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The President's Column

Going Digital. I haven't always been the first to adapt to new technologies. I kept buying music on 12″ vinyl long after most people had switched to CDs. Later, I kept buying CDs even though most of the world had switched to downloading (legally or otherwise) music through the internet. I'm slowly getting used to the idea that video stores are disappearing (my kids watch a lot of their "television" by connecting to websites), but have a really hard time with the idea that bookstores are closing up as more and more people "get their content" in digital format.

My dissertation project involved outcrop and core work, but also a whole bunch of log-based mapping and correlations. I worked with paper copies of logs from about 4000 wells. I spent countless hours printing those logs from microfiche at a company's office in Calgary (generally in the evenings because my days were spent logging core). My correlation work involved a lot of time bending over a light table armed with the logs, rolls of mylar, pencils and several Leroy drafting pens. Headaches were common by the end of the day, but luckily the graduate student pub was only a couple of doors down from my office and I could find pain relief in a pint or two of beer.

Somehow I had the foresight to realize that it would be folly to generate a series of maps (isopachs, net sand, etc.) by hand from a dozen log picks, for 4000 wells covering an area of over 5000 square miles. In these pre-spreadsheet days, I wrote a little BASIC program to merge the X, Y coordinates the company had given me with my log picks (entered into the computer by hand) into an ASCII file that I could then bring into a computer-based mapping package. To my peers' and supervisor's astonishment, I could pretty quickly update my picks (by re-picking on paper, then entering the new values into my digital data file) and generate new maps. I had a tough time convincing my supervisor that my computer-based maps were honoring the geology sufficiently or showing geologically meaningful trends. In the end however, I convinced him that I could crank out (and revise) my maps much faster than could be done by hand and that the geology was being captured accurately enough for me to write profound things about it. There were trade-offs to working digitally, but the advantages outweighed the disadvantages.

My first post-Ph.D. employment (with the Geological Survey of Canada on the West Coast) had me studying the submarine portions of a modern delta using a variety of tools, including "geologic" tools such as grab sampling, piston coring (muddy seafloor), vibrocoring (sandy seafloor), and a suite of "light geophysical" tools that included side-scan sonar imagery and high-resolution seismic profiling ("boomer" data and a small airgun). Being trained as a sedimentologist, I really enjoyed working with the cores of mud and sand and thinking about what ancient analogs might look like. However, I quickly became fascinated by the seismic profiles – how I could use them to interpolate geologic units between my scattered cores and how I could use them to see deeper into the delta (up to 200m thick in places) than my several-meter long cores.

At the time, our seismic and side-scan sonar profiles were burned onto paper directly as we sailed (no subsequent processing back in the lab), and I used those rolls of imagery for my mapping. Groups of us took turns in the aft (science) cabin of the ship, making sure the equipment was functioning properly, taking GPS position fixes, watching the sea-floor and subsurface images get burned onto the paper, drinking coffee and telling bad jokes. Being the West Coast, we were occasionally treated to sights such as pods of orcas (killer whales) leaping through the water – presumably on salmon-fueled feeding frenzies. Although we took great pains to record the seismic profile data on analog tapes, I quickly learned that we had no real way of using those tapes to subsequently print out new copies of the images. The information wasn't accessible digitally.

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Highlights

The GCSSEPM News is published three times a year. Please send any comments or suggestions to Charlotte Jolley, GCSSEPM Secretary at charlotte.jolley@shell.com, or contact your local business representative. Visit the GCSSEPM Website at www.gcssepm.org for Section and Foundation news and information.

Announcing
2012 GCSSEPM Executive Council

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Back in the office, my mapping was done on paper. Our cartographer plotted our ships' tracklines on a map for me and I made use of position fixes we had made on the paper images to calibrate information on the profiles to locations on the maps. I mapped, using paper and colored pencils, the surficial geology (there were some whopping big submarine failure complexes), isochrons/isopachs of the Holocene delta, and miscellaneous things like the distribution of biogenic gas in the Holocene sediments or the tracks of ships that were dumping dredge spoils outside of the legal dumping limits.

At some point during these years, folks from the Survey's Halifax office started muscling their way onto our cruises so that they could collect the seismic data digitally. I resented the presence of these people for a variety of reasons. They had big budgets while our office ran our programs on a shoestring. They interrupted our data acquisition because their equipment wasn't working properly. They didn't get my jokes. They collected data then disappeared, without helping me to do the interpretations. Mostly, they failed to convince me that their digital imagery had better fidelity than the analog paper copies that I was used to working with[1]. The bottom line is that I wasn't convinced that working with digital seismic data was worth the tradeoffs in data acquisition headaches and loss of image quality.

My next employment was an epiphany. I worked with digital 3-D seismic data and digital wireline logs. I learned to do some amazingly interesting and useful things quickly. No more transferring well tops from paper to computer. No more colored pencils and paper maps that needed to be sent to the drafting department. I could do my interpretations more quickly than ever before. I could send and receive digital data to or from colleagues working on the project elsewhere. I could analyze the data in ways that were previously unimaginable[2]. I could use these digital datasets to be a better sedimentary geologist. Digital data are cool and later, after entering the teaching profession, I made a point of trying to get my students to embrace the digital age.

[1] No, I'm not an audiophile who insists that vinyl recordings are better than digital tracks.

[2] I really encourage you to come see new advances in seismic imaging at this year's Perkins conference. It will focus on how seismic attributes can be used to better image geologic features.

