MONTANA GEOLOGICAL SOCIETY

NEWSLETTER

MGS Vol. 53 No. 8

October 2009

MGS Luncheon Meeting
Friday, Oct 2nd, 2009

P. Ted Doughty, Ph.D
Consultant, PRISEM

"Devonian Paleogeographic Highs and Intrashelf Basins in Western Montana: Implications for Oil and Gas Exploration."

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MGS Luncheon Meeting
Wednesday, Oct 14nd, 2009

Carter Havner, Ph.D
Lucturer, MSU-Billings

"A Brief History of the Petroleum Industry."

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MGS Luncheon Meeting
Wednesday, Nov 4th, 2009
12:30 PM

Martin Perlmutter, Ph.D
Chevron, Houston, TX
"High Frequency Paleoclimate Change: Impact on Exploration Strategy and Climate Research.

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Members who do not receive an e-mail reminder can RSVP by calling Doretta Brush at Ballard Petroleum 406-259-8790

All meetings are held at the Billings Petroleum Club at 11:45 a.m. unless otherwise noted

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PRESIDENT'S LETTER – PAT LEMKE

October, 2009

Once again another summer has come and gone and another year has passed in the MGS officer's ranks. Annual MGS elections will take place this month and the confirmation of a secretary candidate. About the time you have a handle on a job, it's time to move on to the next office. I especially feel that way as the outgoing President. There's a lot more going on than just scheduling luncheon speakers. It's amazing how many people both in front of and behind the scenes take on the many tasks and responsibilities necessary to run our volunteer organization. I owe a tremendous thanks to the officers, both those who preceded me and those now serving on the board. They have never been more than a phone call or email away to answer the question, "What should we do in this situation?" or "Who do we talk to get this done?" Thanks to our organizational representation, both the AAPG and RMS with whom MGS is affiliated. Our delegates have taken their own time and resources to represent the MGS at regional and national events, in some cases for several years. We have committee chairs who oversee a number of functions as varied as publications, field trips, the MGS foundation and the MGS/MAPL golf tournament. I know in many cases these are "thankless" jobs, and they don't pay too well, but I also know most of these guys aren't in it for the money and recognition.

Through the course of my last five years on the board, the MGS has gone through some subtle changes. The MGS newsletter has moved into the computer age and sending the newsletter via email adds to its flexibility and presentation, and we are saving the society some money. Member lists, luncheon invitations and email lists have all been computerized for various sorting and broadcasting purposes. These lists have never been more up to date and accurate mostly due to the work and computer savvy of a couple of guys. Due to a windfall profit from hosting the Rocky Mountain Sectional in June 2006, the MGS is in excellent financial condition. However this bumped us into a different tax category. As a nonprofit organization we do not pay any taxes, but we still have to report to the IRS. All of the MGS publications will soon be marketed by the AAPG and available on CD. If you are looking for hard copies of older editions, contact Doretta Brush at Ballard Petroleum. Ballard is generously allowing the MGS to use a spare office as a library —a dry, safe storage area and much more readily accessible. And the list goes on. We try some new things, we can some old things that don't work, carry on business and move ahead. Issues to address in the future will be the MGS website—we've never had a webmaster on the board, which makes changes and updates difficult. And the board will be making some decisions on awarding foundation funds for scholarships and ongoing earth science grants. Good stuff! Important contributions to our community and profession. Thanks for the opportunity to serve and learn who the Montana Geological Society is.

Is something brewing in Big Sky?

The weak shale formations of Big Sky create ripe conditions for landslides. For property buyers, it's *caveat emptor.* This story is part of a series about Big Sky produced by University of Montana School of Journalism students in collaboration with NewWest.Net. Story by Elizabeth Diehl and Megan McLean.

