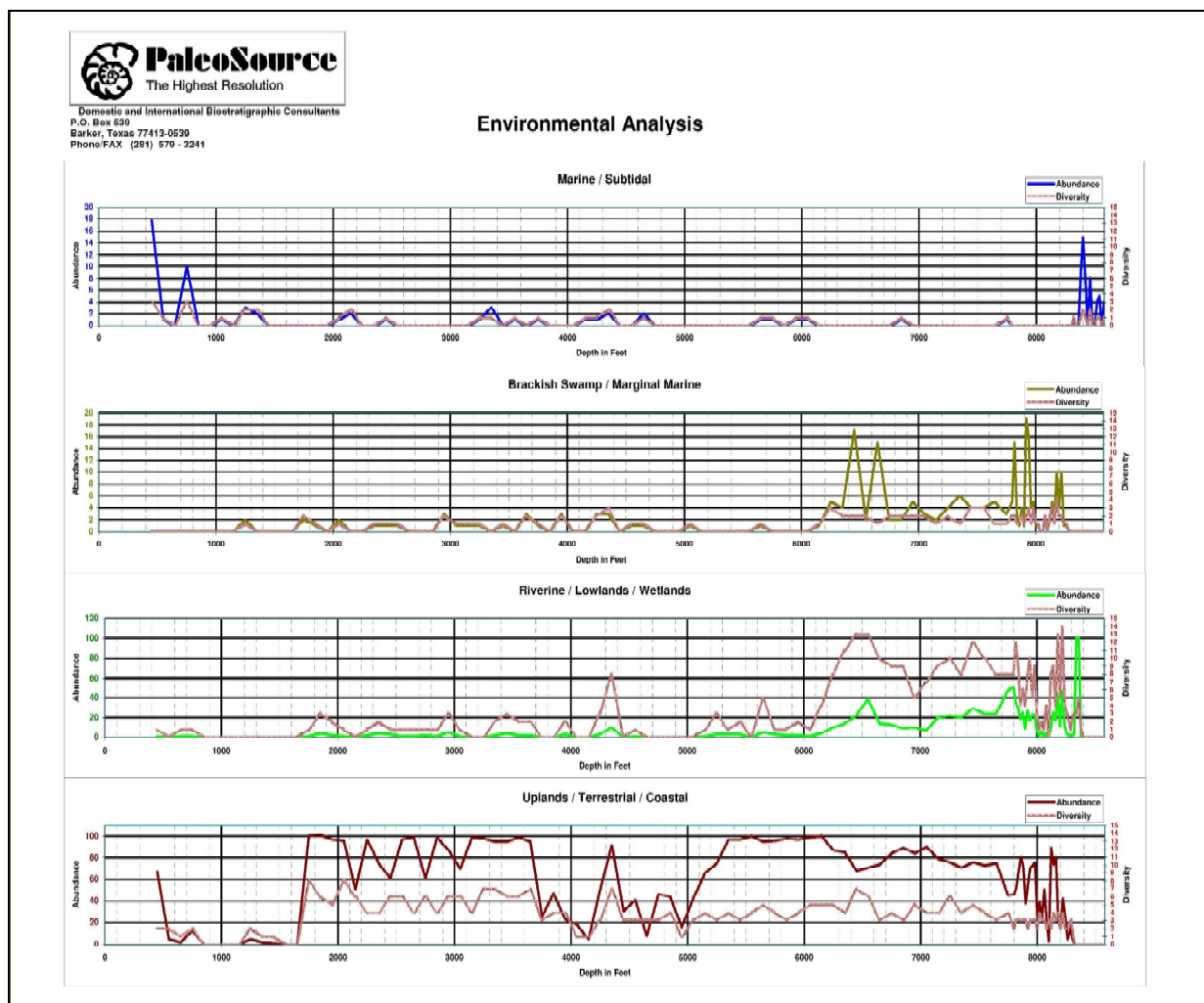


The highly generalized highstand depositional system: Channel accumulations are “drowned” back to backstepping progressions, foundering wetland and swamp sediments. Secondary distribution by mass slides and microlaminated debris flows become a prominent basin deposit.

