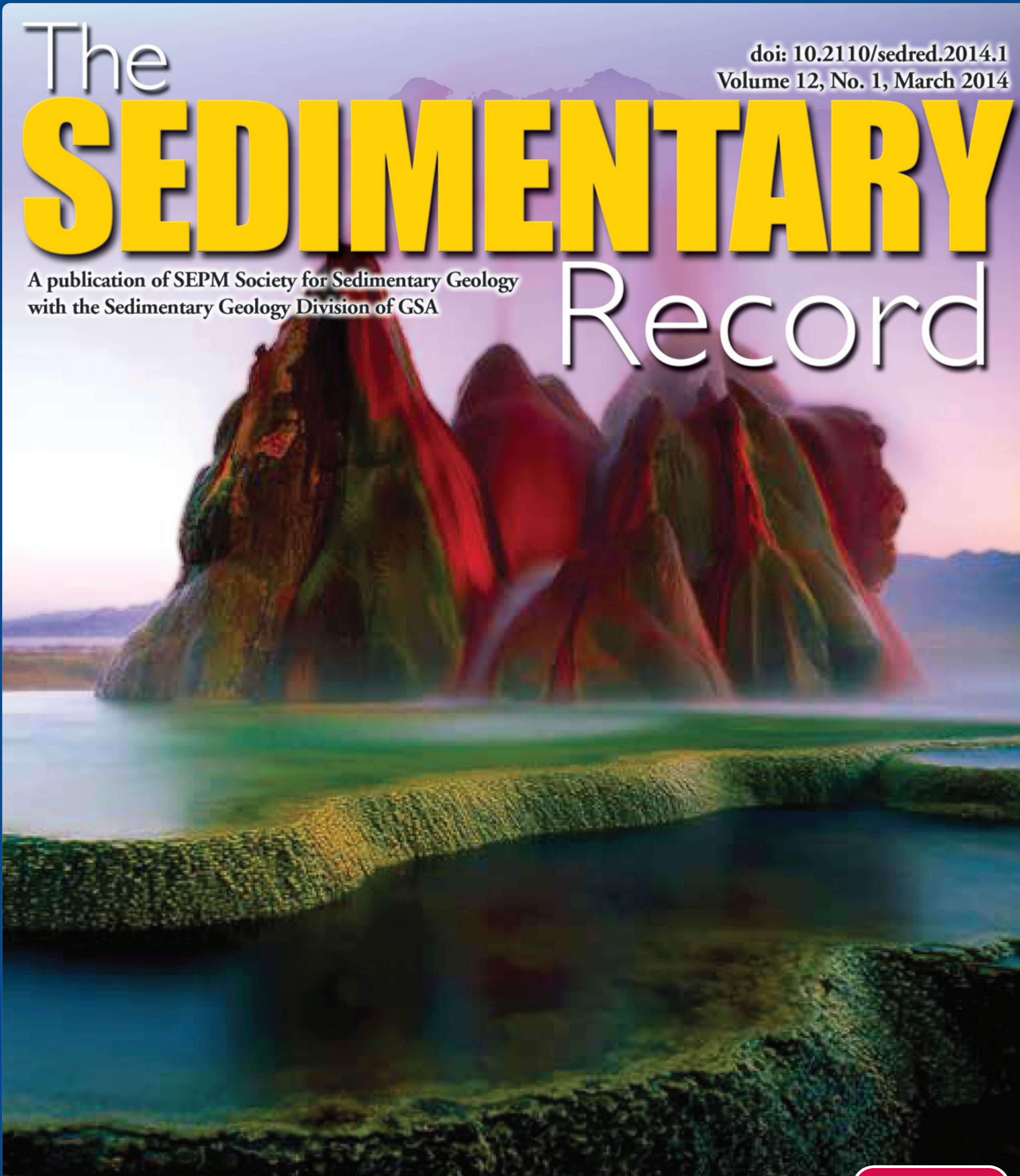
The SEDIMENTARY Record

doi: 10.2110/sedred.2014.1
Volume 12, No. 1, March 2014

A publication of SEPM Society for Sedimentary Geology
with the Sedimentary Geology Division of GSA



INSIDE: AN OPPORTUNITY OF GEOTHERMAL PROPORTIONS IN SEDIMENTARY BASINS

PLUS: LATEST BOOK REVIEWS, PRESIDENT'S COMMENTS, ONLINE FIRST, MEMBERS ONLY, SEPM ACTIVITIES AT THE AAPG ACE

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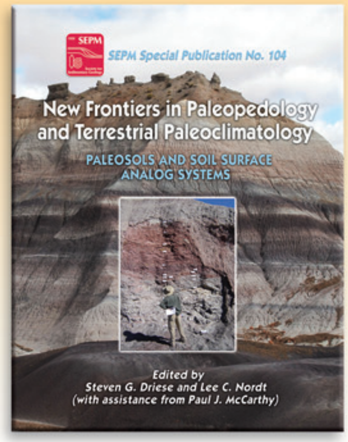
Special Publication #104

New Frontiers in Paleopedology and Terrestrial Paleoclimatology: Paleosols and Soil Surface Analog Systems

Edited by: Steven G. Driese and Lee C. Nordt, with assistance by Paul J. McCarthy



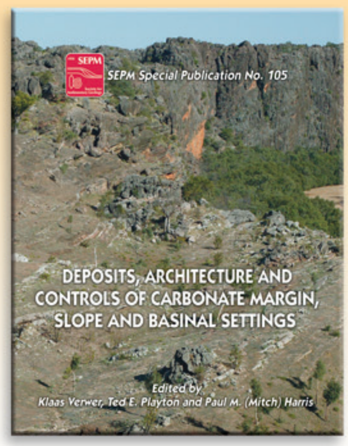
After initial breakthroughs in the discovery of fossil soils, or paleosols in the 1970s and early 1980s, the last several decades of intensified research have revealed the much greater role that these deposits can play in reconstructing ancient Earth surface systems. Research currently focuses on terrestrial paleoclimatology, in which climates of the past are reconstructed at temporal scales ranging from hundreds to millions of years, using paleosols as archives of that information. Such research requires interdisciplinary study of soils conducted in both modern and ancient environments. These issues and many others were discussed at the joint SEPM-NSF Workshop “Paleosols and Soil Surface Analog Systems”, held at Petrified Forest National Park in Arizona in September of 2010. The papers presented in this volume are largely an extension of that workshop and cover topics ranging from historical perspectives, followed by lessons from studies of surface soil systems, with examples crossing between soils and applications to paleosols. The remainder of the volume begins with an examination of the relationship between paleosols and alluvial stratigraphy and depositional systems, and ends with three case studies of ancient soil systems. Because some readers may find the nomenclature rather “foreign” the editors have included a glossary of pedological terms at the end of this volume. These papers incorporate data from studies of surface soil systems as well as deep-time sedimentary rock successions and are designed to provide sedimentary geologists with an overview of our current knowledge of paleosols and their use in interpreting past climates, landscapes, and atmospheric chemistry.