By Kip Sikora, Guest Writer, 8-28-09

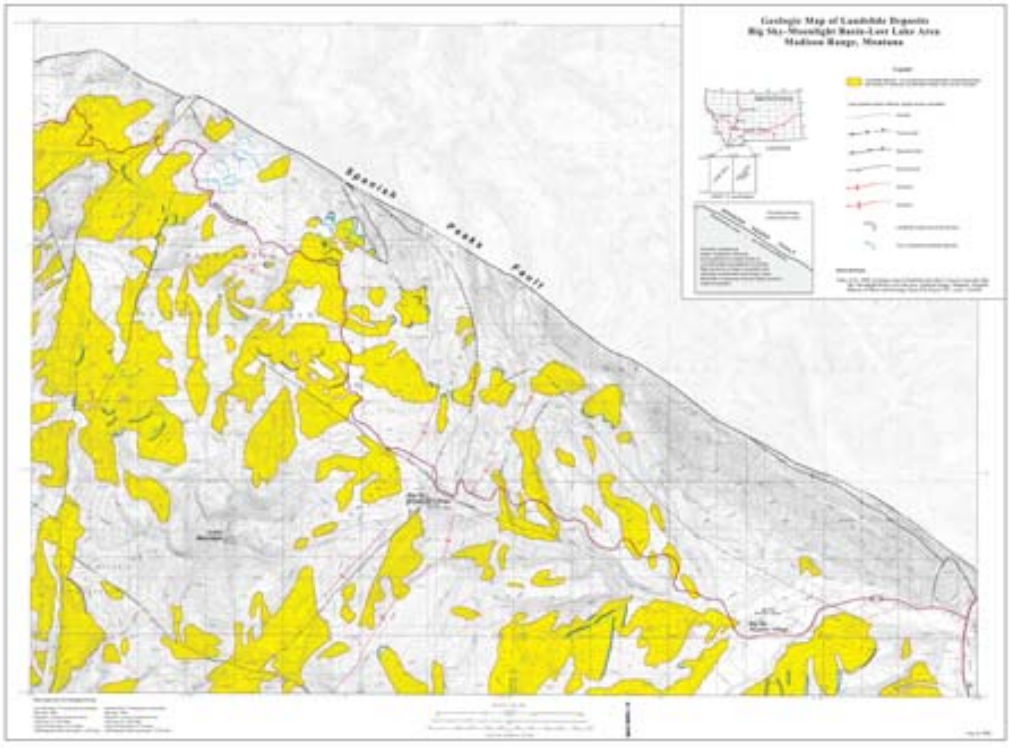
It the spectacular that make Big Sky, Montana what it is, but geologists worry that they're less solid than they seem. The shale formations in many parts of Big Sky are susceptible to landslides, and many houses have been built in areas that could start moving if there's a period of exceptionally wet weather.

And because Big Sky lies within the Intermountain Seismic Belt—the part of the intermountain west with the highest earthquake potential—risk of sudden landslides is that much greater.
In 1959, an earthquake with a 7.5 magnitude struck part of Madison Valley, about 30 miles south of the Big Sky-Moonlight Basin area, triggering a landslide that killed 28 people. After damming a section of the Madison River, this event coined the name "Quake Lake."

How developers, brokers and home buyers in Big Sky deal with the landslide risk is all over the map. In many cases buyers are aware of the problem and invest in engineering solutions, but in other cases they're in the dark. As reported on NewWest.Net, a recently settled lawsuit against the Spanish Peaks development alleged that known risks were not disclosed, and that the sales staff was told to "baffle them with BS" if people asked about the issue.

Geological surveys and soil-sampling are generally required as part of the subdivision approval process, but those reports are not always shared with buyers. In the accompanying video story, several experienced geologists discuss their concerns.

The map below, from Susan Vuke of the Montana Bureau of Mines and Geology, shows known landslides in Big Sky. To read the full story with additional pictures, videos, and other stories on the Big Sky area navigate to ***http://www.newwest.net/topic/article/scientists_see_landslide_risk_in_big_sky/C35/L35/***



Photographic highlights from our MGS Summer 2009 Field Trip

We had a great turnout for the Eagle Field Trip led by Joern Hauer in September. Everyone seemed to enjoy a chance to see the rocks that Joern has been discussing with us over the last year! Enjoy the photos!

