



PAPG/PGS Meeting
Radisson - Green Tree
1 April 2010

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

presented by

Martin Perlmutter

Chevron Geologist and
AAPG Distinguished lecturer

Abstract:

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.

Biography:

Martin Perlmutter



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
1972 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 & megaregional 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.
2003-08 US representative to IODP Industry Liaison Panel

Lecture-Related Publications

- Perlmutter, M.A., N. Azambuja, 2005, Cyclostratigraphy, in E.A.M. Koutsoukos (ed.), *Applied Stratigraphy*, Springer, pp.301-338.
- Perlmutter, M.A., R.E. Plotnick, 2003, Hemispheric Asymmetry of the Stratigraphic Record: Conceptual Proof of a Unipolar Icecap, B. Cecil (ed.), *Climate Controls on Stratigraphy*, SEPM Spec. Pub. #77, pp. 51-66
- Perlmutter, M.A., R.E. Plotnick, 2002, Predictable Differences in the Marine Stratigraphy of the Northern & Southern Hemisphere & the Impact on Reservoir Distribution, 2002 Proceedings of the Gulf Coast SEPM Annual Meeting, pp. 231- 256.
- Perlmutter, M.A., R.J. Radovich, M.D. Matthews, R.E. Plotnick, C.G.St.C. Kendall, 1999, Impact of High-Frequency Sedimentation Cycles on Stratigraphic Interpretation, in K.O. Sandvik, F.M. Gradstein, N.J. Milton (eds.), *Sequence Stratigraphy*, NPF Spec Pub 8, Elsevier Science B. V., Amsterdam, pp. 141-70.
- Kim, W., C. Paola, J. Martin, M. Perlmutter, F. Tapaha, 2008 in press, Net Pumping of Sediment into Deep Water Due to Base-Level Cycling: Experimental & Theoretical Results, in External Controls on Deepwater Depositional Systems, SEPM Spec. Pub #92.

For reservations to this informative and entertaining evening, please see the attached reservation form or pay in advance using PayPal by visiting PAPGlocks.org.

NEWS AND EVENTS

PAPG Website: Visit the website at <http://www.PAPGrocks.org>.

Mark your calendar now for these upcoming events (more details on PAPGrocks.org) -

April 7th - 8th Cranberry, PA
IOGAPA/POGAM seminar
[See website for more details](#)

April 14th State College, PA
PA Geo Survey GMAC meeting
[See website for more details](#)

April 17th State College, PA
PSU-SPE Golf Scramble
[See website for more details](#)

April 22nd Ft Washington, PA
PAEP Nat Gas update
[See website for more details](#)

April 30^h – May 2nd 2009
Utica Shale field trip

[Visit PAPGrocks.org for all upcoming events and newly posted classifieds](http://www.PAPGrocks.org)

***Have information you want to share with the organization?
Please contact the secretary to add the information to the next newsletter.***

WHAT IS THE PAPG?

PAPG is a non-profit organization founded in 1984 to provide a forum for Petroleum Geologists in the Pittsburgh Area to meet socially and discuss technical topics relative to the exploration and development of reserves in the Northern and Central Appalachian Basin. PAPG is an affiliated association with AAPG (American Association of Petroleum Geologists) and has representation in the House of Delegates. Educational opportunities are provided via field trips, seminars and AAPG Sectional meetings, sponsored solely by PAPG or in conjunction with the PTTC (Petroleum Technology Transfer Council), PGS (Pittsburgh Geologic Society) and SPE (Society of Petroleum Engineers).

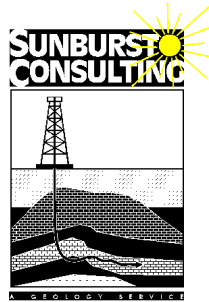
Although PAPG is predominately a geologic organization, numerous industry professionals including geophysicists, engineers, lawyers and landmen are among PAPG's members and find the interaction at meetings and educational opportunities beneficial to their professions. PAPG also encourages student membership and participation.

Meetings are typically held monthly from September through May in locations within 50 miles of downtown Pittsburgh. From time to time, meetings are held in conjunction with SPE and PGS.

SPONSORS

The PAPG wishes to thank the companies who have contributed to the PAPG 2009-10 season.

