



GEOLOGICAL  
SOCIETY OF  
MINNESOTA

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NEWS

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SUMMER 2007  
VOL. LXI, NO. 3  
<http://www.gsmn.org>

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**Membership Renewal**

Thanks to everyone for your patience and understanding as we begin another membership year: 2007-2008. This past year or so, our membership records changed hands three times, and in the shuffle, some members were reminded that their membership had expired when actually, they had already paid their renewal fee. Other members paid so much attention to our reminders, that they paid their membership twice or even three times!

All the dust has now settled, and the records are accurate, and up to date. The date on the label of this newsletter indicates your membership expiration date.

If you see a year that is beyond 2007, that means you have paid twice (or 3 times) and you do not need to renew again for a while. If your date is 10/01/2007, then you DO need to send in your renewal dues for this next year. (Our membership year does not follow the calendar year, but runs October 1 through September 30, which can get confusing.)

We now have a post office box, which can be used for mailing membership renewals or anything else that needs attention by a board member. Also, you can give your membership renewals to me if you see me at a lecture.

--Katy Paul  
Membership Chair

**Lecture Schedule Changes**

Please note: The Dec. 3 and Jan. 28 lectures, as printed on the enclosed flyer, have been switched. Tony Runkel will be speaking on Dec. 3, and Harvey Thorleifson will speak Jan. 28.

## ANNOUNCEMENTS

### Room for Talks Same as Last Year

We are again meeting in Room EE/CS 3-210 on the U of M East Bank campus, intersection of Washington Ave. S.E. and Union St. S.E.

For map and directions, please see the website [www.gsmn.org](http://www.gsmn.org), click on Winter Lectures, and Map to Lectures.

#### GSM NEWS

Editor: **Kathy Ahlers**  
(763) 789-7143  
ahler002[at]umn.edu

The purpose of this newsletter is to inform members and friends of the activities of the Geological Society of Minnesota. GSM NEWS is published four times a year: February 15, May 15, August 15, and November 15. GSM NEWS welcomes unsolicited Geology and Earth Science related articles (best: 300 words, up to 500 words long) and photographs.

Deadline for article submission is three weeks before the date of publication. Contact the editor if you have something to submit.

#### OFFICERS:

**Janet Hopper, President**  
**Ly Preece, Vice President**  
**Randy Strobel, Secretary**  
**Ed Steffner, Treasurer**

Directors in addition to the officers listed above are: Kate Hintz, Gerry Paul, Sandy Steffner, Joan Furlong, and Kathy Ahlers.

Send all GSM membership dues, change-of-address cards, and renewals to:

**Geological Society of Minnesota**  
P.O. Box 390555  
Edina, MN 55439-0555

Membership levels are:

**\$10 Full-time students**  
**\$20 Individuals**  
**\$30 Families**

website: <http://www.gsmn.org>

Additional donations are always appreciated!  
GSM is a 501(c)3 nonprofit organization.

## FROM THE PRESIDENT'S DESK

The summer has gone and lectures are starting again.

We had the very interesting field trip to the Wisconsin Dells. Thanks very much to Bill Robbins for organizing it, and to Prof. Robert Dott for leading it.

Thank you also to Tom Schoenecker and the State Fair Committee for putting together the booth and making sure everything got to the Fair and went back where it belongs again. They also did an awesome job of making sure every shift was filled. I am always impressed with the amount of resource material available to me when I am sitting there, trying to intelligently answer questions. Thank you, too, to everyone who sat at the State Fair. It is our best way to attract new members.

There was a thank-you picnic dinner for those who have volunteered for the club. The turn out was large. There are many people who volunteer their time to make this club function. If we missed you in the invitation list, I am sorry. Thank you to Randy Strobel and Joan Furlong for volunteering their house and backyard and to Ed and Sandy Steffner for doing all the shopping, and to Bill Robbins for prodding us until something actually happened.

Hope to see you at the lectures.

--Janet Hopper ♦

### Editor's notes

Thank you to everyone who contributed an item for the newsletter. Please keep those articles coming in.

Publication was unavoidably delayed for this issue. I apologize for the inconvenience.