Left to right: Durwood Johnson, Brooke Henderson, and Russ Warchola in the sacrifice cliff area.

Back left to front right: Larry Jones, Joern Hauer, Brooke Henderson, and Jim Staub (U of M) contemplating the Eagle.

Please note the gratuitous use of goofy hats! For more information contact Bob Schalla or Dr. Marc Hendrix.

Luncheon Abstract - Friday October 2nd, 2009, 11:45 AM

"Devonian Paloegeographic Highs and Intrashelf Basins in Western Montana: Implications for Oil and Gas Exploration"

by P. Ted Doughty and George Grader

Lecture: We have assembled a regional sequence stratigraphic framework for Devonian rocks in east-central Idaho and southwestern Montana using facies stacking patterns, sequence boundaries, and conodont data to better understand reservoir potential. The Idaho (down-dip) portion of the margin records a much longer period of deposition with Lochkhovian to late Frasnian strata deposited on a passive margin carbonate ramp during 2nd-order Kaskaskia sea level rise in a global greenhouse climate. The upper Devonain succession (late Frasnian to Famennian) was deposited unconformably on older strata in an active margin setting during a change to global icehouse conditions and the 2nd-order Kaskaskia sea level fall as this margin transitioned into a compressive margin during the Antler Orogeny. The up-dip portion of the margin in Montana is much thinner and is composed exclusively of the upper Devonian succession (Frasnian-Famennian) with no underlying pre-Givetian strata due to erosion or non-deposition. Local tectonic adjustments during the Famennian in Montana produced a segmented ramp with paleohighs and lows and associated unconformities, loss of biostromal community members, and changes in the diagenetic environment near and above the Frasnian-Famennian boundary. This segmented margin produced complex multi-directional carbonate ramps during Jefferson deposition and locally restricted intra-shelf basins and evaporates in the upper Jefferson and lower Three Forks formations. A subsequent influx of siliciclastics from the east and localized unconformities and irregular deposition of black shales mark the deposition of the Sappington Formation (Bakken equivalent). Potential Jefferson dolomite reservoirs are associated with evaporates or sequence boundaries in carbonate ramps developed off of the paleohighs. Reefs, a favorite target in Alberta, form down-dip in Idaho, but only thin biostromes develop because of a lack of accommodation space in Montana. The Sappington Formation has two black shales bounding a clastic/carbonate medial member. The shales exceed 20 feet in thickness with TOC's of 6-15% in the oil and gas window. The medial member is locally of reservoir quality and reaches thicknesses of 60'. Oil and gas shows from both lithologies suggest that the Sappington Formation in western Montana it has great potential as a resource play.

Biography: Ted Doughty received his B.A. degree in geology from Washington University in St. Louis (1986), his M.S. degree from the University of Montana (1990), and his Ph.D from Queen's University (1995). After stints in industry as a geologist with Amoco (1990-1991) and Exxon Production Research Company (1996-1999), he was an associate professor of structural geology at Eastern Washington University for eight years before forming PRISEM Geoscience in 2005. Since then he has focused on generating and evaluating thrust-belt and unconventional exploration projects in the Rockies and the Gulf of Mexico.

Luncheon Abstract - Wednesday October 14th, 2009, 11:45 AM

"A brief history of the Petroleum Industry"

by Carter Havner

Lecture: The presentation will discuss the discovery of oil in Pennsylvania and the development of that discovery into Titusville in the 1860's, The relationship of technology, society and the environment will be treated. The story of oil is closely related to the continuing evolution of the American transportation system and the means of transporting and marketing the product. I will present some of the links between early oil production and transportation. In specific the lecture will deal with the early use of oil as an illuminate, the crude means of early distillation and drilling, the problems associated with the "oil boom", the pipeline wars of the 1860's, the need for controlling oil production in the oil fields of Pennsylvania, and John D. Rockefeller's marketing arrangements that enabled him to control production and artificially buoy prices.