Catalog #40104 • SEPM Member Price: $85.00 • Print with color

Special Publication #105

Deposits, Architectured, and Controls of Carbonate Margin, Slope, and Basinal Settings

Edited by: Klaas Verwer, Ted E. Playton, and Paul M. (Mitch) Harris



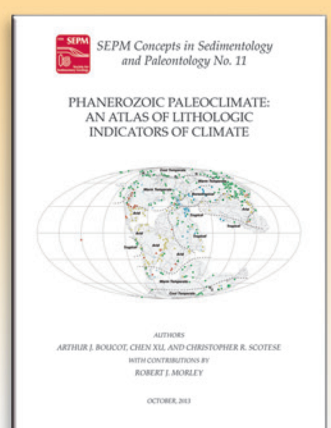
Carbonate margin, slope and basinal depositional environments, and their transitions, are highly dynamic and heterogeneous components of carbonate platform systems. Carbonate slopes are of particular interest because they form repositories for volumetrically significant amounts of sediment produced from nearly all carbonate environments, and form the links between shallow-water carbonate platform settings where prevailing in situ factories reside and their equivalent deeper-water settings dominated by resedimentation processes. Slope environments also provide an extensive stratigraphic record that, although is preserved differently than platform-top or basinal strata, can be utilized to unravel the growth evolution, sediment factories, and intrinsic to extrinsic parameters that control carbonate platform systems. In addition to many stimulating academic aspects of carbonate margin, slope, and basinal settings, they are increasingly recognized as significant conventional hydrocarbon reservoirs as well. The papers in this volume, which are drawn from the presentations made at the AAPG Annual Meeting in Long Beach, California (USA), in May 2012, as well as solicited submissions, provide insights into the spectrum of deposit types, stratal configurations, styles of growth, spatial architectures, controlling factors behind variations, and the hydrocarbon reservoir potential observed across the globe in these systems. The sixteen papers in this Special Publication include conceptual works, subsurface studies and outcrop studies, and are grouped into sections on conceptual works or syntheses, margin to basin development and controlling factors, architecture and controls on carbonate margins, and carbonate distal slope and basin floor development.

Catalog #40105 • List Price: TBD • SEPM Member Price: TBD

Concepts in Sedimentology and Paleontology 11

Phanerozoic Paleoclimate: An Atlas of Lithologic Indicators of Climate

By: Arthur J. Boucot, Chen Xu, and Christopher R. Scotese, with contributions by Robert J. Morley



This publication combines the interpretations of two major sets of data. One is the geophysical data that is used to interpret the position of the tectonic plates through geologic time. The other is based on a long time search of the geological literature to find, record, and evaluate the lithologic descriptions of countless reports around the globe; paying careful attention to those lithologies that have climatic implications. The introduction to this volume includes a detailed discussion of the lithologies, mineralogies and biogeographies that are considered to be the most reliable in identifying the climatic conditions existing during their formation and how they are used or not used in this compilation. Global paleoclimatic zones based on the climatically interpreted data points are identified during twenty-eight time periods from Cambrian to Miocene using paleotectonic reconstructed maps. The paleoclimate of each time period is summarized and includes a discussion of the specific referenced data points that have been interpreted to be the most reliable available for that time period and location.

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Cover graphic: Fly Ranch Geyser, Washoe County, Nevada. In the 1960's, geothermal fluids found a weak path around a well drilled earlier in 1916, and the Fly Ranch Geyser was born. Minerals deposited from these geothermal fluids have produced this magnificent formation and the fluids continue to flow until today. The water spouts to approximately 12 feet above ground level and the mineral mounds stand about 5 feet high.

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The Sedimentary Record (ISSN 1543-8740) is published quarterly by the Society for Sedimentary Geology with offices at 4111 S. Darlington, Suite 100, Tulsa , OK 74135-6373, USA.

The Sedimentary Record is provided as part of membership dues to the Society for Sedimentary Geology.

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An Opportunity of Geothermal Proportions in Sedimentary Basins

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INTRODUCTION

The 7.2 billion people currently inhabiting the planet all need heat and light and those in the developing world each aspire to the many evolving necessities of the modern i-life. The net 10 people added in the last five seconds will likely seek the same (http://www.census.gov). Together they feed an ever-expanding thirst for energy. Finding new energy sources to meet these demands is a principle challenge of our time. However, energy tends to come with some environmental cost. Energy holds to the axiom that no given source pollutes at some smaller scale, but all sources pollute at some larger scale. Some methods of energy conversion have less impact than others, however, and some have the added attractive attribute of being renewable. Meeting the burgeoning national and global demand for energy is a grand challenge on its own merits. Added is the challenge of growing this capacity meaningfully with an energy mix that will have minimal negative environmental impact, have the potential to endure, and, oh yes, is cost effective.

Enter the NSF SEES Program (Science, Engineering, and Education for Sustainability). NSF SEES is a series of funding initiatives intended to promote research into sustainability. Sustainability clearly encompasses a broad landscape but some SEES subinitiatives (e.g., Stainable Energy Pathways, etc.) focus directly on energy conversion and utilization (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504707). Geothermal energy fits this mold well in that it taps a large and renewable energy source within the deep earth that is retrievable with little impact to the surficial environment. Sedimentary basins both host large reserves of geothermal heat and are broadly distributed geographically, with proximity to population centers (Tester, et al, 2006; Williams, 2007). They also have the native permeability that permits the flow of geothermal fluids, a must for extracting this heat. Sedimentary basins are thus natural targets for a new generation of geothermal pilot plants that generate power from deeply sourced heat.