The Director's Chair

It seems there is no end for interesting times. As I write this, it is mid-August. WTI is now around $85/bbl, down from $120+ earlier this year. The stock market goes down 519 points one day and up 423 points the next day. S&P downgrades the US debt not just for the amount of debt but in large part because of our government's increasing inability to agree on anything. The euro is not having a great time, and gold is now so expensive, people are wondering who will buy it if they sell. And for the first time, we will have a Houston conference not at the Marriott Westchase/ Adams Mark. I am not sure which of the above events has been more traumatic or aggravating. Our first conference was in 1980; the 1990 conference was presented twice; and the 1998 conference was cancelled. All the conferences except two have been in Houston and at the same place. No longer. As noted on our web site, for reasons beyond our control we have had to change venues. I know some of you will be curious as to what happened but you must attend the 2011 conference and ask me in person at the ice breaker to find out the details.

Choosing a venue that is convenient for everybody is almost impossible. I guess in truth it is impossible. We had to move quickly for 2011 and the Houston Hilton North met most of our requirements and appears to be a first-rate facility. For those who live in the southwest part of the city, it may seem a major inconvenience, but thanks to the Beltway, it probably takes less time to go the distance than to drive downtown. Certainly, if you come from out of town it is much, much closer to the airport; and if you live in the north part of town it cuts the drive down. At this time, we do not know what will happen in 2012, but we will be checking around and feeling the pulse of the crowd in 2011.

The biggest change in this year's conference is the end of poster sessions as we have had in the past. Most authors are probably thrilled to hear about this as the number of authors willing to prepare a poster session has been going down steadily with time. We still plan to have author/attendee interaction by arranging for Roundtable sessions: authors will bring small copies of their figures, grab a table, and answer any or all questions while we provide food and drinks. We hope this will be a satisfactory solution. I do hope that you will be able to attend this year's conference. Many of the papers are not esoteric but provide practical advice on how to enhance the seismic information we all use. If you use 3D data, there is something for everyone.

We have been told that our publications will go online this October as planned; this we have been told. We have not had too much time to worry about this because of other matters but we will have a campaign for subscribers going before the end of the year.

Stay thirsty, my friends....

Dr. Norman C. Rosen,
Executive Director
GCSSEPM Foundation

In hindsight, that goal was a bit like preaching to the choir. Powerful personal computers had become commonplace. An increasing number of students were becoming adept at manipulating digital data in various ways. Something called "The Internet" was becoming a daily reality for students. They started applying to universities online. They started submitting assignments and downloading course materials online. They started communicating with their professors, fellow students, university administrators, and others online. They started getting their reference material online. Who needs books? Everything can be found in digital format online now, can't it?

Well, as most of us know, a lot has been written about sedimentary geology (and many other fields) that cannot be found online in digital format. Many of the classic textbooks (anyone remember Reineck and Singh?) and other published works have not been converted to digital format, and are unlikely ever to be. There are increasing numbers of students (and possibly now even professors?) who will never pick up a book. Many Industry folks have little or no access to "hardcopies". I worry that we will lose a substantial body of accumulated knowledge because it isn't accessible in digital format.

Our Section's publications, and in particular our Perkins Conference proceedings, are one such problem. It is possible to purchase these in CD format through our website. Individual articles can be purchased online through our website, and it is possible to browse through the abstracts for past meetings. Unfortunately however, there is no efficient way to search

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through the many papers that have been presented through the years. Yes, we are a "local group", but our past meetings have dealt with topics that have global application. Unfortunately, there are many people around the world who don't know that we, or our publications, exist.

Other groups of similar size to us now have their publications in a searchable format online. For example, it is possible to search through GCAGS papers through the AAPG's Datapages site. I regularly use this site in the course of my professional activities now, and I suspect that many/most of my colleagues (including professors and students at many universities) do likewise. Some truly classic papers have been presented at our Perkins Conferences, but that knowledge is being ignored or lost because it is not available in a searchable format online.

The loss of knowledge isn't the only casualty. As an organization, our Perkins Conferences are diminished because some potential contributors, e.g. most professors but also many Industry folks, need or want their results to be available to as broad an audience as possible. Why would they present the results of cutting edge research at our meeting if, effectively, the only people who will have access to the papers will be the people who attended the meeting? Why would they not, instead, prefer to present at meetings where the results will be available to a global audience? On the flipside, why would people attend our meetings if the presentations don't have a high impact.

In a very real way, the Perkins Conference competes for speakers, and for attendees. It is our annual Big Event, and we want to attract high-quality papers, and therefore attendees, to it. In the long run, we will only succeed at this task if we can make those papers available in a digital format that can be accessed by a global community. Globally accessible digital papers will attract authors/presenters, but they will also attract attendees, globally, who will become increasingly aware of the high-quality meetings that we put on. Digital papers attract revenues when people purchase them for download.

None of this was lost on then-President John Holbrook last year as I joined the Executive Council. John, working with GCSSEPM Executive Director Norm Rosen, did the legwork to find out what other societies are thinking about and doing, what options would be available to us, and what the costs would be. In the end, we decided to work with our parent society (SEPM) to make our publications searchable and available digitally. Once this project is completed, graduate students, professors and Industry professionals anywhere in the world will be able to find and download (for a fee, of course) papers from past Perkins Conferences and, eventually, other of our publications. A graduate student in Nigeria doing a thesis on shelf margin deltas will be able to find, learn from, and cite papers presented at the 2003 meeting. An Industry geologist in Norway working the North Sea will be able to find and learn about salt tectonics from papers presented at our 2004 meeting. A petroleum systems geologist in this country might be encouraged to present a paper at our 2012 meeting (Petroleum systems of continental margins) because she found the 2005 meeting to have been right up her alley.