Biography: Dr. Carter Havner is currently a Lecturer at Montana State University Billings. He teaches survey courses in American History and Western civilization, and specializes in Modern East Asian History. He received his PhD from the University of Texas in Austin in 1977. Prior to his teaching career at MSUB he was in Naval Intelligence, serving in Asia and the Middle East. In the near future, Dr. Havner will be doing research about the expansion, regulation and development of petroleum in the state of Montana.

MGS Luncheon - Wednesday, November 4th
12:30 PM Petroleum Club
2009-10 AAPG Distinguished Lecture

Abstract

MARTIN PERLMUTTER

Chevron , Houston, Texas

Funded by the AAPG Foundation

High Frequency Paleoclimate Change: Impact on Exploration Strategy and Climate Research

Orbital cycles alter insolation, which produces climate, sediment yield, lake and sea level cycles. The greatest insolation changes occur at the scale of precession (~20 kyrs) during periods of high eccentricity. Within a hemisphere, the climatic response of a specific region is a function of the phase of the insolation cycle and the paleogeography of the region. Some areas can become wetter while others become drier at the same point in an insolation cycle.

Climate cycles affect the type and rate of sediment weathering and transport, the sediment produced, grain sizes, and yield. Analysis of yield as a function of climate indicates that volume can vary by more than an order of magnitude depending on the conditions. Therefore, a climate cycle can produce a distinct sediment supply cycle whose nature is dependent on the regional climate succession.

An added complexity, similar in some respects to the systematics of annual seasonality, is that precession-scale insolation cycles cause the warmest (or coolest) conditions in the Northern and Southern Hemispheres to be about 10 kyrs out of phase. This is significant because the affects of glacioeustasy, also a function of insolation and climate, are global. Prior to the Plio-Pleistocene, the common glacial state was a unipolar icecap. Under this condition, eustasy tended to track the precession-scale insolation cycle of the glaciated hemisphere. The results were that similar climatic successions in opposite hemispheres had yield cycles with distinctly different phase relationships to glacioeustasy. Such differences would not exist in an ice-free world.

Understanding the inherent paleoclimatic and stratigraphic variability of a system helps improve depositional models and interpretation and reduces the uncertainty associated with exploration analyses. For example, by taking into account the interaction of sediment yield and sea level, exploration areas that are prone to the development of sand-rich submarine fans or deltas can be forecast and high graded. The same approaches can be used for lacustrine regimes.

Additionally, evaluating the stratigraphic record and recognizing that these types of variability occur and mapping them in an accurate chronologic framework will greatly assist paleoclimate modelers by ensuring that simulations are run with the appropriate input parameters and by validating their simulations at the appropriate timescales.

Abbreviated Biography

Education:

1982 Ph.D. Marine Geology, Rosenstiel School of Marine & Atmospheric Science, University of Miami

1973 M.S. Geology, State University of New York at Stony Brook

1973 B.S. Geology, State University of New York at Stony Brook

Experience:

25 yrs with Chevron & Texaco as a team leader & research scientist

3 yrs as a team leader & research scientist at Argonne National Laboratory

Expertise in reservoir prediction, basin analysis, cyclostratigraphy, paleoclimate

Evaluations of 30 basins in North & South America, Europe, Asia, Africa, & the Indian Ocean & mega-regional studies of eastern North America, Brazil, Argentina, Chile, South Atlantic & China

25 scientific publications & numerous presentations

Recent Professional Activities:

2009 Co-Chairman, Grand Challenges that Limit Our Ability to Understand Paleoclimate & Paleoceanography in Deep Time, Oral & Poster Sessions, AAPG/SEPM Annual Meeting, Denver, Co.

2008-09 Chevron representative to the National Research Council Panel on Paleoclimate

1996-2009 Adjunct Professor, Department of Geology, University of Illinois at Chicago

2008 Invited speaker, Impact of Interaction between High Frequency Climate Change & Glacioeustasy on Sediment Delivery to Ocean Margins, AAPG Hedberg Conference on Sediment Transfer from Shelf to Deepwater, Ushuaia, Patagonia, Argentina

2008 Co-Chairman, SEPM Research Symposium: Paleoclimate: Implications for Stratigraphic Interpretation & Modern Climate Change, Oral & Poster Sessions, AAPG/SEPM Annual Meeting, San Antonio, TX.