The SedHeat initiative sprouted from these seeds. SedHeat is an NSF RCN (Research Coordination Network) with the stated goal *"To form a central point of unity, exchange, and education to exceed the science and engineering challenges of sedimentary-basin geothermal energy."* This effort began with a workshop in November 2011 in Salt Lake City, Utah that was supported by the NSF SEES initiative and convened to consider the question, *"What are the basic science and engineering questions that need to be addressed in order to make geothermal energy production from sedimentary basins practical?"* From this, SedHeat has continued as a research community focused on addressing these challenges. Large-scale geothermal energy from sedimentary basins has not yet seen its potential realized. Improved knowledge is needed before this can occur. SedHeat hosts workshops, supports student projects and travel, delivers short courses and provides education, and, overall, facilitates research on sedimentary-basin geothermal systems for a network of >300 researchers involved in the quest for sustainable and affordable geothermal energy. The group, both by necessity and by design, is highly diverse and includes a robust representation from Geology, Engineering, Geophysics, Education, and Social Sciences. All are unified by an interest in the prospects of recovering geothermal energy from deep sedimentary basins and in finding the breakthroughs in science and engineering needed to make this energy source bloom.

In the following we share our consensus views on research priorities in sedimentary-basin geothermal. In particular, we present some of the ongoing activities and the efforts of SedHeat to support future research.

THE PROMISE OF GEOTHERMAL ENERGY

The heat within the earth constitutes a vast store of energy that builds mountains and basins, but could also be providing electricity for our homes. But, how much of this energy can be realistically tapped? Geothermal energy banks a steady radiation of heat that raises the globe to the ~14.5°C average temperature (IPCC, 2007) at the Earth's surface by a depth of ~580 m. The temperature increases to over 500-1000°C at the base of the Earth's crust. The currently maintained global radiation of heat energy from the interior of the Earth is approximately 44 terawatts (KamLand Collaboration, 2011) and represents the sustained energy that is available and renewable without mining the heat accumulated over geologic time. Between stored and sustained heat, recovery of an estimated 1+ megawatt/km^2 is considered conservative and sustainable for net power generation (Tester, et al., 2006; Williams, 2007; DOE, 2008). Thus 1000 km^2 provides at least one gigawatt and the ~10 million km^2 land area of the United States could contribute 10TW, dwarfing of the roughly one terawatt (1000 gigawatts) of currently installed electric capacity within the U.S. (DOE/EIA, 2010).

Current geothermal technology depends on heat extraction from geothermal fluids at temperatures beginning between 100°C and 150°C, which typically occur at depths of 2-6 km (Tester, et al., 2006; Blackwell, et al., 2007; William, 2007; Esposito and Augustine, 2011; Figure 1). Around 500,000 km^2 of well-dispersed sedimentary-basin area exists below 4 km within the conterminous U.S., and these strata commonly host sufficient heat to reach these critical temperatures (e.g., Figure 2). The total heat within these sedimentary basins below 4 km that is available as a resource base is estimated to be 100,000 EJ (Tester, et al. 2006). For perspective, the U.S. utilizes approximately 100EJ/year (DOE/EIA, 2010). The current energy portfolio for electric power is rich in fossil fuels, and the geothermal contribution remains small (Figure 3). The negligible output of CO_2 inherent to geothermal power means that significant gains in capacity for this energy source could help mitigate the impact on climate change by replacing more carbon-rich energy sources.

Sedimentary basins are a prime target for a new generation of geothermal development because they host the three critical conditions needed to produce geothermal energy: 1) heat; 2) water; and 3) permeability. Hydrothermal/magmatic systems provide most of the three gigawatts of geothermal electric capacity currently available in the U.S.

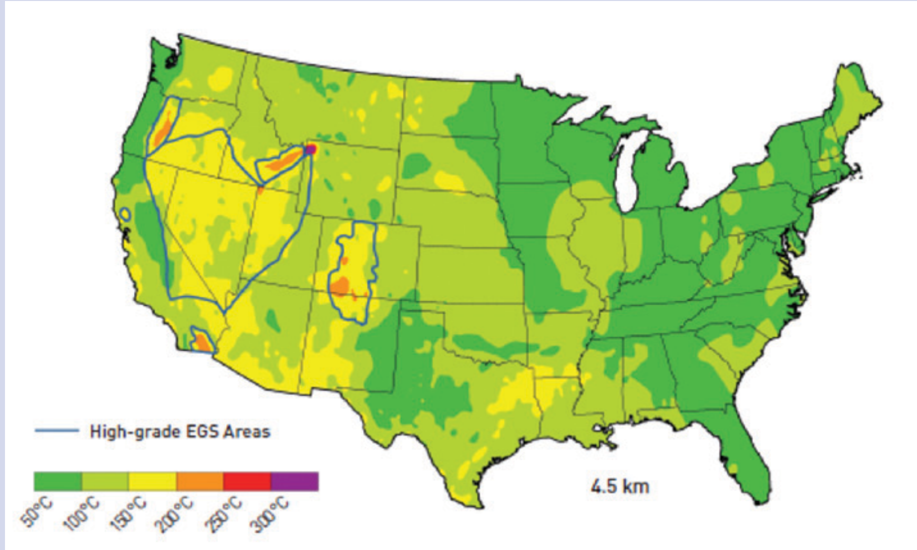

Figure 1: Average temperature at 4.5 km, conterminous United States. (Tester, et al., 2006, after Blackwell and Richards, 2004)