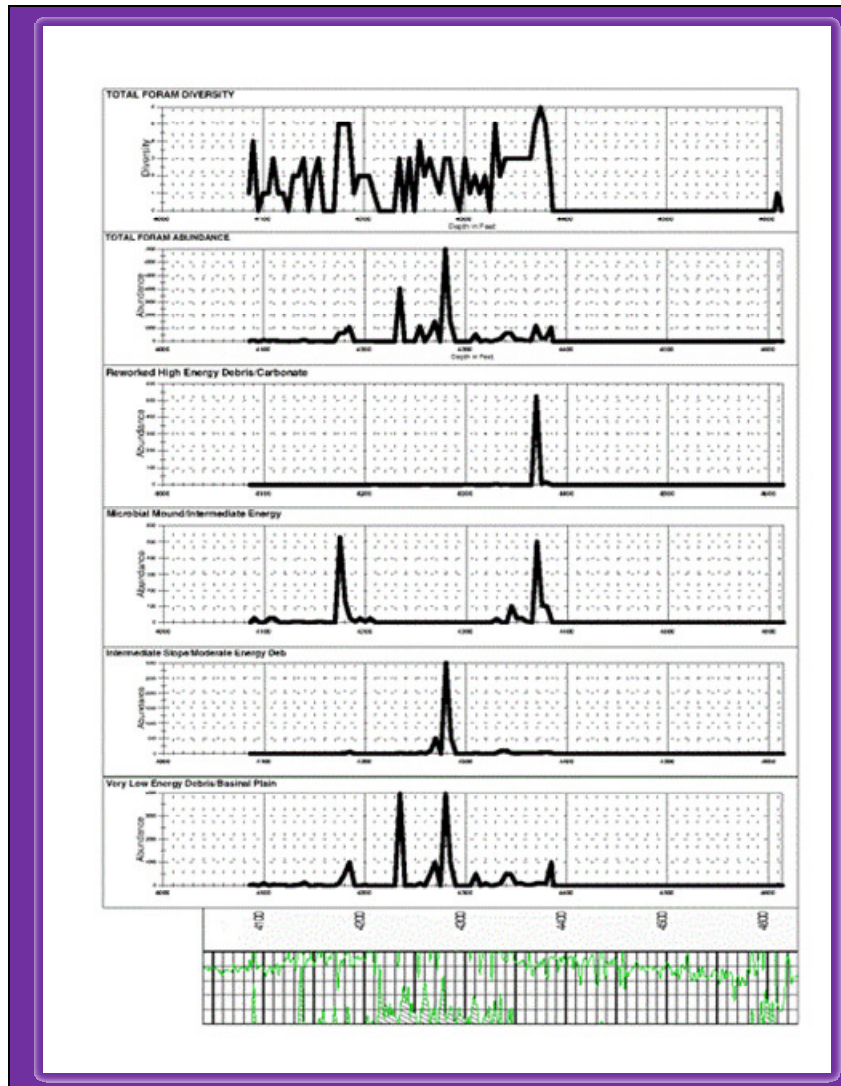


Foundered wetlands/swamp sediments during highstand deposition form thick microlaminated sequences of seasonal deposition containing rich type 1 and type 2 kerogen concentrations which may be secondarily moved basinward by collapse systems (mass wasting) and less often by liquefaction and gravity flows. Some components of humic kerogen are still winnowed into deep basinal environments by having very low density and remaining durably in suspension.

Some updip floral components (lowland origins) have broad distribution and very low dominance over the highstand shelf. Transitional environment foraminifera are narrowly distributed and may be used to identify collapse sediments.



The same composite data above displayed as normalized relative abundance. The lower curve is the abundance of those organisms associated with the dominance of humic (type three) kerogen. The large waves of abundance are typical of lowstand, outbuilding sediment sequences and gas proneness, which was the case here. The second curve from the bottom is abundance of organisms transitional from type 3 to 2 kerogen and the third curve from the bottom is abundance of organisms typically associated with type 2 kerogen environments. The uppermost curve is the relative abundance of type one kerogen environments. The tight, frequent spiking of the curves toward the right of the curves indicates microlamination and high gamma ray values. Oil potential is accurately predicted by the curves above as well as indicating its coastal source.