Going digital will not be free, and there is a real risk that our investment will not pay out. The startup costs will be considerable. However, details of those costs, and how all this will be done (e.g., where the computer servers will be that host the digital publications) aren't important here. The important point is that the 2010 Executive Council, following John and Norm's lead, decided that we had two options: take a chance on going digital, or face the certainty that we would shrink as an organization. We think that our society has a lot to be proud of, and we decided that making the investment would help our light to shine, and make our group continue to grow and prosper. The job isn't finished yet, but it is the right thing to do and we will keep you posted about progress on the project.

One of my M.Sc. classmates went on to become head of the Science Library at McGill University in Montreal. When I first arrived at McGill, back in 2000, he was on a one-man crusade to get the library converted to a digital only format – in particular for journals, but ideally for books as well. Like most librarians, he was caught between shrinking budgets and increasing publishing costs. His shelves were full of inventory (i.e., books and journals) that were being accessed less and less frequently. University administrators were coveting his space. My guess is that many librarians elsewhere faced (and continue to face) similar problems.

Like many of my professorial colleagues at the time, I was skeptical at best and fearful at worst about the conversion to digital-only access. I had an emotional attachment to paper, and the process of walking through the stacks. By the time I left McGill (2008) I was converted, accessing all of my journal articles online. Sure, there are problems. For example, the quality of photographs can be atrocious in old papers that have been scanned and converted to tiff files. On the other hand, I no longer have many dusty shelves holding back issues of journals that I seldom read. My extensive digital library now fits on a 2″ long thumb drive. I plan on adding many more papers from past Perkins Conferences, hopefully in the very near future.

There are trade-offs to going digital, but the advantages outweigh the disadvantages. Thanks John and Norm.

Bruce S. Hart
President

News from Our Representatives

ALABAMA AREA NEWS
Dr. David T. King Jr.,
Auburn University

UNIVERSITY OF ALABAMA
At the University of Alabama, Dept. of Geological Sciences, there are some new faculty and new opportunities for graduate student research, as reported by the Chair, Dr. Ibrahim Çemen. Two funded graduate student opportunities of note are: (1) working in China (Tibet) on an NSF funded project in which the objective is to determine the Mesozoic tectonic history of the Qamdo Basin with the goal of understanding the pre-Cenozoic evolution of Tibet and; (2) working on seismic lines and well data in the Eastern Gulf of Mexico. This project is funded by an oil and gas company with a goal of determining the tectonic history of the opening of the Gulf of Mexico. For more information, see http://www.geo.ua.edu/.

UNIVERSITY OF AUBURN
At Auburn University, Dept. of Geology and Geography, Dr. Luke Marzen is now part of a large EPA-funded effort to inventory, classify, and assess Alabama's geographically isolated wetlands. Dr. Charles "Chuck" Savrda, former Chair of Geology and Geography is now the Dean of the College of Sciences and Mathematics.

Ed Picou Fellowship Grant Announcement

This year's Fellowship program officially ended with 53 applications received literally from around the world. This year we will dispense $28,250 in grants but I know that many applicants were disappointed in that their project did not receive funds. I can only say that I wish our resources were greater as some truly outstanding proposals did not receive support. A listing of our winners follows, with a brief title of research.

Rachael Acks, University of Colorado: *Eocene thermal maximum.*

Jennifer Barth, University of Houston: *Travertine work.*

Kelly Best, Ohio State University Polar Institute: *Isotope analysis of Arctic Ocean cores*.

Thomas Cawthern, University of New Hampshire: *Gas hydrates, Andaman accretionary wedge.*

Matt Corbett, University of Nebraska: *Cretaceous nannofossils.*

Jessica Douglas, University of Southern Mississippi: *Clay fabric of marine sediments.*

Nichole Dzenowski, Ohio University: *Late Pennsylvanian Glenshaw Fm, SE Ohio.*

Andy Fraass, University of Massachusetts: *The Mi-1 event.*

Padmavathi Iyengar, University of Missouri-Kansas City: *Seismic properties of coal during sorption of CO_2-CH_4.*

Kyle Jones, University of Buffalo: *Depositional models, Utica Shale, Mohawk Valley.*

Chris Lowery, University of Massachusetts: *Foram biostratigraphy, Niobrara Fm.*

Vishal Maharaj, University of Texas-Austin: *Minibasin models, offshore Gulf of Mexico.*

Diana Ortega-Ariza, University of Kansas: *Sequence stratigraphy, Mio-Pliocene carbonates, Caribbean.*

Eric Prokocki, University of Illinois: *Holocene evolution and avulsion, lower Mississippi River.*

Jane Stammer, Colorado School of Mines: *Heavt minerals, submarine fans.*

Emily Wooton, University of California-Riverside: *Late Devonian mass extinction.*

Two schools in Colorado, two schools in Ohio, and Massachusetts won two awards. Please note that only two Gulf Coast schools received an award because as a region, they applied the least! Elsewhere in the newsletter, we announce the rules and regulations for next year. Please read carefully, as the rules have changed. Of these 16 awardees, two received unanimous votes for support: Jessica Douglas and Jane Stammer. Their proposals follow.