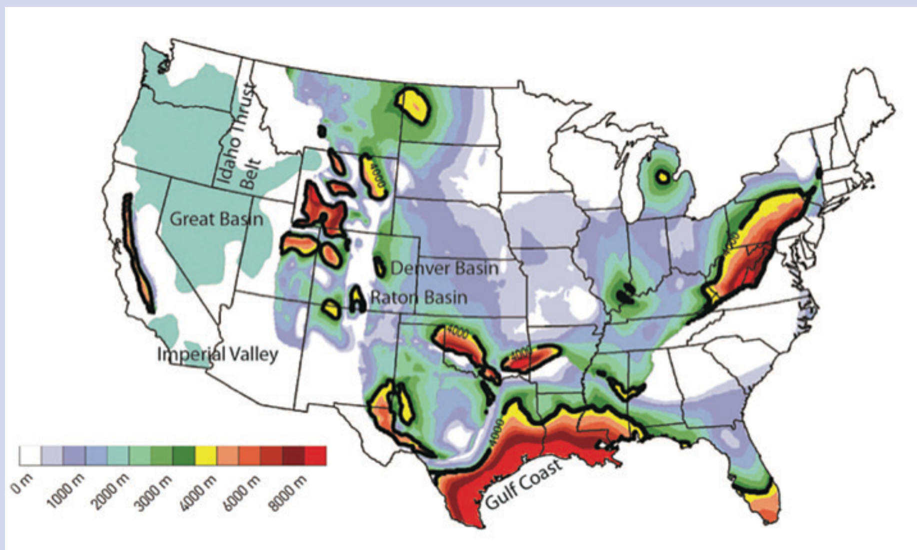

Figure 2: Distribution of sediment thickness in the conterminous U.S. 4 km isopach in black. Numerous basin-and-range basins over 4 km excluded for small resolution (Tester, et al., 2006)

and studies on Engineered Geothermal Systems (EGS) reservoirs have been the focus of added attention in recent years (Tester, et al., 2006; DOE, 2006; DOE, 2008). Hydrothermal/magmatic systems are local and well tapped. While vast areas of crystalline basement host ample heat at depth, the needed water and permeability are not native to these rocks. Furthermore, efforts to provide or develop these critical attributes through EGS have thus shown limited success. Conversely, sedimentary basins natively host large hot rock volumes with the two otherwise missing elements of water and permeability and offer a more forgiving environment for an initial run at large-scale geothermal power. They are also a potential stepping stone for EGS application in the more expansive heat resources hosted in crystalline rock. Sedimentary-basin geothermal resources can be classified as: 1) co-produced fluids from oil and gas fields; 2) geopressured regimes; and 3) deep sedimentary extraction with natural and enhanced (c.f., EGS) permeability. If the aggressive goals of 10% increase in capacity by 2014, doubling the geothermal capacity by 2020, and 100,000MW in 50 years (DOE, 2008; reaffirmed in DOE-GTP Mission and Goals: April 11, 2011) are to be realized, new technologies, including power from sedimentary basins and other novel resources must be added to the current geothermal mix (Shook, 2009).

With proper management, heat can be extracted from geothermal fluids sustainably, with negligible pollution to the surface and atmosphere (Duffied and Sass, 2003; Blodgett and Slack, 2009; Tester, et al., 2006) and with a significant positive impact on total carbon footprint and concomitant influence on climate. Our principle technical barriers are in learning how to harvest this energy with sufficient predictability and efficiency to make it economically viable. Given the complex architecture of basin fills, the loss of permeability with depth, the complicated fracture processes, and the briny diagenetic conditions inherent to sedimentary basins, this harvest will not come without its challenges.

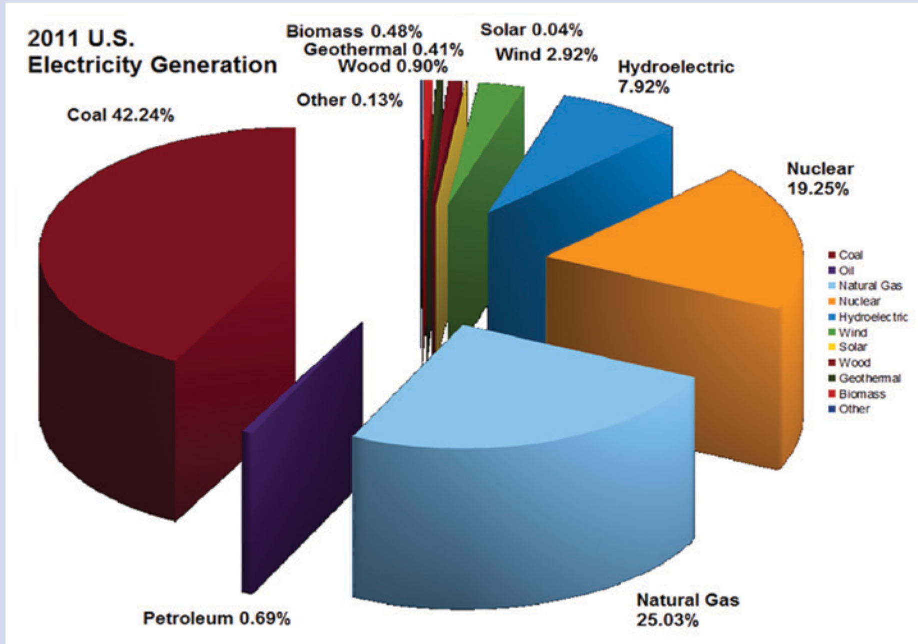

Figure 3: Distribution of electric generation by source in the U.S.for 2011. (Figure from http://earthdesk.blogs.pace.edu/tag/clean-water-act/; raw data available at http://www.eia.gov/totalenergy /data/monthly/#electricity)