### Call for photos

Do you have photos from a recent field trip or other GSM event...especially ones in which members are recognizable? It's fun to look at pictures in the newsletter, but it doesn't happen unless and until you send them to me.

Why not e-mail them to me while you are thinking about it? Thank you!

--Kathy Ahlers

## Arizona surveyors consider restricting use of GPS

From:  
<http://arizonageology.blogspot.com/2007/07/arizona-surveyors-consider-restricting.html>

Should only licensed surveyors and engineers be legally allowed to use high-precision GPS instruments to make maps in Arizona?

The Arizona Professional Land Surveyors (APLS) are circulating a 'white paper' entitled "Geospatial Debate" that questions who should be allowed to use sub-meter accuracy GPS units to map natural and man-made features. It was prepared in response to a complaint to the Arizona State Board of Technical Registration (SBTR) by a licensed surveyor protesting non-surveyors using such units.

**To read the full draft white paper, go to**  
[http://sco.az.gov/WhitePaper\\_v6.pdf](http://sco.az.gov/WhitePaper_v6.pdf)

It falls on the heels of a recently dismissed federal lawsuit at the national level to restrict map making to surveyors and engineers. In the wake of that contentious battle, earth scientists are wary.

The paper talks about the need for "... surveyors or engineers to take an aggressive and proactive stance against non registrants using this equipment [ i.e. sub-meter GPS]..."

The paper does state that, "The GO Committee believes the best approach is to focus on the use of geospatial data and not on the

licensing, registration or certification of geospatial professionals as a general rule. The Committee believes that whether geospatial data are used as an "authoritative" location of a boundary or geographic feature is the most relevant aspect of whether geospatial data must be developed by a registered professional."

But the options laid out for the APLS members to consider are to "do nothing," adopt model national restrictions, or adopt rules like those in Oregon that also include the national restrictions.

The National Council of Examiners for Engineering and Surveying (NCEES) model guidelines define land surveying as "... the making of geometric measurements and gathering related information pertaining to the physical or legal features of the earth, improvements on the earth, the space above, on, or below the earth... providing, utilizing, or developing the same into survey products such as graphics, data, maps, plans, reports, descriptions, or projects".

Clearly this crosses over to the roles of geologists and others. APLS is preparing to develop recommendations to take to the SBTR. Geologists need to get engaged in this debate. ♦

### Editor's Find

...A website with a wide variety of geology-related T-shirts for possible holiday gift-giving!  
(Caution: some are rated PG-13)

<http://www.cafepress.com/buy/geology/>

## Volcanoes Key to Earth's Oxygen Atmosphere

From Science Daily  
<http://www.sciencedaily.com/releases/2007/08/070829143713.htm>

A switch from predominantly undersea volcanoes to a mix of undersea and terrestrial ones shifted the Earth's atmosphere from devoid of oxygen to one with free oxygen, according to geologists.

"The rise of oxygen allowed for the evolution of complex oxygen-breathing life forms," says Lee R. Kump, professor of geoscience, Penn State.

Before 2.5 billion years ago, the Earth's atmosphere lacked oxygen. However, biomarkers in rocks 200 million years older than that period, show oxygen-producing cyanobacteria released oxygen at the same levels as today. The oxygen produced then, had to be going somewhere.

"The absence of oxidized soil profiles and red beds indicates that oxidative weathering rates were negligible during the Archaean," the researchers report in the Aug. 30 issue of *Nature*.

The ancient Earth should have had an oxygen atmosphere but something was converting, reducing, the oxygen and removing it from the atmosphere. The researchers suggest that submarine volcanoes, producing a reducing mixture of gases and lavas, effectively scrubbed oxygen from the atmosphere, binding it into oxygen containing minerals.

"The Archaean more than 2.5 billion years ago seemed to be dominated by submarine volcanoes," says Kump. "Subaerial andesite volcanoes on thickened continental crust seem to be almost absent in the Archaean."

About 2.5 billion years ago at the Archaean/Proterozoic boundary, when stabilized continental land masses arose and terrestrial volcanoes appeared, markers show that oxygen began appearing in the atmosphere.