Three-dimensional Clay Nano- and Microfabric of Marine Sediment and Laboratory Control Samples

Jessica Douglas
University of Southern Mississippi

Clay fabric (defined as the spatial distribution, orientations, and particle-to-particle relations of the solid particles) has been of scientific and engineering interest since the work of Terzaghi (1925) and Casagrande (1932). Various early models were proposed (Terzaghi-Casagrande Honeycomb Model; Goldschmidt 1926, Lambe 1953, and Tan 1957) to explain the physical and mechanical properties of the soils and sediment but a significant refinement of clay particles and fabric models emerged with the advancement of transmission electron microscopy (TEM) that provided visualization of clay (Rosenqvist 1959). For a number of years, clay fabric models evolved with concepts that increasingly coupled function with structure. However, these concepts relied upon 2-D TEM images to achieve the high resolution micrographs with great detail. Technological advances in computer capabilities and computer software, first demonstrated by Bennett et al. (1977) using traditional 2-D microfabric TEM photomicrographs, are presently more advanced and are helping us elucidate sediment clay fabric in 3-D images. Historically, fabric analysis using 2-D representations addressed physical properties such as porosity, void ratio, and particle size distribution, and particle shape. Important properties such as particle orientation, tortuosity, and the distinction between effective and inaccessible porosity have remained elusive until recently. With the advent of software for nanoscale 3-D reconstruction techniques, 3-D representations of clay now enables us to visualize and study quantitatively those previously elusive properties at the nanometer scale (level) of organization allowing us to refine and improve models of clay fabric from a volumetric perspective. Three-dimensional techniques using tomography and scanning electron microscopy (Keller et al. 2011) are showing the promise of 3-D technology, but TEM takes this technology to the highest level of resolution that can be achieved.

Effects of organic matter (OM) on clay fabric are poorly understood but are significant to in situ depositional properties and dynamic sediment behavior (Bennett et al. 1985, 1999a and b, 2004). Various investigators, i.e., Mayer (1994a & b) and Ransom (1997), have proposed that clay can trap and protect OM against enzymatic degradation at the nanometer scale in significant concentrations and, furthermore, this protection extends into geologic time scales (sedimentary rock formations, etc.). Evidence of the sequestering process can be found within lithified stratigraphic layers of clay, shale, and mudstone, where ancient OM is still present (Bennett et al. 1985, 1991, 2004).

Mayer (1994a & b) proposed a monolayer-equivalency hypothesis to describe an association between the surface area of clay and organic matter concentration noting that organic matter could coat

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Jessica Douglas Proposal *continued from page 4*

the surface of clay one molecule thick. The term monolayer-equivalent was used to describe this association because he considered a uniform monolayer unlikely. An irregular coverage of organic matter bridging between clay particles and on clay surfaces also was confirmed by Ransom *et al.* (1998).

The purpose of this project is to develop a technique for 3-D reconstruction of selected marine clay sediment that will enable refinement of nanometer scale models of clay fabric including delineation of relationships of domains and aggregates that form the building blocks of clay sediment. An effort will be to develop techniques for quantifying clay fabric and properties such as particle orientation, tortuosity, effective porosity, and inaccessible porosity. A judicious choice of (1) samples of laboratory consolidated clay for control on the mineralogy and percentages of OM and (2) natural marine sediment samples including polychaete fecal pellets and sediment from the Gulf of Mexico will be examined for comparison of clay fabric, selected physical properties, and micro- and nanofabric differences that can be ascribed to OM concentration and distribution within the different sediment 3-D volumes of study. Furthermore, techniques will be developed to visualize the otherwise electron transparent OM in 3-D representations of fabric.

Materials and Methods

Clay samples for analysis are carefully embedded in resin in a manner that preserves their ultrastructure (Bennett et al. 1977, Baerwald et al. 1991). Ultrathin serial sections (ca. 100 nm) are collected, carbon coated to protect against electron beam damage, and examined with TEM to discover suitable areas for analysis, i.e., long series of contiguous samples free from artifacts. Appropriate areas are photographically mapped, the electron micrographs are rendered in digital form (scanned) and assembled as mosaics in a graphing program (Corel Photo-paint). Each photographic mosaic represents one serial section (ca. 100 nm thick). The serial mosaics are assembled into a stack and converted into a 3-D representation (ImagePro). The 3-D representation can be rendered into an animation that the user can rotate to any vantage point (VRML) and can be made into movie clips (AVI, MP4) for qualitative analysis. Quantitative analysis requires substantial sub-sampling of the 3-D representation in order to perform measurements and calculations on the contiguous clay domains and aggregates. Particle fragments in the sub-samples are measured for volume, surface area, orientation (azimuth and inclination), etc. Representations can be electronically inverted so that voids can be treated as solid volumes and the same quantitative measurements can be effected. Data are exported to a spreadsheet, reorganized, and imported into a plotting program where histograms of parameters of interest are created. Figure 1 is a pictorial representation of our materials and methods. The combination of qualitative data and visualized quantitative data allow for a powerful analysis of clay fabric and various samples can be readily compared.

