Deep-water Clastic Reservoirs: Processes and Products

Tuesday 17th March – Wednesday 18th March

Overview:

This 2-day seminar is designed to provide professionals with a modern awareness of the full spectrum of marine siliciclastic stratigraphy and petroleum reservoirs. Taught from the perspective of an exploration business unit, diverse industry datasets are used throughout the collaborative course to illustrate the broad variation and scale of primarily deep-marine depositional environments and their petroleum reservoirs, seals, and traps. This course dives downslope in a marine depositional system and examines feeder systems that link the shelf to submarine canyon, to submarine fan, to outer fan, to distal basin plain, using many of the most illustrative outcrop, core, and seismic examples from various active and passive margins – including key examples from petroleum basins in Asia-Pacific.

This course is designed to give industry professionals an appreciation of the predictive attributes of deep-water stratigraphy and reservoirs, as well as knowledgeable insight into the scale and architecture of the wide range of deep-water depositional systems. This course draws from materials presented in field courses to outcrops and petroleum basins worldwide.

The modifying term “deep-water” is often misunderstood, and it does not imply that these types of rocks are found only in modern offshore environments. Rather, many of the petroliferous basins onshore today are filled with shallow-water and deep-water marine strata including turbidites and intervals of interbedded mudstone.

The benefits of attending:

This course will give participants an understanding of the broad scope of deep-water stratigraphic reservoir characterization. By the end of the course, participants will be able to:

- Describe transport and depositional processes for the different types of sedimentary petroleum reservoirs along passive and active margins
- Map several of the different types of marine siliciclastic depositional environments (deltaic environments and those of submarine fans, valleys, and aprons – canyon, channel, levee, splay, overbank) and their implications to petroleum reservoir architecture and reservoir quality
- Use lithofacies and stratigraphic architecture to understand variations in reservoir properties pertaining to reservoir presence, reservoir quality, and seal presence acting to form internal reservoir barriers and baffles
- Integrate seismic, outcrop, core, and other oil and gas industry data to inform drilling decisions
- Use modern and ancient depositional systems to understand geologic risk and uncertainty
in exploration and development drilling campaigns

- Characterize turbidites, debrites, and transitional to hybrid flow type deposits and describe their transport and depositional processes
- Apply predictive attributes to reservoirs in the context of reservoir appraisal and development
- Build depositional models using first principles to characterize deep-water reservoir properties
- Apply source-to-sink transport and sequence stratigraphic methods to marine and deep-water sediment delivery
- Understand the context, limitations, and utility in datasets used to perform seismic interpretation, reservoir characterization, core analysis, geophysical log interpretation, sequence stratigraphy, play fairway mapping, risk and uncertainty analysis, gross depositional environment mapping, STOOIP calculation, and oil and gas exploration methods

Description:

How we help build your skill set:

This course will alternate between inclusive lectures, hands-on technical demonstrations, and intensive collaborative exercises involving practical application of cores, outcrops, logs, seismic, and other industry data.

The course starts with an overview of sediment gravity flows and how they accumulate to form some of the most prolific petroleum reservoirs on Earth. Both the scientific and economic drivers of understanding deep-water depositional systems are emphasized, and modern and ancient analogues are discussed. Next, exercises involving core, outcrop, and seismic data are used to interpret gross depositional environments and ultimately define common risk segment maps, all while observing the scale and architecture of marine depositional systems formed by turbidity currents, debris flows, mass-transport events, and other processes associated with deep-water environments from outer shelf, to slope, to basin plain. Integration of additional reservoir quality data enhances the understanding of appraisal and development drilling options. Throughout the 1-day course, geologic risk and uncertainty concepts will be applied to the exercises.

The course will conclude with a summary discussion of the realistic expectations in siliciclastic petroleum reservoirs, as well as new research that is changing these paradigms. By the end of the course, participants will be able to map depositional systems at a variety of scales using disparate data and discuss the implications for reservoir and seal properties.

Learning level:

Intermediate.
Participants’ profile:

This course is designed for employees of all ages primarily interested in clastic stratigraphy and reservoirs as they pertain to the exploration and development of oil and natural gas. Professionals may be engaged in technical to management positions.

Why attend?

- Industry professionals engaged in reservoir characterization possess this knowledge, and expect others to as well.
- Business decisions, including final investment decisions, are based on the concepts presented in this course.
- An understanding of reservoir characterization is critical for the development of accurate subsurface models.
- There is high demand for technical and business professionals with these skills.

Venue:

Pan Pacific Perth, 207 Adelaide terrace

Tickets:

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<th>Category</th>
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Comments on instructor’s teaching from previous AAPG (USA) engagements and others:

“I have never been impressed with a geological talk the way I was impressed with Jon’s: clear, sharp, with lots of facts, and entertaining.” – Third Annual Geoscience Symposium participant – Odessa (25 Apr. 2019)


“This course covered leading edge concepts.” – GCAGS Annual Convention participant (31 Oct. – 1 Nov. 2017)

“Highly-acclaimed power-course.” – AAPG Education Blog (24 April 2017)

“Great overview of deep-water siliciclastic systems and how they are valued in the petroleum industry. Hands-on learning that challenges you to think critically about these systems from an economic standpoint.” – AAPG ACE participant (1–2 April 2017)

“A great course filled with real world examples and fun and engaging exercises to reinforce
concepts.” – AAPG ACE participant (1–2 April 2017)

“The instruction brought together material from a diverse set of real world examples/outcrops and applied them to depositional models.” – OTC Houston participant (30 April 2017)

“Jon did a great job of engaging grad and undergrad students, and balanced a wealth of information with discussion and hand samples.” – University of Texas – Austin (9 September 2017)

Instructor:

Jon Rotzien is President of Basin Dynamics, a US based consulting and exploration company. He has published peer-reviewed research papers and conference proceedings pertaining to petroleum geology, reservoir characterization, sequence stratigraphy, basin analysis and geophysics, and he consults for the oil and gas industry on all oil-producing continents. Since 2017, he has delivered courses designed for AAPG and its partner societies OTC and GCAGS in Houston, Bakersfield and San Antonio. He is a Distinguished Service Award winner of GCSSEPM (2018), associate editor of the Bulletin of Canadian Petroleum Geology and co-founder of the Houston Explorers Club, a leadership forum for young energy industry executives. Mr. Rotzien received a Ph.D. in Geological Sciences from Stanford University and a B.A. degree in Geology from Colorado College.

Contact information:

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Additional selected references on petroleum geoscience:


Rotzien, J. R., D. R. Lowe, and J. R. Schwalbach, 2014b, Processes of sedimentation and

Rotzien, J. R., 2017b, Global Deep-water Siliciclastic Reservoirs: AAPG 100th Anniversary Annual Conference and Exhibition in Houston: Short Course No. 4 Notes, April 1–2, 166 p.

Rotzien, J. R., 2018a, Integrated Methods for Deep-water Reservoir Characterization: EAGE Annual in Copenhagen, Denmark, also Rio de Janeiro, Mexico City and Houston. Short Course Notes and Exercises, 238 p.


Schwalbach, J. R., D. D. Miller, and J. R. Rotzien, 2009, Pliocene turbidites of the Ventura Basin: Core workshop and field trip, complete with guidebook, held in conjunction with the AAPG/SEPM Meeting Short Course, May 3–6, Ventura, CA.