



# PBS-SEPM NEWSLETTER



February 2016

*"We are like a judge confronted by a defendant who declines to answer, and we must determine the truth from the circumstantial evidence."*

— Alfred Wegener

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## President's Column

Although 2016 has continued the downward slide of oil prices and the sense of uncertainty across the industry, members of the PBS-SEPM have much to look forward to over the coming weeks and months.

Over the past few months, the society has seen good attendance at our monthly luncheon meetings, with presentation topics ranging from tectonics in the Delaware Basin to the character of the Avalon Shale. Our March luncheon will feature Dr. Ryan Phelps of ConocoPhillips who will be discussing platform evolution of the Cretaceous passive margin along the northern Gulf of Mexico. The Midland Country Club has been a wonderful host since we moved our luncheons to their facility last year, providing enjoyable food and great service. If you have not attended a luncheon since the location change, consider joining us at an upcoming meeting to check it out for yourself.

Looking forward to the spring, we have been busy planning and preparing for our annual core workshop. Due to the unavailability of the Midland Center as it undergoes renovations, we have been searching for a new location

to accommodate the workshop. After exhausting other location options around town, Midland College has stepped in and is graciously providing us with a location for our workshop. More details will be forthcoming at our luncheon meetings and on the PBS-SEPM website, but we have tentatively scheduled the workshop for the **fourth week of March (March 23rd tentatively)**. If you have a core that you would be willing to present, please contact us.

We are still eager to bring back our one-day field trips, with an aim of being fun and educational to both members and their families. Many of the privately owned fossil collecting locations that have been open to PBS-SEPM groups in the past are no longer welcoming guests due to safety and legal concerns. We will continue to seek out unique one-day field trip opportunities and we hope to get something planned for late spring/early summer. If you have access to any good fossil collecting localities, or any other one-day trip ideas, please let us know.

The PBS-SEPM Intern and New Hire Field Trip will be returning in June 2016. I attended the trip

as a new hire in 2008 and it is a great opportunity for new geologists, engineers and landmen to work together and learn from knowledgeable and experienced leaders. Look for further information regarding the trip the coming months.

I would like to thank our members for continually supporting the society and being committed to furthering their education and knowledge through our luncheons, field trips and workshops. I hope to see many of you at our upcoming events.

*Alan LeFever*

**PBS-SEPM 1st Vice President 2015-2016**  
<http://www.pbs-sepm.org>

## Mark Your Calendars! [All luncheons at Midland Country Club Upstairs Ballroom]

### FEBRUARY 2016

- **9: WTGS Luncheon:** (11:30am-1pm) **Speaker:** Milly Wright, Chemostrat Inc., **Title:** Modelling TOC and Anoxia From Elemental Data in the Wolfcamp Fm: A Reality Check

- **16: PBS-SEPM Luncheon:** (11:30am-1pm) **Speaker:** Tony Lupo, SM Energy, **Title:** A Case

Study in The Pennsylvanian Cleveland Sandstone on the Nemaha Ridge: Leveraging High Resolution 3D Seismic and Stratigraphic Analysis

### MARCH 2016

- **15: PBS-SEPM Luncheon:** (11:30am-1pm), **Speaker:** Dr. Ryan Phelps, ConocoPhillips,

**Title:** Oceanographic and Eustatic Control of Carbonate Platform Evolution and Sequence Stratigraphy on the Cretaceous Passive Margin,

Northern Gulf of Mexico  
• **23: PBS-SEPM Core Workshop** (8AM-2PM; Midland College Gym #1)

## PBS-SEPM Luncheon Talk – February 16, 2016

### Tony P. Lupo

#### *“A Case Study in The Pennsylvanian Cleveland Sandstone on the Nemaha Ridge: Leveraging High Resolution 3D Seismic & Stratigraphic Analysis to Create the Conditions for Repeatable Drilling Opportunities in Complexly Distributed Reservoirs”*

Chief Geophysicist, SM Energy

Co-Author: Lee Krystinik, Fossil Creek Resources, LLC

Tuesday February 16, 2016 - Midland Country Club, 11:30 a.m.

### Abstract

Since drilling started in the 1920's along the Nemaha Ridge of north central Oklahoma and south central Kansas the Cleveland Formation has traditionally been viewed as a shallow (2,500'-3,000'), thin, tight-oil tertiary objective on the way down to other more economic objectives. By integrating high-resolution 3D seismic and detailed sequence stratigraphic analysis, thicker, productive Cleveland reservoir fairways can be identified and drilled economically on the Nemaha Ridge.