2008 Co-Chairman, New and Emerging Exploration Technologies, Oral & Poster Sessions, AAPG/SEPM Annual Meeting, San Antonio, TX.

Don Wirth Retires from the MGS Board of Directors

After many, many, years of distinguished service to the Montana Geological Society Don wirth has decided to retire from his seat on the Board of Directors. It cannot be confirmed but rumor has it that Don earned a seat on he Board in a tragic accident when a T-Rex ate the last sitting member of the Board of Directors. It a less exciting turn of events Bob Schalla has volunteered to continue in service to the MGS by taking Don's seat.

The Board would like to thank Don for his tireless service to not just the Society but to the community at large. Don you are a shining example for the way we all should work to give back to the community. Thanks for everything that you do and enjoy the time to come! Thanks also to Bob Schalla for continuing in his efforts on behalf to the MGS.

It's that time of year again!

Officer elections will be held Wednesday October 14th, 2009 at the MGS Luncheon Meeting in the Petroleum Club. Please come down and let your voice be heard.

The MGS Publications are warm, dry and cozy!

The officers and Board of the MGS would like to thank Ballard Petroleum for provide a war, safe, and easily accessible place to store the Publications Archive.

MGS Calendar and Reminders

October 14 **MGS Luncheon,** "A Brief History of the Petroleum Industry."

October 27 **PTTC Rockies,** Chemical Enhanced Oil Recovery – Golden CO, Contact 303-273-3107

November 4 **MGS Luncheon,** "High Frequency Paleoclimate Change: Impact on Exploration Strategy and Climate Research."

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All ads must be prepaid.
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Submission deadline for the MGS Newsletter is the 20th of each month. Submit requests to Newsletter Editor.
Andrew Urie
aurie@stmaryland.com
245-6248

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Billings, MT 59103

MGS PUBLICATIONS

2006 Montana Oil & Gas Fields CD----------$65.00
MGS – NRGDC Northwestern Geologic Service Sample Logs (MT, ND, SD) ----------$2500.00
Over 2500 sample logs on CD-ROM, regional sets also available
2000 Guidebook: Northern Montana & the Montana-Alberta Thrust Belt (2 Vol. Set) ----------$125.00
50th Anniversary Symposium
1998 8th International Williston Basin Symposium ----------$55.00
1998 Core Workshop Guide for Williston Basin Symposium ----------$30.00
1997 Bighorn Symposium Guidebook ----------$50.00
1997 MGS-TRGS Field Conference Guide ----------$25.00
"The Edge of the Crazies: Where the Mountains Meet the Plains"
1996 AAPG Rocky Mountain Section Meeting Expanded Abstracts Volume ----------$25.00
1995 Guidebook: Seventh International Williston Basin Symposium ----------$100.00
1993 Guidebook: Energy and Mineral Resources of Central Montana ----------$54.00
1991 6th International Williston Basin Symposium ----------$55.00
1991 Guidebook: Geology and Horizontal Drilling of the Bakken Formation ----------$50.00
1991 Field Trip Guides: Beartooth Mountains ----------$7.50
Sequence Stratigraphy of the Eagle Sandstone at Billings ----------$7.50
1989 Guidebook: Geologic Resources of Montana ----------$80.00
1986 Guidebook: Geology of the Beartooth Uplift and Adjacent Basins ----------$45.00
1985 Symposium: Montana Oil and Gas Fields ----------$55.00
1978 Economic Geology of the Williston Basin ----------$100.00
1971 Catalog of Stratigraphic Names ----------$10.00
1969 Guidebook: Economic Geology of Montana ----------$8.50
1951 BGS 2nd Annual Central Montana Field Conference ----------$12.50
1950 BGS 1st Annual Field Conference ----------$12.50

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S & H charges are not included in prices. Add $6 US shipping or $12 Canadian for each book ordered. For 1985 guidebooks add $15 US shipping or $25 Canadian.