SOME BASIC RESEARCH CHALLENGES

Geothermal energy has true advantages as a prospective energy source, but also faces some challenges. The magnitude and distribution of geothermal heat are generally known and sufficient for large-scale production. The technology to drill sedimentary basins and the thermal needs for energy production are also an area of extensive experience and established capability. So why is geothermal power not the norm? Like most such issues it boils down to the economics of benefit and risk. Consider this scenario. At the current consumer price of ~$0.10/kilowatt hour, a well producing at 100kg/s and yielding 10 Megawatts would gross $24k/day. A well drilled to the 3-6 km depth needed to attain >150^{O}C in most sedimentary basins would cost roughly $7-10 million to drill, then as much as $5 million in additional development costs (e.g., logging, completion and stimulation, etc.). It would thus take approximately two years to recover the investment of this well, not including the costs of the plant and infrastructure on the surface. Conversely, an oil well producing 5,000 bbl/day would gross $400k/day at $80/bbl and pay for itself at 17x this rate (based on calculations by Rick Allis in workshop keynote address; in Holbrook, et al., 2012). With this investment and return ratio, a geothermal prospector cannot afford too many misses before gaining a success and the risk/benefit ratio for petroleum looks much more appealing to the average investor, producer, and driller. Thus, the extraction of waste heat from petroleum wells and the recovery of heat from played fields thus offers promise as it seems cheaper than drilling new geothermal wells. Petroleum producers, however, do not drill deliberately for production of large volumes of water. The optimal point of success for a geothermal well is about 80kg/s (~0.5 barrels/s) of water at around 150^{O}C (after Tester, et al., 2006). This level of water production is not what you generally want in an oil well. The 150^{O}C temperatures where the preferred geothermal reservoirs begin to start are also the temperatures where the oil window begins to dwindle. While several companies are looking seriously at waste heat recovery as a geothermal source, they do so selectively and cautiously.

The challenges for bringing geothermal energy from the sedimentary basin to the home are in improving the ability to predict and manage the subsurface. With small profit margins and the need to accept long-term return on investment, the appetite for risky drilling programs is expectantly low. Producers need to be assured that payback is reasonably certain and the risk of a dry hole is minimal. This, of course, is a familiar problem to all those working resources in sedimentary basins. In this case, the low return-on-investment-per-well means that the need for precision and success is stepped-up a notch.

The first SedHeat workshop in Salt Lake City assembled a series of questions that define the core research challenges of sedimentary-basin geothermal energy (Figure 4). The needs and importance of each of these questions are elaborated more fully in our NSF-SEES flyer (Holbrook, et al., 2012), available at the SedHeat.org website. Many of these questions apply to gaining a better fundamental understanding of the native sedimentary basin, and address both the heat and fill factors. Critical is gaining an understanding of the distribution of geothermal heat and predicting how this heat system will respond to heat extraction. Field observation coupled with high-resolution modeling of basin fill processes and a more precise determining of the movement and chemistry of fluids through complex fill systems is a keystone in the success of sedimentary basin geothermal. Finding and tracking these fluid conduits in deep basins also demands a new generation of geophysical techniques with increased resolution. The need for coupling of engineering and science is also

Questions Pertaining to the Native Sedimentary Basin

- *How does heat move within sedimentary basins at large scales and how does this impact the renewability of the resource?*
- *How is heat stored and released on the local and micro scales and how does this impact efficiency of heat sweep?*
- *What are the fundamental sedimentary processes that control the filling of sedimentary basins across all scales, and how do they impact permeability, connectivity, and heterogeneity of deep-basin flow paths?*
- *What are the diagenetic processes that operate in deep sedimentary basins and how do they increase or reduce permeability as they evolve?*
- *What controls the natural processes whereby fractures form and evolve within basin sediments, and what is the impact of these fractures on the transmission of fluid flow?*

Geophysics

- *How can discrete geophysical methods be integrated to identify basin properties critical to geothermal development (e.g. permeability pipes, thermal distribution, etc.)?*
- *What are the critical advances needed to better predict and measure changes in thermal properties of fluids and solids in deep-Earth settings during development and production?*
- *How can geophysical aspects of deep-Earth settings be effectively simulated within the lab?*

Engineering of Geothermal Systems

- *What new or improved well technologies can make drilling and developing large boreholes possible and practical at very high temperatures?*
- *What new techniques can be defined that permit us to predict, control, and monitor stimulated fracture systems in deep, hot, and heterogeneous media?*
- *How can we effectively monitor the evolution of fractures, heat regime, and stress conditions induced by geothermal extraction?*
- *What are the relationships and thresholds between modified fluid pressures and induced seismicity?*
- *Can numerical decision models be generated that effectively predict geothermal operational risk?*

Education and Cyberinfrastructure

- *What short-term and long-term efforts will prove most effective toward tempering workforce shortages expected of an emerging geothermal industry?*
- *What efforts would prove most effective at raising the current low profile of geothermal energy in the mind of the public and policy makers?*
- *What are the positive and negative feedbacks tied to relationships between the geothermal and oil and gas industries as it relates to perceptions, workforce development, and educational infrastructure?*
- *What are the most effective forms of cyberinfrastructure that may be used to promote sharing of data and education materials to best aid the development of geothermal curricula?*
- *What are the best vehicles for fostering cross-disciplinary education and scholarship between engineering and science disciplines?*
- *What are the best processes for building an educational and workforce pipeline from K-12, though undergraduate, to graduate, to professional in the geothermal sciences, and how can we best assure that women and minorities are not leaked from this system?*
- *What can be done to retain underrepresented groups in the educational and career pipeline toward potential geothermal positions?*
- *What are the cyberinfrastructure platforms that will best facilitate effective exchange of ideas and data and foster greatest participation for the SedHeat community, and what is the best approach for constructing this platform?*

Figure 4: Some key questions defining the driving needs of sedimentary-basin geothermal research as assessed by the NSF SEES workshop Tracking an Energy Elephant (see Holbrook, et al., 2012 for more detail on these questions and research needs.)

acute. Improving our ability to predict and control fracture propagation through heterogeneous strata under high T/P conditions is mandatory to integrating of matrix permeability conduits with engineered fracture patterns, and requires an understanding of both engineered and native basin conditions. Engineering and geophysics merge particularly in the management of risk from induced seismicity. In addition, advances in drilling are required to sink the need large boreholes into basin media with highly elevated ambient heat. All of this will require information sharing and a new workforce generated through surmounting of numerous challenges in education and cyberinfrastructure.

Many of these questions are familiar and long-standing because of the commonality between extracting heat vs. petroleum from sedimentary basins. Some however are new, and all diverge because of the basic change in application and the low margins of error demanded by successful geothermal production. One familiar commonality is that geothermal energy from sedimentary basins requires a robust cooperation between geologists, engineers, geophysists, and educators if this endeavor is to meet with any success. Geothermal space heating in homes and commercial buildings expanded when the ratio between cost and eventual return became predictable and positive. Realizing geothermal electric energy from sedimentary basins is similar and requires that the risk threshold be lowered such that economic gain is more certain for the producer. Forward movement on a better understanding of the basic science and engineering of sedimentary basins remains the key to lowering this economic risk.