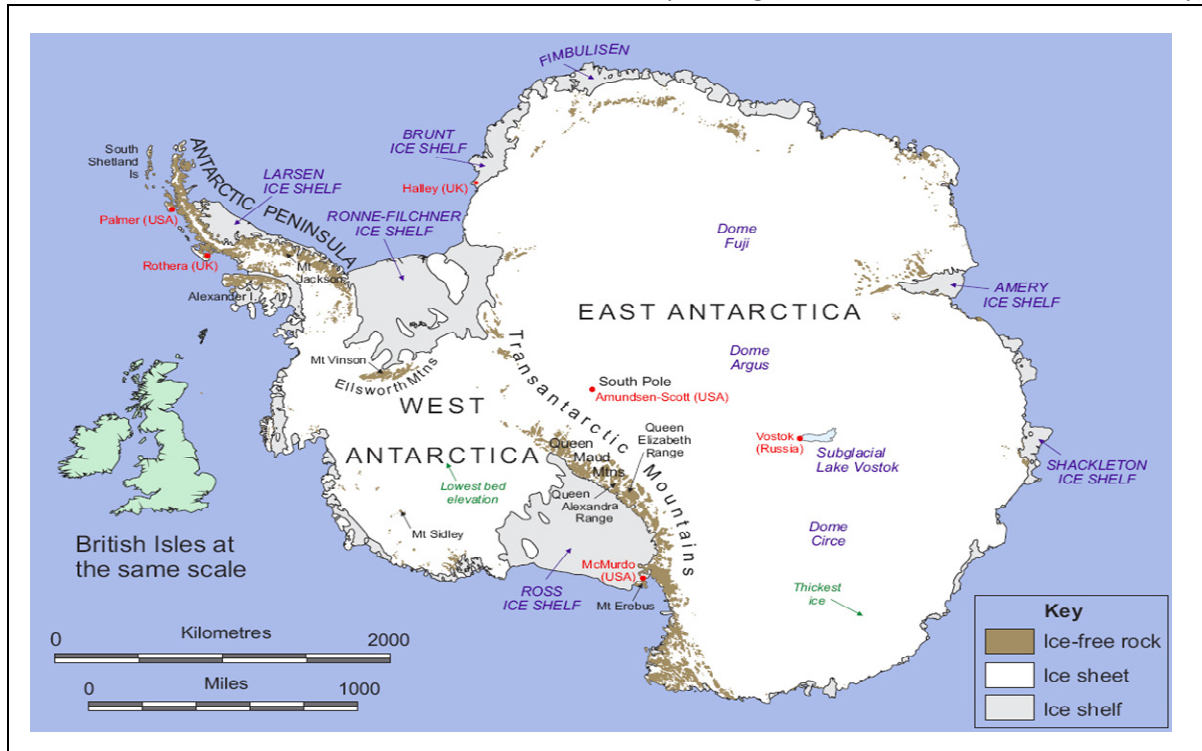
The curves above indicate (from the top) foraminiferal data for 1) abundance, 2) diversity and 3,4,5) varied shelf marine trophic affinities and (lowermost curve) 6) humic trophic affinities. Note the gamma ray value curve at the bottom. The gamma ray anomaly starting two spaces from the left is characterized as a relative lowstand shale dominated by a sequence of rapidly deposited channel debris.

Foraminifera species are distributed by the sources of food they prefer (trophic affinities). When present in large numbers, you can determine what carbon source “brings them to the table”. In this set of curves, the lowermost curve suggests the dominance of humic kerogen source or gas proneness, which was the case. The dominance of humic sources only excluded the chance of significant liquid petroleum concentrations within the gamma ray zone.