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Sponsor Information

If you or your company would like to sponsor the PAPG and help support the continuation of our Meetings, Field Trips, and other events, we ask that you send a donation to the PAPG. Any contribution of \$100.00 or more by any group or individual will be recognized on our website, in the monthly newsletter, and at scheduled monthly meetings.

We ask that you show your support for the PAPG by a contribution and your continuing attendance at the monthly meetings.

We appreciate your continued support.

Contributions may be sent to:

Eric Ober, PAPG president
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15238-2837 USA

Or use the link on the webpage: <http://papgrocks.org/sponsors.htm>

CONTACT THE PAPG

PAPG Officers:

President: Eric Ober -- Texas Keystone, Inc.
Phone: 412-388-0917
Email: eober@texaskeystone.com

Vice President: Connie Jump – Marathon Oil Co.
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Treasurer: Tracee Imai--
Email: tracee.imai@gmail.com

AAPG Delegate: Bob Trevail – Dallas Energy, LLC.
Phone: 724-709-6862
Email: bob@dallas-morris.com

PAPG 2009-2010 DUES

PAPG dues for the 2009-2010 season are now DUE!

*The membership form is attached to this newsletter. Please fill the form out **completely** so that we can ensure that we have your latest contact information. Please email Katie Schmid this information if you pay online. We are planning to publish a membership directory this year and your updated information is crucial.*

NOTICE OF APRIL 2010 MEETING PITTSBURGH ASSOCIATION OF PETROLEUM GEOLOGISTS

DATE: Thursday 1, April 2010

PLACE: Radisson Hotel - Greentree
101 Radisson Drive, Pittsburgh, PA 15220
412-922-8400

TIME: 5:00 PM – Social Hour
6:00 PM – Dinner
7:00 PM – Speaker

TOPIC: “High Frequency Paleoclimate Change:
Impact on Climate Exploration and Paleoclimate Research”

SPEAKER: **Martin Perlmutter**

COST: \$30.00
\$5.00 Students
(Checks payable to PAPG)

DINNER OPTIONS: Roast Pork Loin
herb crusted with Apple Chutney
or
Sesame crusted Atlantic Salmon
with pineapple teriyaki glaze

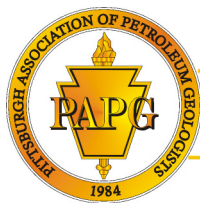
RESERVATIONS: **NEW Pay in advance using PayPal** – Visit PAPGrocks.org to reserve your spot or call, email, or mail this reservation form by NOON March 30, 2010 to:

Katie Schmid
412-807-1077 (phone)
kschmid3@gmail.com

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APPLICATION FOR MEMBERSHIP AND MEMBERSHIP RENEWAL

PLEASE INDICATE YOUR MEMBERSHIP STATUS BY CHECKING THE APPROPRIATE BOX:

PROFESSIONAL - RENEWAL

STUDENT - RENEWAL

PROFESSIONAL – NEW MEMBERSHIP

STUDENT - NEW MEMBERSHIP

The **PITTSBURGH ASSOCIATION OF PETROLEUM GEOLOGISTS** membership year runs from JUNE 1 through MAY 31. Monthly meetings are usually held the second Thursday of the month from September through May.

Professional Dues are \$25.00 per year

Student Dues are \$10.00 per year

NEW APPLICATION: If you have never been a member of PAPG, please fill out the remainder of the form, obtain the signatures of two members to sponsor you, and mail check, payable to PAPG, to the address below.

RENEWAL: Please fill out the mailing address/directory information below if your contact information has changed and submit dues, payable to PAPG, to the address below.

Mail completed form and dues payment (checks only - Payable to PAPG) to:

Katherine Schmid
12 Watson Blvd
Pittsburgh, PA 15214

MAILING ADDRESS / DIRECTORY INFORMATION – PLEASE COMPLETE ALL INFORMATION

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WOULD YOU BE INTERESTED IN PAPG PARTICIPATION?: Officer Speaker

**WOULD YOU LIKE YOUR CONTACT INFORMATION PLACED
IN THE MEMBERSHIP DIRECTORY (available to members only?)** Yes No