Kump and Mark E. Barley, professor of geology, University of Western Australia, looked at the geologic record from the

Archaean and the Palaeoproterozoic in search of the remains of volcanoes. They found that the Archaean was nearly devoid of terrestrial volcanoes, but heavily populated by submarine volcanoes. The Palaeoproterozoic, however, had ample terrestrial volcanic activity along with continuing submarine vulcanism. Subaerial volcanoes arose after 2.5 billion years ago and did not strip oxygen from the air. Having a mix of volcanoes dominated by terrestrial volcanoes allowed oxygen to exist in the atmosphere.

Terrestrial volcanoes could become much more common in the Palaeoproterozoic because land masses stabilized and the current tectonic regime came into play.

The researchers looked at the ratio of submarine to subaerial volcanoes through time. Because submarine volcanoes erupt at lower temperatures than terrestrial volcanoes, they are more reducing. As long as the reducing ability of the submarine volcanoes was larger than the amounts of oxygen created, the atmosphere had no oxygen. When terrestrial volcanoes began to dominate, oxygen levels increased.

The National Science Foundation, NASA Astrobiology Institute and the Australian Research Council supported this work.

Note: This story has been adapted from a news release issued by Penn State. ♦

### May 2008 Conference for Early-Career Scientists

The Meeting of Young Researchers in Earth Science (MYRES) 2008 conference, Dynamic Interactions of Life and its Landscape, will focus on the spatial and temporal scales over which various physical, chemical, and biological processes act.

This conference for early career scientists will be at Tulane University, New Orleans, from May 20 to May 23.

## Minnesota State Fair

The 2007 Fair booth once again was a successful event. It goes without saying that, without you folks who volunteered time to staff the booth, it could not be successful. We had thousands of people pass our way. Many, many children stopped with their parents and enjoyed looking, touching, and inspecting our display and perhaps telling us what they might have at home.

Listed below are the people (not in alphabetical order) who staffed the booth. A number in parentheses after the name shows how many shifts the individual worked. More thanks than I have voice to give out to all you folks.

Kudos also to the people who planned, set up and tore down the booth.

Tom Schoenecker, Chairman, did all the calling to sign up workers; Kati Paul keeps the rock labels and corresponding chart in order, and with Judy Hamilton this summer went through and cataloged everything for the booth which is stored at the Geological Survey; Judy Hamilton bossed around the set up/take down crew. The crew this year was Tom, Judy, Paul Martin, Roger Benepe, Steve Erickson, and Dave Wilson. Bill Robbins had 4500 brochures printed and Doug Zbikowski had more business cards printed. These items were passed out liberally.

We look over the suggestions which you have written in the book provided, and try to do what we can with those suggestions the following year. Some are not possible because of space. I did note that more than one person mentioned labeling the field trip pictures. The pictures used to be identified but the labels got separated. If anyone who has been around for a while, and might recognize the older pictures, wants to go to the Survey with me sometime this winter (perhaps February) to go through the pictures to identify them, I would appreciate the help. Give me a call.

Judy Hamilton  
On Behalf of the State Fair Committee

Dave Wilson  
David Schaaf  
Paul Martin (2)  
Elaine Handelman  
Vern Schaaf  
Diane Lentsch  
Keith Relyea  
Joan Furlong  
Jean Cant  
Dick Heglund (3)  
Randy Strobel  
Janet Hopper  
Doug Zbikowski  
Roger Benepe (2)  
Judy Hamilton  
Kate Hintz  
Conrad Zbikowski  
John Maronde (2)  
Roger Willette  
Dan Japuntich  
Maureen Scaglias  
Bill Robbins  
Jean Doyle  
John Ernst  
Gerry Paul  
Patsy Huberty  
Ken Barklind (2)  
Elaine Brown  
Jim Stroebel  
John Bussard  
Mary Caine  
Harlin Finney