Cleveland depositional systems in the Nemaha Ridge area include river-dominated deltas and incised valleys, each with distinctive log and seismic characteristics. Deltaic reservoir successions occur in the upper two thirds of the Cleveland interval and are usually the best reservoirs. The deltaic reservoir units are composed of very fine to fine-grained sanding upward successions exhibiting dip-elongate behavior and rapid changes along strike.

Optimal drilling locations are best identified by fine-scale correlations and seismic mapping, linked to subtle syn-sedimentary tectonics. High-resolution 3D seismic and multi-attribute analysis has proven a key tool in differentiating and predicting optimal reservoir trends in this new play and sets up an opportunity for focused horizontal exploitation that can be broadly applied to a number of other similar plays in old development areas.

### Biography



Tony Lupo is currently working for SM Energy as the chief geophysicist at the corporate headquarters in Denver. He also spent two years working for both the Corporate Exploration and the Tulsa Region A&D teams for SM Energy. Before joining SM Energy, Lupo worked on the Cana Woodford and Gulf Coast asset teams for Cimarex Energy. Prior to that, he was vice president of geophysics at Fossil Creek Resources, LLC in Arlington, TX and before joining Fossil Creek Resources he worked in Samson Resources' Mid-Continent division where he

helped establish enhanced acquisition and interpretation technologies prospecting for various deep gas plays that were a significant component of its portfolio. Lupo began his career at ConocoPhillips working with various assets teams, including West Africa, the Gulf of Mexico, Alaska and the Mid-Continent. As part of ConocoPhillips' Integrated Geologic Analysis group, he focused on advanced interpretation techniques, rock physics, high-resolution seismic acquisition and processing, particularly in the Mid-Continent, where his efforts significantly reduced risk in key stratigraphic plays and were used to help identify several previously undocumented plays. Lupo has 15+ years of oil and gas industry experience, holds a B.S. in geology from Grand Valley State University and an M.S. in geophysics from New Mexico Tech.

“An education isn't how much you have committed to memory, or even how much you know. It's being able to differentiate between what you do know and what you don't .”

“Chance favors the prepared mind.”

- Louis Pasteur  
(1822-95)  
French chemist and bacteriologist.



# PBS-SEPM Publication Carbonate Log Analysis Spreadsheet v. 4.0

By: Cory L. Hoffman

March 2016 Release Date / Designed for Microsoft Office Excel 2013



**Carbonate Log Analysis Tool**  
**NEW AND IMPROVED!**

- Analyze up to 7500 data rows (depths)
- Color-code up to 5 different series of data points on plots
- GR, Sw, and porosity filters hide unwanted points on plots and analyses
- Quick Rt, Quick Rxo, Sonic Porosity, Total Porosity from raw input data
- Input data plotted: GR, N/D/Sonic/Total porosity, Rxo and Rt
- Performs 11 carbonate log analysis techniques simultaneously:
  - Secondary porosity using sonic or resistivity data
  - Archie Sw, PRI, Ratio Water Saturation, MHI, BVW
  - Sw using variable 'm' (Nugent, Borai, Focke & Munn, user-defined)
  - Uses R<sub>Z</sub> technique if no Rxo device present
- Interprets results & highlights potential pay zones meeting user cutoffs
- Generates interpretive plots: Dew, Buckles (BVW), Pickett
- Includes guide to interpreting log analysis results

**Core Data Analysis Tool**

- Integrates capillary pressure and core perm/porosity data
- Winland R<sub>35</sub> and K/Φ methods (port size) for rock quality
- Plots up to 20 capillary pressure curves
- Plots depth profiles of porosity, perm, K/Φ
- Plot multiwell Sw vs subsea to evaluate apparent OWC
- Includes guide to interpreting Winland R<sub>35</sub> and K/Φ results