WAYS FORWARD

Presently, the most pressing need in establishing sedimentary-basin geothermal as a viable energy source is demonstrated success. These successes will come from two directions. First are breakthroughs in the fundamental science and engineering of sedimentary basins that improve the ability to predict fluid pathways passing through sufficiently large volumes of hot rock. Second are examples of actual economic successes in geothermal development of sedimentary-basins.

One key area for a fundamental breakthrough in basic science and engineering for geothermal energy is in gaining better constraints on basin-fill processes and properties that will aid in prediction of natural and engineered permeability pathways in deep sedimentary basins. This was the theme of a GSA Penrose conference convened by SedHeat in October of 2013. This meeting hosted a coordinated series of 52 presentations, gathered around principal themes. All presentations are available on the SedHeat.org website together with notes for the pre-meeting short course, attended by early-career and established professionals alike. In addition the conference is being followed by a series of "incubator" workshops that focus on actualizing ideas developed at the conference and are centered on the deep processes in the Raton Basin, co-production of energy and minerals from brines in the Idaho thrust belt, and improving constraints on the heat budgets of sedimentary basins (Figure 2). Furthermore, researchers in the group are already working on such issues as coupling CO_2 sequestration with geothermal energy by using waste CO_2 as a working fluid, directive fracture models for deep sedimentary basins, and induced seismicity from high-volume water injection.

Some basins are being actively examined for potential geothermal production. Recent investigations in the Great Basin indicate temperatures of 150 - 230^{O}C occur at depths of less than 4 km where heat flows exceed 80 mW/m^2 (Allis et al., 2011, 2012). Basins with more than 2 km of unconsolidated sediments are the most attractive because of the insulating effects of these sediments. The reservoirs targeted are primarily in Paleozoic carbonate rocks because of their high permeabilities, which commonly are in the range of 10 to 100 millidarcy, but siliciclastic rocks may also serve as thermal aquifers. Because of the lateral extent (>100 km^2) of these stratigraphic reservoirs, these individual basins have the potential to generate hundreds of MWe, based on reservoir modeling which suggests sustainable power densities of 2 - 5 MWe/km^2 are possible. Other regions of high potential include the Imperial Valley of California, where nearly a dozen geothermal systems are identified, the Rio Grande Rift of New Mexico and Colorado, the Denver Basin, and the Gulf Coast (Figure 2).

INTERESTED IN SEDHEAT?

SedHeat is an open network of researchers and welcomes new members. We will be hosting activities in the near future in support of geothermal research. These include large and small workshops, short courses, and student opportunities. If you would like to be looped into upcoming events, just send us an e-mail at John.holbrook@tcu.edu, or check out our web page at Sedheat.org. Feel free to join SedHeat and take part in the fun.

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Accepted March 2014

LATEST BOOK REVIEWS

Tracking environmental change using lake sediments,
Vol. 5: Data handling and numerical techniques, edited by H. John B. Birks, André F. Lotter, Steve Juggins & John P. Smol, 2012

Sediments, morphology and sedimentary processes on continental shelves - advances in technologies, research and applications,
edited by Michael Z. Li, Christopher R. Sherwood & Philip R. Hill., 2012

Mid-latitude Slope Deposits (Cover beds),
edited by Arno Kleber & Birgit Terhorst, 2013

PRESIDENT'S COMMENTS

Consistent with SEPM's mission of advancing and disseminating scientific knowledge, there has been focused attention on developing closer ties with sister societies and having a presence at other society's meetings. SEPM is also broadening its presence in the international arena through the Global Ambassador program. One example is SEPM partnering with the Sedimentary Geology Division of GSA in 2012 to create a Joint Technical Program Chair position for an SEPM representative to help develop the sedimentary geology sessions at Annual GSA meetings. Another example is an agreement with AGU that was just finalized to bring an SEPM presence to their December meeting.

As you may know, SEPM has eight regional sections in North America, and an international section. The active sections include the Permian Basin, Rocky Mountain, Pacific, Gulf Coast, Great Lakes, Eastern, and Central European sections. Sections are established with constitutions and bylaws that are in line with the Society's Certificate of Incorporation and Bylaws, and that promote the objective of the Society, but operate completely separate from SEPM.

In line with the recent efforts discussed above, my President's project has been focusing on establishing closer connections with the SEPM sections. We are exploring various collaborations that would be mutually beneficial, and mechanisms that allow the ties to continue into the future.

For the initial step, I invited section representatives to a luncheon meeting at the 2013 annual GSA meeting in Denver. Four of the regional sections were represented at the meeting; Rocky Mountain Section, Great Lakes Section, Eastern Section, and the Pacific Section. Representatives from the Gulf Coast, Permian Basin, and Eastern Europe sections were unable to attend, but were contacted separately for discussion and informed of the results of the meeting at GSA. Some of the ideas for collaboration that were generated at the meeting include:

- SEPM HQ handling membership data for sections
- Sections and SEPM partnering on events, such as small conferences, larger meetings, and field trips
- Selling Section publications through SEPM HQ
- SEPM HQ officially publishing Field Guides or Special Publications from Section conferences and field trips
- SEPM HQ publishing Section newsletters and other Section information in *The Sedimentary Record*
- Creating tangible benefits for having dual membership in Sections and SEPM

As I move into my role as Past-President, I will continue the dialog with Sections and work towards implementing various collaborations that will be mutually beneficial to SEPM and the Sections.

This is my last article in The Sedimentary Record as President. In looking back at past President Comments in *The Sedimentary Record* over the last 10 years, there is a consistent theme of high praise for the staff at HQ and particularly Howard Harper (Executive Director) and Theresa Scott (Associate Director and Business Manager). One message in this is that SEPM has been truly fortunate to have Howard and Theresa running HQ over the years. They, and the rest of the HQ staff, are invaluable in keeping SEPM moving forward and making Council's job easier. It has been a pleasure to know and work with Howard and Theresa, not only during my presidency, but also for the many years that I have been involved with SEPM in various capacities. I also want to thank my predecessor Dave Budd, incoming President Kitty Milliken, and all the other people on Council that I have interacted with during my term as President. It truly has been a gratifying experience.