Work Accomplished and Work to be Done (Research)

We have developed and refined techniques for creating serial sections, photographic mosaics, and 3-D representations using our control samples with 1 and 10% OM (chitin). Creating 3-D representations for qualitative analysis has been mastered, and we have developed a procedure for sub-sampling and quantitative analysis. These techniques can be readily applied to other clay sediment samples, e.g., Gulf of Mexico (GOM), and polychaete fecal pellets for comparative analyses of fabric characteristics and types.

We have developed a technique using silver proteinate for visualizing the location of polysaccharides, a class of organic molecules, in relation to nanofabric signatures observed in 2-D electron micrographs; now we must refine and extend the technique for 3-D application. We also have experience with visualizing specific types of organic molecules with colloidal gold and intend to explore this powerful technique for visualization of OM in 3-D clay fabric representations. The interaction with crude oil and marine clay is a topic of current interest for the GOM, and we are developing a technique for visualizing that broad class of OM.

A number of samples are available to us that would make meaningful geological comparisons of clay fabric and sediment properties. We have refined our techniques using the laboratory control consolidated smectite-illite rich samples with 1 and 10% chitin added as an organic substrate that can be visualized with silver proteinate (Curry et al. 2009) and colloidal gold. This includes sub-samples that have been enzymatically digested with chitinase to analyze the protective properties of clay fabric and physico-chemistry for sequestered OM. We have samples of marine polychaete fecal pellets that represent natural, bioturbated clay, sub-samples of which have been enzyme digested to analyze the protective mechanisms of bioturbated clay sediment microstructure. We also have acquired GOM samples near the recent Deepwater Horizon oil spill that provides an additional natural sediment with the novelty of impregnated crude oil-rich mud.

Anticipated Results and Benefits

The proposed research effort will address important issues regarding the 3-D clay fabric characteristics of fine-grained clay mineral and OM-rich sediment deposits that largely control and thus determine the fundamental convection, diffusion, OM sequestering, and sediment physical and early diagenetic properties of marine muds. Important comparisons of observed 3-D nano- and microfabric will be made with earlier published 2-D fabric models to develop an understanding of potential differences in the interpretation of volumetric versus two dimensional quantitative and numerical analysis of the fundamental fabric and sediment properties as delimited and measured in the TEM 2-D and 3-D fabric models. Hypotheses will be tested by direct observation with transmission electron microscopy using appropriate staining techniques for OM and hydrocarbons (HC). Appropriate samples from the GOM will be prepared for examination. The patterns of HC distribution is best assessed using three-dimensional reconstructions of sediment clay fabric. Our recent on-going NSF funding is providing the opportunity to develop and become proficient in creating three-dimensional reconstructions of clay fabric using the control laboratory samples, and with computer software we are visualizing and characterizing both qualitatively and quantitatively the nature of the fabric, pores, and the distribution of OM; thus an excellent opportunity to address natural sedimentary deposits including the GOM HC-sediment issue.

We address the important issue of the long term fate of the OM and HC by natural containment through processes and mechanisms of OM and HC interaction with clay sediment.

In summary the research proposed is to:

Develop a quantitative three-dimensional visual model of OM protection in natural clay sediment pores and adsorbed on clay surfaces based on direct TEM observations that reveal the distribution of OM with respect to pores and potential energy fields developed by the clay microstructure. Marine fine-grained clay sediment represents the globally most important OM depocenters.

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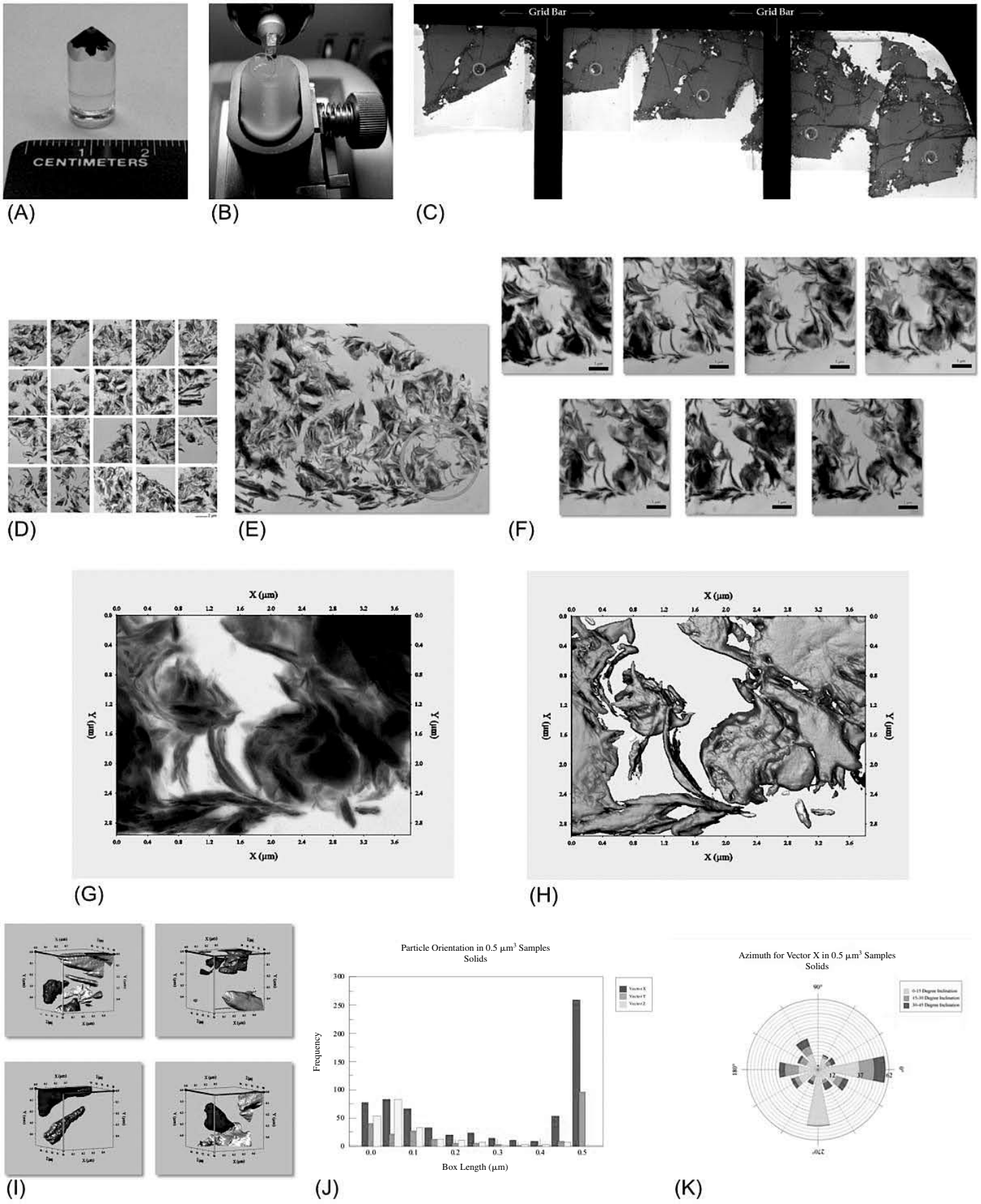