Ratio Index (PRI)	Quicklook PRI Interp.	Archie Water Saturation	Ratio Water Saturation	Swa/Swr Ratio Interpretation	Hydrocarbon Index (MHI)	MHI Using Rz	Quicklook MHI Interpretation	Bulk Volume Water BVW
PRI	PRI Interp.	Swa (m=2)	Swr	Swa/Swr	Swa/Sxo	Sw/SI	MHI Interp.	BVW
0.018	OIL	20%	33%	Interparticle - Swa reliable	0.408	--	HC present + moved	0.018
0.021	OIL	26%	28%	Interparticle - Swa reliable	0.360	--	HC present + moved	0.021
0.015	OIL	15%	20%	Interparticle - Swa reliable	0.275	--	HC present + moved	0.015
0.006	OIL	29%	45%	Moldic/Vuggy/High ROS - Swr reliable	0.530	--	HC present + moved	0.006
0.019	OIL	25%	35%	Interparticle - Swa reliable	0.427	--	HC present + moved	0.019
0.019	OIL	22%	19%	Interparticle - Swa reliable	0.270	--	HC present + moved	0.022
0.023	OIL	23%	8%	Interparticle - Swa reliable	0.138	--	HC present + moved	0.005
0.023	OIL	73%	68%	Interparticle - Swa reliable	0.735	--	????	0.031
0.005	OIL	22%	5%	Bimodal/Fracture - Swa reliable	0.087	--	HC present + moved	0.011
0.002	GM	19%	31%	Interparticle - Swa reliable	0.390	--	HC present + moved	0.002

**PRICE: \$40** (all proceeds go directly to PBS-SEPM; nominal shipping charges may apply)

- Get 2 tools for 1 low price — spreadsheet includes carbonate log analysis AND core data analysis tools
- Flash drive contains current version (Excel 2013; v. 4.0) and previous version (Excel 2010; v. 3.2) of spreadsheet
- Price includes free upgrades within version class (v. 3, v.4, etc.) for each registered user

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Please send registration and payment information: PBS-SEPM, P.O. Box 1595, Midland, Texas 79702

For additional information contact: **PBS-SEPM office** (432) 683-1573.

## PBS-SEPM Luncheon Talk – March 15, 2016

### Dr. Ryan Phelps

*“Oceanographic and Eustatic Control of Carbonate Platform Evolution and Sequence Stratigraphy on the Cretaceous (Valanginian-Campanian) Passive Margin, Northern Gulf of Mexico”*

**Geologist, ConocoPhillips**

Tuesday March 15, 2016 - Midland Country Club, 11:30 a.m.

### Abstract

An integrated study based on outcrop, core, chemostratigraphic, and wireline log data documents the combined impact of Cretaceous eustasy and oceanic anoxic events on carbonate platform morphology and facies distributions in the northern Gulf of Mexico. The diverse facies and abundant data of the Comanche platform serve as a nearly complete global reference section and provide a sensitive record of externally driven oceanographic conditions affecting Cretaceous platform development. Regional cross-sections across the shoreline to shelf-margin profile provide a detailed record of mixed carbonate-siliciclastic strata for the Hauterivian through lower Campanian stages (~136-80 Ma). The study also documents the impact of oceanic anoxic events and global eustasy on deposition of the Hosston Formation through Austin Chalk along the San Marcos Arch of central Texas. Changing reef margin facies patterns and architecture are examined in relation to shelf interior lithologies and oceanographic changes.

Three second-order supersequences comprised of eight composite sequences are recognized in the Valanginian-Barremian, the Aptian-Albian, and the Cenomanian-Campanian. Oceanic anoxic events 1a, 1b, 1d, and 2 occurred immediately before, after, or during shale deposition in the Pine Island Member, Bexar Member, Del Rio Formation, and Eagle Ford Group, respectively. Oceanic anoxic event 3 corresponds to deposition of the Austin Chalk Group. Each period of oceanic anoxia is associated with composite sequence maximum flooding, termination of carbonate shelf sedimentation, and deposition of condensed shale units in distally-steepened ramp profiles. Using chemo- and sequence-stratigraphic observations, a four-stage model is proposed to describe the changing facies patterns, fauna, sedimentation accumulation rates, platform architectures, and relative sea-level trends of transgressive-regressive composite sequences that developed in response to global carbon-cycle perturbations. Some of these oceanic anoxic events led to deposition of organic-rich source rock intervals on the platform. The relationships between reservoir units and source rock intervals will be briefly examined.