I will close by mentioning that the strategic plan meeting will be held in May (*Sedimentary Record*, December 2013). There is still time to weigh in with your thoughts and ideas for topics to be addressed at the meeting.

Evan Franseen, SEPM President

SEPM announces the opening of ONLINE FIRST

In the September 2013 issue of *Sedimentary Record* we outlined important changes to the SEPM Special Publication submission process, manuscript format, paper citation indices, and new platforms for online publication access.

SEPM announces that ***Online First*** is up and running and that the first tranche of papers that are part of a Special Publication on:

Architecture and Controls of Carbonate Margin, Slope, and Basinal Settings,
edited by Klaas Verwer, Ted E. Playton, and Paul M. (Mitch) Harris

These ***Online First*** articles are currently available for viewing and purchase. These papers have completed all stages of review, revision and final proofing; the ***Online First*** papers significantly increase the speed of publication – they include a DOI, but not page numbers (these will appear in the final volume). Chapter titles and abstracts are freely available, including how to cite these articles. There is a charge to access these papers online with a discount for SEPM Members.

Once the volume has been completed, these papers will be withdrawn from the SEPM ***Online First*** website and the book will be available for purchase as usual from the SEPM Bookstore, as a CD or POD version, and online digitally at www.sepmonline.org.

We will announce new additions of papers to the ***Online First*** site as they come to hand. We anticipate that this will increase the visibility of individual papers and Special Publications.

The SP Publication Team

http://www.sepm.org/OnlineFirst.aspx

List of articles/authors:

- ***Warm- vs. cool-water carbonate factories and adjacent slopes: Pennsylvanian–Early Permian Sverdrup Basin, arctic Canada***, Benoit Beauchamp, Candice V. Shultz, Kaylee D. Anderson
- ***Lower Jurassic microbial and skeletal carbonate factories and platform geometry (Djebel Bou Dahar, High Atlas, Morocco)***, Giovanna Della Porta, Oscar Merino-Tomé, Jeroen A.M. Kenter, Klaas Verwer
- ***Origin of mixed carbonate and siliciclastic sequences at the margin of a "giant" platform during the Quaternary (Bonaparte Basin, NW Australia)***, Julien Bourget, R. Bruce Ainsworth, Rachel Nanson.
- ***Lithofacies, depositional environments, burial diagenesis, and dynamic field behavior in a carboniferous slope reservoir, Tengiz Field (Republic of Kazakhstan), and comparison with outcrop analogs***, Joel Collins, Wayne Narr, Paul M. (Mitch) Harris, Ted Playton, Steve Jenkins, Terrell Tankersley, Jeroen A.M. Kenter

SEPM's *Members Only* Webpages

Although common with many organizations, SEPM has not really used a *"Members Only"* section of its website in the past. Recently with the addition of some exciting members-only benefits which need special access programming, SEPM has launched a redone *Members Only* section. The section has been set up to accommodate some specific newer benefits.

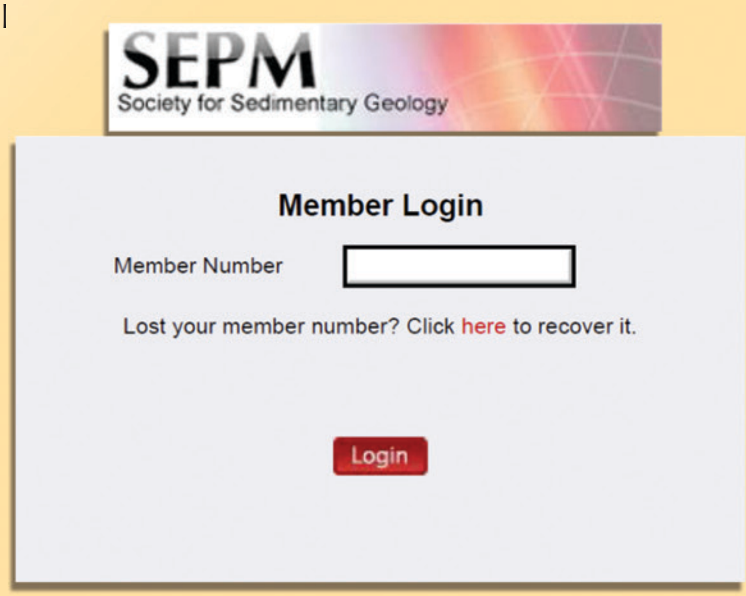
****Note: Access to Members Only requires your SEPM Member number (see below).**

- The first is the **Geofacets SEPM Millennium Edition** access, which is a subset of the Geofacets SEPM module. It includes all of the Geofacets SEPM maps and map data from the year 2000 to the present. It is only available to SEPM Members who subscribe to it, which at $15 for 2014 is a bargain. For more about this option go to the Membership or Members Only pages.
- The second benefit is access for all SEPM members to the online **Treatise of Invertebrate Paleontology**. The treatise is the mainstay for all taxonomic work dealing with invertebrate fossils. SEPM is major sponsor of the Treatise and as a benefit all members can access the online version but only through the SEPM *Members Only* portal.
- Another new *Members Only* feature will be the need to access the **Member Discount Code** for the new SEPM Bookstore which his under final development. Members will need this code to receive their member pricing when they check out. Member pricing for SEPM publications is about 40% below list pricing – a tangible member benefit. Currently the new bookstore is under construction but should be open soon and SEPM will let you know when it is.

Your SEPM Member Number –

From now on there will actually be a good reason to know your SEPM member number!

If you can't find it there is a button to email it to you. Of course the email you use must match the latest email that SEPM has for you. If it doesn't recognize your email you will need to contact HQ (Janice Curtis, jcurtis@sepm.org) to update our files. The need to have at least this level of security to access *Members Only* is required by our partners at Geofacets and the Treatise.