Figure 1. Pictorial description of method. (A) Resin embedded sediment, (B) Serial sections (blue circle) from an ultra microtome, (C) Electron micrographs of serial sections at low magnification with areas of interest circled, (D) Photographic map of one serial section (12,000X), (E) Mosaic of D with area of interest circled, (F) Serial set of mosaics, (G) 3-D representation, (H) 3-D representation with Isosurfaces necessary for quantitative analysis, (I) Representative sub-samples of H, (J) Histograms of orientation data. See accompanying MP4 files for animations of G and H.

Jessica Douglas Proposal *continued from page 5*

We plan to reconstruct:

1. pore throat size and geometry and associated pores that may demonstrate a potential relationship with OM protection,
2. micro- and nanofabric pores of varying tortuosity developed by the fabric that also may demonstrate a relationship with OM protection, and
3. micro-and nanofabric in order to demonstrate the distribution of OM on edges of clay platelets (domains) which define pore openings and pathways into pores and that influence the depositional porosity, permeability and compressibility of marine fine-grained sediments.

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The GCSSEPM Welcomes New Members

James Markello
ExxonMobil, Houston, TX

Pamela Hallock-Muller
University of South Florida, College of Marine Sciences
St Petersburg, FL

Mark Wilson

Changbing Yang
University of Texas, Austin, TX

Lost Members

We no longer have contact information for the following individuals. If you can provide information please contact Brandi Sellepack, brandi.p.sellepack@conocophillips.com.

Didier Arboulie
Kazuyoshi Hasegawa
Duncan W. McMaster
Paul Owens
Garth E. Syhlonyk

Hydrodynamic Fractionation of Minerals and Textures in Submarine Fans: Implications for the Prediction of Reservoir Quality

Jane Stammer
Research Proposal, GCSSEPM

Scientific Problem and Importance: Outcrop and subsurface studies document that submarine fan systems consist of channels and lobes that compensationally stack. Additionally, studies show that individual lobes have a thick axis and strata thin and become finer-grained toward the lateral and distal margins. No studies document how texture and mineralogy, which affects reservoir quality, changes laterally and longitudinally in these deposits. Through outcrop and experimental studies, this project will address the following fundamental questions related to reservoir quality in deep-water turbidite systems: How do mineralogy and texture change longitudinally and laterally in submarine fans? Are these changes related to hydrodynamic fractionation? Are the changes systematic? How do turbidity currents fractionate minerals of different size, shape, and density? How does fractionation affect reservoir quality?

Submarine fans are common reservoirs and comprise a large proportion of petroleum targets off the Gulf Coast of the U.S. Primary porosity and permeability, the main components in reservoir quality, are related to textural properties such as sorting, grain size, and grain shape, whereas secondary porosity and permeability are related to mineralogical properties such as alteration of feldspars to clay. Understanding textural and mineralogical variability and their impacts on reservoir quality is therefore critical.

Research methods and objectives: The proposed questions will be addressed by two methods of research: 1) field-based outcrop measurements of deep-water lobe strata within the Cretaceous Point Loma Formation, San Diego, California, and 2) scaled, physical experimentation using a deep-water tank.

Lobes are depositional features found in deep marine basins associated with nonchannelized flows. Previous research conducted on the Point Loma Formation has identified four lobe complexes that expose strata from proximal, medial, and distal locations. The strata are well-exposed, have exceptional lateral continuity (5+ kms), and the outcrop is nearly perpendicular to paleocurrent direction. Individual beds and larger lobe elements will be mapped and sampled at the cm-scale, from axis to margin within proximal, medial and distal locations in order to document how mineralogy and texture varies longitudinally and laterally. The following parameters will be documented along the profiles: bed thickness, facies, primary and secondary sedimentary structures, mineral composition, sorting, grain size, and grain shape. Standard petrography and QEMSCAN, which is an automated scanning electron microscope (SEM) system, will be used to accurately measure percentages of minerals, grain size distributions, and grain shape. Additionally, ICP-MS whole rock geochemical data will be used to relate changes and trends in geochemistry to changes in mineralogy produced by hydrodynamic fractionation.