### Biography



Ryan Phelps is a carbonate geologist currently employed by ConocoPhillips in Houston, TX. He graduated with a BS degree from Trinity University in San Antonio, TX where he studied Holocene lacustrine sedimentology and paleobiology (2004). He then completed an MS degree in carbonate sedimentology-stratigraphy at The University of Texas at Austin (2006) with a focus on outcrop sequence stratigraphy in the Permian San Andres Formation of the Guadalupe Mtns. Ryan then began a doctoral program and completed a PhD at The University of Texas at Austin (2011). Research efforts focused on

Cretaceous subsurface sequence stratigraphy in south-central Texas and the relationships between shelf and reef margin facies patterns. In addition, he documented the impact of multiple Oceanic Anoxic Events (OAE's) on the development of the carbonate platform. His recent work with ConocoPhillips initially focused on reservoir characterization and karst prediction within multiple San Andres and Grayburg fields of the Permian Basin. Subsequent efforts were devoted to description and reservoir quality analysis of the Eagle Ford shale, Austin Chalk, and Niobrara Formation. His current assignment within the Williston Basin Reservoir Characterization team has led to extensive study of reservoir properties in Bakken and Three Forks reservoirs.

“In rivers, the water that you touch is the last of what has passed and the first of that which comes; so with present time.”

— Leonardo da Vinci  
(1452 - 1519)

“You cannot teach a man anything; you can only help him discover it in himself.”

— Galileo Galilei  
(1564 - 1642)  
Italian physicist, mathematician, engineer, astronomer, and philosopher.

**PBS-SEPM Publications**



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For additional information **contact: PBS-SEPM office (432) 683-1573.**

## PBS-SEPM Executive Board (2015-2016)

<b>President:</b>	John Leone	<a href="mailto:John.Leone@whiting.com">John.Leone@whiting.com</a>
<b>President-Elect:</b>	Cory L. Hoffman, Ph.D.	<a href="mailto:choffman@sm-energy.com">choffman@sm-energy.com</a>
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<b>Previous President:</b>	Curtis Helms Jr.	<a href="mailto:cdhelms@suddenlink.net">cdhelms@suddenlink.net</a>

*"Science is facts; just as houses are made of stone, so is science made of facts; but a pile of stones is not a house, and a collection of facts is not necessarily science."*

- Jules Henri Poincaré  
(1854-1912)  
French mathematician

*Do you have an idea for an interesting luncheon talk? Have a core workshop you'd like to present? Have some suggestions on how PBS-SEPM can better serve the geologic community? Just click on the e-mail above & drop us a note, your PBS-SEPM Executive Board would love to hear from you!*

## Corporate Sponsorships (2015-2016)

Your Company Logo could be in this space showing your support of PBS-SEPM.

Your support lifts your corporate name within the Permian Basin.

If you are interested in a sponsorship opportunity, please call Paula Mitchell-Sanchez for more details at (432) 683-1573.



**PBS-SEPM is grateful for the generosity of these fine corporate sponsors!**

*"No one is useless in this world who lightens the burden of it for someone else"*

- Benjamin Franklin



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**We're on the Web!**  
[www.pbs-sepm.org](http://www.pbs-sepm.org)

“..In reply, I can only plead that a discovery which seems to contradict the general tenor of previous investigations is naturally received with much hesitation.”

*[Charles Lyell](#),  
British Lawyer, Geologist,  
(1797 - 1875)*

**PBS-SEPM is the Permian Basin Section of SEPM—the Society for Sedimentary Geology. However, you do not need to be a SEPM member or a geologist to join PBS-SEPM.**

**Our non-profit society relies upon the efforts of dedicated volunteers to serve the geological community—primarily through educational events. These events include monthly luncheon talks, core workshops, annual field trips, and special geological publications. Additionally, we are involved on the college campuses—reaching out to future earth scientists through scholarships, discounted memberships, and offering full-time geology students the ability to participate in professional-grade field trips at little to no cost.**

**If you would like to join PBS-SEPM, you may visit our website ([www.pbs-sepm.org](http://www.pbs-sepm.org)) to learn more about us, download a membership form, and learn how to get involved.**

### **Individual Sponsors of PBS-SEPM (2015-2016)**

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#### ***Your Business Card Could be here***

Your card will be in every newsletter for one year May to May, on the Website, the Power Point shown prior to every luncheon and in the calendar credits.

**“Volunteering is an excellent way to provide meaning in your life and help give back to your local community.”**

*Peter Muggeridge*