Dave Wilhelm  
Dianne Pierce  
Tom Casey  
Ken Holmbeck  
Jerry Mundt  
Lee Kaphingst  
Rita Childs  
John & Jean Zettervall  
Mark Ryan (2)  
Pat Ryan  
Jim Nye  
Ed Steffner  
Sandy Steffner  
Steve Erickson (2)  
Tom Bart  
Dick Bottenberg  
Fran Corcoran  
Lisa Peters  
David Peters  
Paul Bondhus  
Sharon Casey  
Nancy Halvorson  
Kay Smith  
Alan Smith  
Nancy Wiens  
Ron Ellis  
Steve Heimer  
Tom Schoenecker (2)  
Galen O'Connor  
Don Swensrud  
Jerry Schirmers  
Mark Nupen

## October 22 GSM lecture on groundwater in MN

Dale Setterholm, Ph.D., from the Minnesota Geological Survey, will give us an update on groundwater resources in the state.

If you know a person with environmental or water resources interests, please consider inviting them to hear this talk.

# GEOLOGICAL SOCIETY OF MINNESOTA

2007 - 2008 Lecture Series

7:30 PM alternate Mondays

Lecture room at the University of MN,

to be announced on website: [www.gsmn.org](http://www.gsmn.org)



## THEME: New and Old in Geoscience

### Fall 2007

**Banquet:** Grand City Buffet, 8912 Hwy 7, St. Louis Park, MN 55426-3919

September 24 **Glacial History of Minnesota**

Howard Hobbs, Ph.D., MN Geological Survey

October 8 **Pyrennes Mountains of Europe**

Ian Williams, Ph.D., Univ of Wisconsin, River Falls

October 22 **Groundwater Resources in Minnesota**

Dale Setterholm, Ph.D., MN Geological Survey

Nov. 5 **The Latest and Greatest about Dinosaurs**

Kristi Curry-Rogers, Ph.D., Science Museum of Minnesota

**Saturday, Nov 10 Lab at Macalester College: Basic Rock forming Minerals**

Nov. 19 **Collapse of Mountain Systems**

Donna Whitney, Ph.D., University of Minnesota

Dec. 3 **Search for Diamonds in Minnesota**

Harvey Thorleifson, Ph.D., MN Geological Survey

### Spring 2008

January 28 **Geology of SE Minnesota**

Tony Runkel, Ph.D., MN Geological Survey

**Saturday, February 9th Lab at Macalester College: Igneous and Sedimentary Rocks with their Metamorphic Equivalents**

February 25 **Geology of Isle Royal**

Laurel Woodruff, Ph.D., United States Geological Survey (USGS)

March 10 **Recent work along the San Andreas Fault of California**

Sarah Titus, Ph.D. Carleton College (Spring Break March 17-21)

March 24 **The Role of Fluids in Geology**

Martin Saar, Ph.D., University of Minnesota

April 7 **Geology of New Zealand**

Kate Pound, Ph.D., St. Cloud State

April 21 **Does Polar Drift Drive Mega-Earthquakes?**

Doug Zbikowski, BSME, Geological Society of Minnesota

May 5 **Kimble Memorial Banquet: The Geophysical view of the Earth**

Justin Revenaugh, Ph.D., University of Minnesota

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## Geological Society of Minnesota 2007-2008 MEMBERSHIP INFORMATION

Membership is not necessary to attend these lectures.

All Lectures are free and open to the public

Membership in the Geological Society of Minnesota is open to all people who have an interest in supporting or participating in a public-spirited organization devoted to increasing our understanding of the earth sciences. Memberships:

\$10 Student (full-time)

\$20 Individual

\$30 Family

Please mail dues payments and change of address to the GSM Membership chair:

Geological Society of Minnesota

P. O. Box 390555

Edina, MN 55439-0555



Rocking the State since 1938

Here are various terms to describe the stages that our Earth has passed through in getting from 4.5 billion years ago to today. This is a time scale that will help identify terms and grasp concepts of "deep time."