The experimental portion of this research will take place in a ~ 6x4x2 m tank at Tulane University. The experiment will test the effects of particle density and particle shape on flow behavior and characteristics of turbidity current deposits in 3-dimensions. To do this, two sets of experiments will be run. First, to test particle density, spherical beads of two of more densities with the same grain size distribution will be mixed. Second, to test particle shape, spherical and crushed silica of the same grain size distribution will be mixed. After each experiment, samples collected from all areas of the deposit will be analyzed to see how turbidity currents hydrodynamically fractionate particles based on these two parameters. Analyses and measurements taken during each run include particle size distribution using an LPSA, grain density and shape distributions using QEMSCAN, and flow velocity and flow turbulence using acoustic Doppler instrumentation.

GCSSEPM Sponsors Student Workshop at BEG in Austin

GCSSEPM President-Elect **Ursula Hammes** and Bureau of Economic Geology (BEG) colleagues Gregory Frébourg, Bob Loucks, Fred Wang, Ray Eastwood, and Eric Potter conducted a GCSSEPM sponsored Student Workshop on June 23rd at the BEG in Austin. About 40 students from University of Houston, UT Austin, Rice University, and UT Arlington attended the workshop. Ursula and her team put together a very timely topic on sedimentology, sequence stratigraphy, geochemistry, engineering, and petrophysics of the Haynesville and Bossier mudrocks in east Texas and north Louisiana. Emphasis of this short course was rock based because one morning and afternoon session each was dedicated to examining several mudrock cores at the BEG's extensive core facilities. This hands-on experience was very much appreciated by all students. The students were eager to learn about shale-gas systems as not many University specific classes are yet taught on mudrock geology. Future GCSSEPM Foundation sponsored courses are planned for students. If a member is interested to conduct a one or half-day short course please contact Ursula Hammes or Norm Rosen.

GCSSEPM FOUNDATION
ED PICOU Fellowship Grant For Graduate Studies in Earth Science
Programs and Rules for 2012-2013

Founded in 1981, the GCSSEPM Foundation is a tax-exempt, nonprofit organization whose primary objective is to promote the science of stratigraphy through research in sedimentary petrology, reservoir quality, paleontology, and any other related geological and geophysical fields, especially as it relates to petroleum geology, with emphasis in (but not limited to) the Gulf Coast region.

Among the activities which the Foundation may engage in are:

- Conduct research d\irectly or through promotion, assistance, encouragement, or support of studies and research in the field of stratigraphy and in the science related thereto;
- Dissemination of information relating to stratigraphy and related fields through lectures, seminars, research conferences, symposia, publications, educational courses, teaching aids, and by other means and material;
- To carry on programs of continuing education in stratigraphy and related studies;
- To assist in career guidance to persons interested in stratigraphy and related studies;
- To assist public and private schools and colleges and universities and technical schools in teaching and education in the field of stratigraphy and related fields.

Therefore, we are hoping to support students whose thesis or dissertation is related to our primary objective. **We are primarily concerned about quality of work and how it relates to our objectives. If you look at past winners of the Fellowship, we are not limited to a particular geographic area. We are interested in research on projects in North America/Caribbean in general, the Gulf Coast Basin in particular.** Maximum grant will be for $2500.

The program is open to graduate students of Canadian and United States universities only. Interested students should submit all material electronically only. (1) A short description of their proposed work, approximately 4-6 pages (in type no smaller than 11 point and with standard margins). (2) A separate file of expenses and other support should be included; please note, valid expenses should be for field work and support thereof; we normally do not support attendance at conferences or meetings. (3) The student's advisor should write an appropriate document of support in digital format sent from their university e-mail address and in written format by snail mail. (4) We also require a short biography of the student as well as a digital picture. In your cover e-mail, insure that your full name, your university, your snail-mail address, your e-mail address, the name of your adviser, and their e-mail address are included. We do accept Word format but prefer if files are sent in PDF as they are much smaller and are easier to send as e-mail attachments.

The e-mail address for submissions is: gcssepm@comcast.net.

The adviser's snail-mail letter of support should be mailed to:

Dr. Norman C. Rosen
Executive Director
GCSSEPM Foundation
2719 S. Southern Oaks Drive
Houston, TX 77068

Submission of a proposal to the GCSSEPM indicates acceptance of the following conditions.

(1) The GCSSEPM Foundation will be acknowledged in the work.
(2) This money is being granted for the defraying of the cost of thesis/dissertation work associated with a degree program only. In the event that this work is not done, the money must be returned to us.
(3) We request a note at six (6) month intervals letting us know about the progress of the research. The first such note will be due (i.e., posted) by December of the year in which the award is granted.
(4) You will submit two notes (expanded abstracts) for publication in our GCSSEPM Newsletter. The first will refer to the goals of your study; the proposal for the grant in general will be used. The second will be a summary of results of the work after completion.
(5) If the topic is appropriate for submittal to the GCAGS-GCSSEPM, we request that you present your work at a GCAGS-GCSSEPM convention.
(6) Please note that if awarded a grant, acceptance **must be signed by both the student and the adviser.**

Failure to comply with these terms may result in our refusal to consider future proposals from students of your professor and university. (Please make your advisor aware of this.)