AAPG | Hedberg Conference

SEPM 1926 Society for Sedimentary Geology

September 29-October 1, 2014 | Banff, Alberta, Canada

CALL FOR ABSTRACTS:

AAPG/SEPM Hedberg Research Conference

Latitudinal Controls on Stratigraphic Models and Sedimentary Concepts

The primary goals of this conference are:

1. Identify differences in depositional processes between high and low latitude systems
2. Define how such variability affects hydrocarbon play elements
3. Define the differences in stratigraphic models and sedimentary concepts that arise due to differences in latitude,
4. To search for insights that may be applicable for subsurface interpretations & petroleum exploration.
5. To identify revisions to models, including the application of new techniques such as Earth System Modeling, to improve stratigraphic and sedimentary models

Extended abstracts are currently being solicited. Abstracts can be up to 4 pages in length, including optional figures. Specify that your abstract is for the AAPG/SEPM 2014 Banff Hedberg Research Conference. An abstract cover sheet is required for all submitted abstracts. Log on to **www.aapg.org/events/research/hedberg-conferences** or contact AAPG Education Dept. to obtain this form.

Abstract Submission Deadline: April 30, 2014

William Smith Meeting 2014

SEPM 1926 Society for Sedimentary Geology

CALL FOR ABSTRACTS

The Future of Sequence Stratigraphy: Evolution or Revolution?

22-23 September, 2014, London, UK

www.geolsco.org.uk/wsmith14

by The Geological Society with SEPM and Neftex

Conveners:

- Peter Burgess (Royal Holloway University, London)
- Philip Allen (Imperial College, London)
- Paul Wright (PWGC Ltd.)

THE GEOLOGICAL SOCIETY OF AMERICA®

SEDIMENTARY GEOLOGY DIVISION

Sedimentary Geology Division

News from SEPM and GSA

In this issue, we highlight the activities of your sedimentary geology division during 2013. We have about 1200 members, which is about the size the division has been for the last 7 years.

2013 GSA Annual Meeting

The Sedimentary Geology Division had a strong presence in Denver at 2013 GSA where we sponsored 30 topical sessions, and three short courses and one field trip. The Sedimentary Geology Division and SEPM also hosted the "Seds and Suds" Forum and Icebreaker. For the second year, Seds and Suds was held on Monday Evening. The joint Sedimentary Geology - Limnogeology Division Business Meeting and Awards Reception, also sponsored by SEPM, was held on Tuesday, October 29th.

Summary of the Seds and Suds Symposium at the Annual GSA meeting Denver 2013

Over 100 people came to the icebreaker and forum this year this year the progress of the STEPPE program was discussed by Howard Harper. STEPPE is now up and running. The STEPPE consortium works to obtain support for research and education and helps develop integrated, collaborative projects.

Joint Sedimentary Geology/ Limnology Business Meeting and Awards Ceremony

The Joint Sedimentary Geology Division/ Limnogeology Division Business Meeting and Awards Reception welcomed approximately 125 attendees, with a free drink and free food, this year organized by the Limnology Division.

Fred Read, 2013 Lawrence L. Sloss Award winner with citationist Isabel P. Montañez.

Fred Read, of Virginia Tech University is the 14th recipient of the Laurence L. Sloss

Award and joins the company of distinguished sedimentary Geologists. In the 44 years since he obtained his PhD from the University of Western Australia, Dr. Read has mentored over 30 MS and Ph.D. students and published an amazing number of papers critical to our understanding of carbonate stratigraphy. His research on cyclostratigraphy, and the behavior of carbonates in greenhouse and icehouse conditions has been the framework of our modern understanding of carbonate shelves.

Peter Mozley receiving the Steven Laubach award.

Peter Mozley is the first faculty winner of the Stephen E. Laubach Award for Structural Diagenesis, a joint award from the Sedimentary Geology and the Structural Geology and Tectonics Division. Peter's innovative research looks at cementation in fault zones.

Latisha Brengman, this year's winner of the Student Research Grant!

Latisha Brengman is a doctoral student in at the University of Tennessee. She is using oxygen isotopes, and rare earth geochemical data to delineate different types of Achaean chert. She was the unanimous choice by the committee from an exceptional group of applicants.

We welcome sponsors for the next event at the 125th GSA Annual Meeting in Vancouver, British Colombia in October 2014.

SEPM ACTIVITIES AT THE AAPG ACE

Thursday

- Field Trip #2: Microbial Carbonates in the Upper Cambrian of Central Texas (Run Thursday to Sunday)
- Field Trip #3: Eagle Ford Unconventional Reservoir Field Seminar (Runs Thursday to Sunday)

Friday

- Field Trips #2 &3

Saturday

- Field Trips #2 & 3
- SEPM Council Meeting
- Short Course #6 - Sequence--Stratigraphic Analysis of Mudstones (Day 1 of 1)
- Short Course #12: 3-D Seismic Interpretation for Geologists (Day 1 of 2)
- Short Course #13: Applied Ichnology (Day 1 of 2)
- Short Course #14: Sequence Stratigraphy for Graduate Students (Day 1 of 2)

Sunday

- Field Trips #2 & 3
- Short Course #12: 3-D Seismic Interpretation for Geologists (Day 2 of 2)
- Short Course #13: Applied Ichnology (Day 2 of 2)
- Short Course #14: Sequence Stratigraphy for Graduate Students (Day 2 of 2)
- SEPM Booth – Exhibit Hall Ice Breaker – 5:00-7:30 pm

Monday

- SEPM Booth Exhibit Hall – 8:30 am – 5:30 pm
- AAPG/SEPM Student Reception: 6:00 pm – 8:00 pm (Open Event)
- SEPM Research Group Meetings & Reception: 7:00 pm – 10:00 pm (Open Event)

Tuesday

- SEPM Booth Exhibit Hall – 8:30 am – 5:30 pm
- SEPM Research Symposium: New Advances in Devonian Carbonates: Outcrop Analogs, Reservoirs, and Chronostratigraphy (Morning & Afternoon Sessions)
- SEPM Luncheon: Field Studies in Earth Models: Past, Present and Perspective Practices – Ole Martinsen and John Thurmund – 12:00 pm – 1:00 pm (Ticket required)
- SEPM President's Reception and Awards Ceremony – President Evan Franseen – 7:00 pm – 9:00 pm (Open Event)

Wednesday

- SEPM Booth Exhibit Hall – 8:30 am – 12:00 pm

Thursday

- Short Course #19: Predictive Tools for Deepwater Depositional Environments (Day 1 of 1)