



*"Science is the great  
antidote to the  
poison of enthusiasm  
and superstition."*

— Adam Smith —  
(1723-1790)  
Scottish Economist

#### Inside this issue:

- PBS-SEPM January Luncheon**, Speaker: Dr. Evan Franseen, U. Kansas, KICC, KGS, Title: Character of the Avalon Shale (Bone Spring Fm.) of the Delaware Basin, W. TX and SENM: Effect of Carbonate-rich Sediment Gravity Flows **2**
- PBS-SEPM Executive Board 2015-2016** **3**
- PBS-SEPM 2016 Field Trip**: Carbonate Reservoir Characterization: From Rocks to Fluid Flow Simulation Using Sequence Stratigraphy, Paradox Basin, Utah, May 12-15 **4**
- PBS-SEPM Digital Publication Project DVD order form** **6**
- Individual Sponsors About PBS-SEPM** **7**

# PBS-SEPM NEWSLETTER



December 2015

## President's Column

As we enter into the final days of 2015, we recognize that it is a difficult time for many of our members who are tied directly or indirectly to the oil and gas industry. The industry was hoping for a quick recovery in commodity prices similar to 2008, but now in December with oil prices dropping below \$35/bbl the reality of a longer recovery has set in for most. As many companies have begun to shift from growth to survival mode, our geologic professionals are understandably concerned about what their future holds. In such an environment, it is easy for a non-profit society like PBS-SEPM that relies on volunteerism and sponsors in order to function to similarly be concerned when our membership is affected negatively.

But it is precisely in this environment that our membership needs PBS-SEPM the most. Similar to the national society, SEPM, we are dedicated to the dissemination of scientific information on sedimentology, stratigraphy, and a variety of other geologic disciplines. This translates into the continuing education of our membership through high-quality, low-cost training events. Our monthly luncheon talks bring in excellent speakers that discuss

cutting edge research and topics relevant to our membership. Annual core workshops expose our membership to the depositional and diagenetic complexities of the producing formations within the Permian Basin in order to highlight opportunities and risks. Our annual field trip allows members to study geologic analogs on a reservoir scale under the guidance of experts from industry and academia. Our Young Professionals field trip enables those new to the industry to not only broaden their skills and deepen their understanding of the relevant geologic, engineering, and land disciplines, but integrate and apply these disciplines in a simulated exploration exercise using real-world data and analogs.

To continue to serve you as a society, we need two things from our membership—(1) feedback on the kinds of training and topics that are the most valuable to you, and (2) your continued support through volunteerism and event participation.

As for feedback, if you have suggestions for training events or topics to cover, please contact one of the Executive Board members with your ideas. We are currently soliciting ideas for new

training events and one-day field trips.

As for volunteerism, as we work to put together the Core Workshop for late March, we would appreciate your willingness to show some of your favorite cores. We also have a few openings on our committees, most notably the one for the Robert L. Read, Jr. Distinguished Lecture Series, which is fully funded and ready to be implemented.

As for participation, we hope you will seriously consider our annual field trip this year focusing on the Pennsylvanian carbonates of the Paradox Basin with Rick Sarg and Jim Weber. The trip will begin and end in Durango, CO, May 12 – 15, 2016. Please note the registration deadline of **January 31, 2016**.

In closing, I'm optimistic about what 2016 will bring to the industry, and certainly excited about the continuing education PBS-SEPM is offering. Thanks for your continued support!

*Cory L. Hoffman, Ph.D.*  
**PBS-SEPM President Elect  
2015-2016**  
<http://www.pbs-sepm.org>

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

### **JANUARY 2016**

- **5: WTGS Luncheon**: (11:30am-1pm) **Speaker: Dr. Thomas Ewing**, Frontera Expl. Consultants, **Title: Building West TX: Insights From 'Texas Through Time'**
- **19: PBS-SEPM Luncheon**: (11:30am-1pm) **Speaker: Dr. Evan Franseen**, U. Kansas,

KICC, KGS, **Title: Character of the Avalon Shale (Bone Spring Fm.) of the Delaware Basin, W. TX and SENM: Effect of Carbonate-rich Sediment Gravity Flows**

### **FEBRUARY 2016**

- **9: WTGS Luncheon**: (11:30am-

1pm), TBA

- **16: PBS-SEPM Luncheon**: (11:30am-1pm), TBA

### **MARCH 2016**

- **15: PBS-SEPM Luncheon**: (11:30am-1pm), TBA
- **Core Workshop** (TBA)

## PBS-SEPM Luncheon Talk – January 19, 2016

**Dr. Evan K. Franseen**

### *“Character of the Avalon Shale (Bone Spring Fm.) of the Delaware Basin, West Texas and Southeast New Mexico: Effect of Carbonate-rich Sediment Gravity Flows”*

**Professor, University of Kansas**

Co-Authors: Dustin J. Stolz and Robert H. Goldstein

Tuesday January 19, 2016 - Midland Country Club, 11:30 a.m.