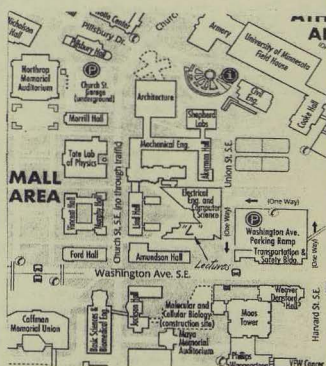
EON	ERA	PERIOD	EPOCH	Millions of years before present
Phanerozoic	Cenozoic	Quaternary	Holocene	0.01
			Pleistocene	1.5
		Tertiary	Pliocene	5.3
			Miocene	23.7
			Oligocene	36.6
			Eocene	57.8
	Paleozoic	Mesozoic	Cretaceous	144
			Jurassic	206
		Paleozoic	Triassic	245
			Permian	286
			Pennsylvanian	320
			Mississippian	360
			Devonian	408
			Silurian	436
Ordovician	505			
Cambrian	542			
Proterozoic	Ediacaran	620		
Archaean	Precambrian		~2500	
		Moon Formed	~4500	
		Earth Formed	~4540	

Below is a simplified map of the University of Minnesota's East Bank Campus, where we hold free lectures and laboratories. The map may help new members and friends locate the lecture room and parking places. Our lectures and most labs are held on the University of Minnesota Minneapolis campus.

**We will not have our classroom assigned until just before Fall Semester, but in the past we been have in the Computer Science Electrical Engineering building, Room 3-210. Please call the phone number or access the following web site to get the classroom assignment.**

The Geological Society of Minnesota phone is: **612-724-2101**

The GSM web site is [www.gsmn.org](http://www.gsmn.org)



University of Minnesota East Bank Campus  
 "L" indicates the location of Lectures  
 A convenient parking location is shown by "P"  
 Need more copies of this schedule?  
 Call the friendly GSM Hotline!  
 612-724-2101

### Geological Society of Minnesota: Membership Information

The membership year begins October 1st  
 Name (as you would like it to appear in the Directory) \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_  
 e-mail address \_\_\_\_\_

Membership questions? Call: 952-831-5165  
 Directory) \_\_\_\_\_  
 Phone (h) \_\_\_\_\_  
 State \_\_\_\_\_ Zip \_\_\_\_\_

See other side for membership pricing.  
 Amount Enclosed \$ \_\_\_\_\_

If this is a new Membership, please indicate below how you learned about GSM.

Included in your new membership: *Rocky Roots-3 Walking Tours of St. Paul, Fire & Ice-North Metro Geology Mini-tour, GSM Membership Directory and field trip notices.*

## NASA Orbiter Provides Insights About Mars Water and Climate

For full text of this article, plus all sorts of up-to-the-minute, amazing photographs and flyover simulations, visit:  
<http://marsprogram.jpl.nasa.gov/mro/newsroom/pressreleases/20070920a.html>

NASA's Mars Reconnaissance Orbiter is examining several features on Mars that address the role of water at different times in Martian history.

Features examined with the orbiter's advanced instruments include material deposited in two gullies within the past eight years, polar ice layers formed in the recent geologic past, and signs of water released by large impacts when Mars was older.

Last year, discovery of the fresh gully deposits from before-and-after images taken since 1999 by another orbiter, Mars Global Surveyor, raised hopes that modern flows of liquid water had been detected on Mars. Observations by the newer orbiter, which reached Mars last year, suggest these deposits might instead have resulted from landslides of loose, dry materials. Researchers report this and other findings from Mars Reconnaissance Orbiter in five papers in Friday's issue of the journal *Science*.

"The key question raised by these two deposits is whether water is coming to the surface of Mars today," said Alfred McEwen of the University of Arizona, Tucson, lead scientist for the spacecraft's High Resolution Imaging Science Experiment camera and co-author of three of the papers. "Our evidence suggests the new deposits did not necessarily involve water."

One of the fresh deposits is a stripe of relatively bright material several hundred yards long that was not present in 1999 but appeared by 2004. The orbiter's Compact Reconnaissance Imaging Spectrometer for Mars reveals the deposit is not frost, ice or a mineral left behind by evaporation of salty water. Also, the researchers inspected the slopes above this and five other locations

that have bright and apparently young deposits. The slopes are steep enough for sand or loose, dry dust to flow down the gullies. Bright material seen uphill could be the source.