DEADLINES

This program is designed to support research starting summer 2012 and into the 2012-2013 calendar/academic year. Therefore, we ask that all requests be sent after **January 1, 2012** and received by us no later than **March 1, 2012**. We hope to notify award winners by the end of March, 2012.

Gulf Coast Section – Society of Economic Paleontologists and Mineralogists

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FINAL CALL FOR PAPERS AND POSTER PRESENTATIONS

New Understanding of the Petroleum Systems of Continental Margins of the World

32nd Annual GCSSEPM Foundation Bob F. Perkins Research Conference

DECEMBER 2-5, 2012 • HOUSTON, TX

During the past decade, numerous discoveries have been made in many deep-water basins globally, as well as ongoing significant development of previous discoveries. With many new companies operating in deepwater globally, our goal is to assemble an outstanding, innovative technical program that summarizes the recent successes globally, and a CD-ROM with the conference proceedings.

We are soliciting papers that document some or all aspects of the petroleum systems of deep-water margins with major production and/or discoveries (source rocks, seals, generation, migration, reservoirs, and traps). We are interested in papers that address these specific elements in a field, discovery, emerging play or regional setting of a basin.

The conference will address current areas of active exploration/development, and emerging deep-water basins. Current deepwater basins of interest include northern Gulf of Mexico (including the emerging Paleogene and Mesozoic plays), Brazil (Santos, Campos, Sergipe-Alagoas, Espirto-Santo), West Africa (Angola, Congo, Gabon Equatorial Guinea, Nigeria, Ghana, Sierra Leone, Mauritania, Morocco), eastern Mediterranean (Nile Delta, Levantine basin), west of Shetland Islands, Norway (recent discoveries), Indian subcontinent (Krishna Godavari), circum-Borneo (Baram Delta, northwest Borneo basin, Kutei/Makassar), northwest Shelf of Australia, Sakhalin Islands.

Emerging deep-water basins of the world: east Africa (Madagascar, Mozambique, Tanzania, Kenya, Somalia), additional West Africa basins, Arctic basins (east- and west-Greenland, North Siberian Shelf, Beaufort Sea), southern Gulf of Mexico, north Africa (Algeria, Libya), eastern Canada (Scotian, Jeanne D'Arc), northern south America (Colombia, Venezuela, Guyana, Suriname), Caribbean (Trinidad/Tobago), additional Brazilian basins, Argentina, Western India, Black Sea, New Zealand basins.

Authors interested in presenting a paper at the conference should submit by e-mail a preliminary title and 250-word abstract to Norman C. Rosen or one of the technical co-conveners.

DEADLINES

Preliminary Title and Abstract. . . . October 1st 2011	First Manuscript . . . . . December 15, 2011
Tentative Program Announced . . . November 15, 2011	Final Illustrated Manuscript . . . June 1, 2012

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1st CALL FOR PAPERS AND POSTER PRESENTATIONS

Sedimentary Basins: Origin, Depositional Histories, and Petroleum Systems

33rd Annual GCSSEPM Foundation Bob F. Perkins Research Conference

DECEMBER 1-4, 2013 • HOUSTON, TX

The structural and depositional diversity of sedimentary basins is profound, effecting great variation in petroleum systems. This diversity encompasses rifts, sag basins, pull-apart and low-angle detachment basins, foreland basins, and divergent and transform passive margins, to name just a few. In addition, the need to understand the depositional patterns and processes of shale has increased dramatically in the last few years.

Technological advances in data acquisition are changing our conceptual models of many facets of geology. This, in turn, impacts the way we think, interpret data, and explore for energy resources. Examples include recognition of the ongoing dynamics of “passive” margins, visualization of the Moho with implications for heat flow history and crustal balancing, appreciation for low angle detachment faults in extension, exhumation of sub-continental mantle at continent-ocean transition zones, sub-salt imaging, and listric fault control beneath seaward dipping reflector packages which in turn controls subsidence histories at outer margins.

This conference is devoted to upgrading our conceptual models of exploration settings and to identifying the geological processes that create them. We also seek to highlight ties between these processes and depositional systems, along with implications for various petroleum systems.

We are soliciting papers that document how sedimentary basins are formed, how sediments (including shales) are deposited in all types of basins, and how petroleum systems can differ in these various basins. Settings may come from around the globe. We expect to have sessions on specific margins and regions such as the “Gulf of Mexico”, the “Atlantic”, and the “Arctic, Pacific and Indian oceans”. Talks for topical themes such as “rifting”, “transform margins”, “shale deposits”, and “subduction-related basins” are also sought.

Authors interested in presenting a paper at the conference should submit an abstract using the abstract submission form on our web site or by e-mail to Norman C. Rosen or to one of the technical co-conveners, whose contacts are below.

DEADLINES

Preliminary Title and Abstract	October 1, 2012	First Manuscript	December 15, 2012
Tentative Program Announced	November 15, 2012	Final Illustrated Manuscript	June, 1, 2013

TECHNICAL CO-CONVENERS

James Pindell (Tectonic Analysis Inc., Rice University) . . . . . jim@tectonicanalysis.com
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