### **Abstract**

Sediment-gravity-flows (SGFs) can distribute large quantities of shelf or slope carbonates to deeper basinal settings, forming heterogeneous deposits, which may develop conventional and unconventional hydrocarbon reservoirs, or even negatively impact reservoir properties. The upper Leonardian (Lower Permian) Avalon Shale (1st Bone Springs Carbonate) in the Delaware Basin consists of hundreds of meters of organic-rich siliciclastic mudstones interbedded with carbonate-rich SGF deposits. Much remains to be learned about what controls the sweet spots in this largely unconventional hydrocarbon system.

This study integrates core and well-log data to understand the distribution of SGFs and their effect on Avalon Shale reservoir properties in Culberson, Reeves and Loving Counties, Texas and Eddy County, New Mexico. Carbonate platforms (ramps) that surrounded this basinal area during the Leonardian gave rise to apron, sheet, submarine fan, and linear SGF geobodies throughout the basin. Individual source areas varied in prominence through time, creating two phases of deposition dominated by submarine fan development in the north separated by a phase dominated by apron development in the northwest and sheet deposition in basin-central areas. Sea-level fluctuations, reflected in sequences identified on the shelf, are a possible control for the regional three-phase fan-apron-fan succession in the basin. Backstepping geometries identified in the apron phase suggest development during transgression/highstand, when production moved proximally on the ramp, whereas fans were deposited during regression/lowstand when production moved distally on the ramp.

Reservoir potential of this system is largely controlled by carbonate content. Increased carbonate content is linked to poorer reservoir quality compared to surrounding mudstones, and shows that carbonate-rich facies do not add a conventional component to this unconventional system. The multiple sources that varied spatially and temporally controlled the location of the better reservoir rock. Submarine fans that formed during regression/lowstand were not deposited during transgression/highstand, and subsequently were covered in thick muddy deposits. Submarine fans created positive relief that limited the extent of other SGFs, resulting in better mudstone reservoir facies being deposited in relatively proximal positions around the margins of the submarine fans.

### **Biography**



Dr. Evan Franseen received his B.S. and M.S. degrees and his Ph.D. from the University of Wisconsin-Madison. He joined the University of Kansas in 1989 and is currently a professor in the Department of Geology, co-leader of the Kansas Interdisciplinary Carbonates Consortium (KICC), and Senior Scientific Fellow at the Kansas Geological Survey. He served as SEPM President in 2013-2014. Evan's current research interests are sedimentology, sequence stratigraphy, and diagenesis of carbonate and mixed carbonate-siliciclastic systems.

“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 Executive Board (2015-2016)

<b>President:</b>	John Leone	<a href="mailto:John.Leone@whiting.com">John.Leone@whiting.com</a>
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<b>Previous President:</b>	Curtis Helms Jr.	<a href="mailto:cdhelms@suddenlink.net">cdhelms@suddenlink.net</a>

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*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!*

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*"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

## Corporate Sponsorships (2015-2016)

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**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

## PBS-SEPM 2016 Field Trip: May 12-15, 2016

### CARBONATE RESERVOIR CHARACTERIZATION: From Rocks to Fluid Flow Simulation Using Sequence Stratigraphy, Paradox Basin, Utah, USA

**LEADERS:** J.F (Rick) Sarg<sup>1</sup>, L.J. (Jim) Weber<sup>2</sup>, T. (Tom) Chidsey<sup>3</sup> and S. (Scott) Ridder<sup>4</sup>

**Thursday, May 12 – Sunday, May 15, 2016**

(trip begins and ends in Durango, Colorado)



**FEE: \$1,450** (includes ground transportation from Durango Doubletree Hotel to Four Corners and back, five nights' lodging (double occupancy, beginning on Wednesday, May 11), river rafting, breakfasts in Bluff, all lunches, one group dinner, refreshments, and guidebook).

**Participants responsible for travel arrangements and expenses to/from Durango, CO.**

**For trip details see following page —>**

<sup>1</sup>Colorado School of Mines; <sup>2</sup>ExxonMobil Exploration; <sup>3</sup>Utah Geologic Survey, <sup>4</sup>Brigham Young University

"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 2016 Field Trip: May 12-15, 2016 (cont.)