- Many of the characters common to shale plays (microlamination, intermittent anaerobism) are attributable to coastal marsh systems and their direct effects (clastic sequestration, high organic production)
- Swamp or wetlands sourcing determines the kerogen/hydrocarbon product (and depositional traits) available to these plays which can be determined by fossil content
- Foundered, low energy depositional systems have a rich potential, identified by the ancient marsh type (or bypass thereof) and location

Along with the summary above, remember the key is rainfall or the hydrologic cycle and lots of it. One of the most prolific periods of Earth was the Carboniferous. The Carboniferous was characterized by heavy rain fall, high atmospheric partial pressures (percentages) of carbon dioxide and oxygen; very warm and wet. So... (next slide)

Source: scentofpine.org (credited to British Antarctic Survey)



This final component of my talk has created the most controversy. On Randy Bissell's encouragement and near insistence, I end my talk with a comment about circumstances around the Jackson Shale Fm or the "Fail Shale". In the Late Eocene or Priabonian Stage Antarctica assumed its current position at the South Pole. This did several things, like forming new, deep cold water currents, but mostly it formed new continental glaciers. This glaciation formed a worldwide unconformity, known in the Gulf of Mexico as the Glide Plane which uses the unconformity as a decollement surface. The reason for the unconformity was that atmospheric water deposited upon Antarctica was simply taken out of play globally, yielding a severe lowstand. Once captured as Antarctic ice, the water could not return as rain. Remember: no rain or significantly less rain, no extensive swamp system to charge shale plays. Thus, the Jackson Shale has no associated swamp/wetlands system, has no high TOC of coastal origin, has no microlaminated bedding and none of the things that go with it. Welcome to the Neogene Ice Age!

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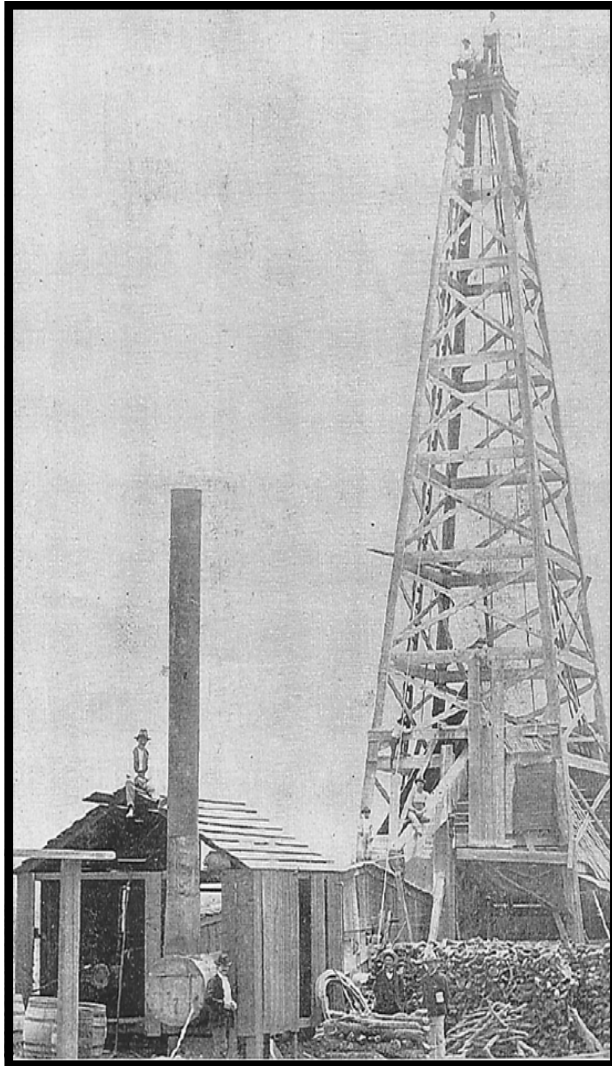
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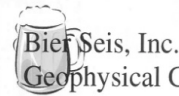
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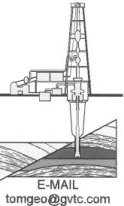


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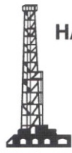
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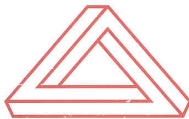
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