Other gullies, however, offer strong evidence of liquid water flowing on Mars within the last few million years, although perhaps at a different phase of repeating climate cycles. Mars, like Earth, has periodic changes in climate due to the cycles related to the planets' tilts and orbits. Some eras during the cycles are warmer than others. These gullies are on slopes too shallow for dry flows, and images from Mars Reconnaissance Orbiter's high-resolution camera show clear indicators of liquid flows, such as braided channels and terraces within the gullies. ♦

## ESTREAM: Earth-Science Teacher/Researchers Exploring Active Modeling

From:  
<http://www.nced.umn.edu/estream.html?crawler=true>

Pre-service and in-service teachers can apply to join research teams at the National Center for Earth-Surface Dynamics (NCED) that are working on specific research projects. Educators become integral members of the research teams, participating at the level of an undergraduate intern.

Teams of pre-service and in-service teachers and NCED graduate students then create classroom-ready activities which are tested in the classrooms of the participating educators and other local schools. The activities are evaluated, collected, and broadly disseminated through NCED and Science Museum of Minnesota school outreach programs. The website (URL above) contains a link to the application form.

NCED is headquartered at the St. Anthony Falls Laboratory on the banks of the Mississippi River in Minneapolis.

For more information, contact Karen Campbell: [kmc\[at\]umn.edu](mailto:kmc[at]umn.edu). ♦



## U of M Water Resources Science Seminars—Fall 2007 Schedule

Theme: **Climate Impacts on Water Resources**  
Fridays, 3:00-3:50 pm Free and open to the public  
375 Borlaug Hall (St. Paul campus)  
Refreshments available

**Oct 12 Claire Serreyssol Bleser, WRS  
Student - Entomology**

A Paleolimnologic Study on Impacts of  
Settlement, Damming and Hydromanagement in  
a Large Boreal Lake

**Oct 19 Martin Tsui, WRS Student - Ecology  
and Evolutionary Behavior**

Mercury Dynamics in Minnesota Streams and  
Rivers

**Oct 26 Haibo Wan, WRS Student -  
Fisheries, Wildlife and Conservation**

Aquatic Habitat Classification on the St. Croix  
River

**Nov 2 Mark Seeley, Dept. Soil, Water and  
Climate**

Climate Change in Minnesota: Measurements,  
Evidence and Consequences

**Nov 9 Donn Branstrator, Biology, UMDuluth**

The Distribution and Dispersal Potential of the  
Invasive Spiny Waterflea, *Bythotrephes longimanus*

**Nov 30 Lucinda Johnson, Natural Resources  
Research Institute, UMDuluth**

Impacts of Climate Change on Amphibians

**Dec 7 Tim Griffin, Dept. Soil, Water and  
Climate**

Partitioning Regional Scale Water and Carbon Fluxes  
♦

### Geological Society of Minnesota

P.O. Box 390555  
Edina MN 55439-0555

### Membership Renewal - October 1, 2007 to September 30, 2008

\$10 Student

\$20 Individual

\$30 Family

\$50 Sustaining

\$100 Supporting

\$250+ Guarantor

NAME(s) \_\_\_\_\_

(as you would like it/them to appear in the GSM Directory)

ADDRESS \_\_\_\_\_

PHONE (\_\_\_\_) \_\_\_\_\_

E-Mail \_\_\_\_\_

*Upcoming event...*

**Geological Society of Minnesota  
FIRST GEOLOGY TOWN MEETING**

Tentative: Sat., Nov. 3, 2007

1 – 5:00 p.m.

Details will follow

GSM members and other interested people  
will recognize what GSM currently is doing well  
and look at near-future service, support, and collaboration opportunities  
including the role of geology in new **STEM\*** curriculum initiatives

**(\*Science, Technology, Engineering, and Mathematics)**

Anyone who might have a stake in STEM education, broadly defined, will be welcome

Check the website, and watch your e-mail for details  
(Mail a note to Katy Paul with your name & current e-mail address if we do not have it)



Geological Society of MN  
P.O. Box 390555  
Edina, MN 55439-0555



FIRST CLASS MAIL

Harvey Thorleifson  
Minnesota Geological Survey  
2642 University Ave. W  
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