### CARBONATE RESERVOIR CHARACTERIZATION: From Rocks to Fluid Flow Simulation Using Sequence Stratigraphy, Paradox Basin, Utah, USA

#### Introduction and Goals

Deeply incised canyons along the San Juan River provide spectacular exposures of Upper Paleozoic rocks that produce oil in the nearby subsurface of the Paradox Basin of southwestern Colorado and southeastern Utah. These outcrops along with selected subsurface cores will be examined within the context of a mixed carbonate-siliciclastic-evaporite depositional system that may be analogous to other oil producing basins. Particular attention will be devoted to the cyclic nature of Upper Carboniferous strata and the vertical and lateral variation of reservoir and associated non-reservoir rocks. Heterogeneity of lagoon/tidal flat, sand shoal, and reef/mound settings will be investigated as these major depositional systems produce oil and gas in the Paradox basin. Carbonate source rocks in the basin are discussed for their potential as unconventional targets.

The goals of the field trip are to demonstrate how outcrop and subsurface data are integrated to develop reservoir models and in particular permeability models within the context of a predictive sequence stratigraphic framework. The stratigraphic architecture of the giant Aneth Field will be used to generate maps that predict the distribution and quality of stratified carbonate reservoirs. Engineering and petrophysical data are integrated with the geology to refine and validate geologic concepts and develop an understanding of interwell- and reservoir-scale heterogeneities that affect fluid flow and hydrocarbon recovery processes. Methods and concepts discussed are applicable to exploration and producing ventures worldwide.

With river rafts, we will examine the architecture of algal mound buildups at 8-Foot Rapids. Vertical facies successions and the cyclic nature of the strata will be studied in sections at Raplee Anticline and Honaker Trail. These field localities will be used to generate discussion involving the significance of lateral and vertical variability of rock types and their impact on the exploration and production history in the basin. In addition, we will discuss how high resolution sequence stratigraphy is applicable to exploration and producing ventures worldwide.

#### Itinerary

Day one of this trip will begin in Durango, Colorado on Thursday May 12<sup>th</sup>, 2016 with background geology presentations and core examination of the Aneth Field. On day two, we will travel from Durango to Bluff, Utah via several stops north of Durango and at the Aneth Field to introduce the participants to the outcrop geology and reservoirs of the Paradox Basin. On day three, we will hike down Honaker Trail to look in detail at the vertical succession, compare lateral off-mound facies to the reservoir facies at the Aneth Field, and to extend the sequence stratigraphic framework. On day four, we will raft down the San Juan River to observe (1) vertical and lateral variability of reservoir facies (e.g., algal mounds and carbonate sand shoals), (2) porosity and permeability distribution within and between buildups, and (3) petrophysical characteristics of reservoir facies. In addition, we will hike through part of the Raplee Anticline section to examine the transgressive to regressive character of the stratigraphy, general facies types, vertical stacking patterns of high-frequency cycles, biostromal mound geometries, and stacked ooid shoals. The trip will end in the evening of day four, Sunday May 15<sup>th</sup> in Durango, Colorado.

Please note that some of the field stops of this field trip involve walking and climbing in rough terrain. Participants should be physically prepared for climbs and hikes that gain 300 to 1,000 feet (100-300 m) elevation at 5,000-6,000 feet (1500-1800 m) altitude and high temperatures (90 degrees F; 32 degrees C).

**Total cost of the field trip is \$1,450. A non-refundable deposit of \$500 is required by January 31, 2016. A second installment payment of \$500 is due by April 1, 2016. The balance of \$450 is due by April 30, 2016. You may pay the full amount in advance, if desired.**

**Participants are responsible for their travel arrangements and expenses to/from Durango, CO.**

For more information, please visit [www.pbs-sepm.org](http://www.pbs-sepm.org) or call 432-683-1573

*"No man ever  
steps in the  
same river  
twice, for  
it's not the  
same river  
and he's not  
the same  
man.  
Nothing  
endures but  
change."*

Heraclitus of Ephesus  
(535-475 BCE)  
Greek philosopher

*"Chance  
favors the  
prepared  
mind."*

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

## PBS-SEPM Publications



### **PBS-SEPM Symposia And Core Workshops on 3 DVDs**



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**[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.**

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Individual sponsors are advertised on the PBS-SEPM website and each Newsletter. Cost is \$85/year. If you are interested in an individual sponsorship opportunity, please call Paula Mitchell-Sanchez for more details at (432) 683-1573.

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

*Peter Muggeridge*