

November 2016



MONTANA GEOLOGICAL SOCIETY NEWSLETTER

Vol. 61 No. 2

Inside this Issue:



P2 / PRESIDENT'S LETTER

Read our President's geological insight prompted by the recent Election.



P5 / SPOTLIGHT

Read an autobiographical account of Charles A Sandberg, a long-standing, award-winning MGS member.



P8 / CALL FOR PAPERS

See how to submit your abstract for next year's RMS-AAPG Section Meeting, to be held in Billings.



P9 / YOUR 2016 MGS OFFICERS

Learn more about your elected officers & what they do outside of the MGS.

Upcoming Events:

December 15 - Oilies Christmas Party:
At the Double Tree Hotel

See Page for more details.



Contact Us:

mtgeo.org / montanageologicalsociety@gmail.com

Add our email address to your contacts so your Newsletters & Luncheon announcements don't end up in Spam!

PO Box 844
Billings, MT 59103



Dear Membership,

I hope you're able to enjoy this warmer than normal fall weather now that all the hoopla of the election is over. If there is anything to be learned from this election cycle, it may be that it is good to be against something or perhaps everything. I seem to grow fonder of the fall each year, and the great weather for field work. But maybe it's my hidden dislike of vegetation and rejoicing when much of it dies and falls to the ground. All summer the leaves on bushes and tall grasses hide the bedding, carpet the shale slopes, and wedge apart resistant outcrop forming layers. Why should geologists be limited to exploring desert areas and road cuts when trying to define the surface stratigraphy? If we were all against the plants that hide the truth from us, couldn't we unite with a common geologic understanding? It was fortunate that the MGS field trip this summer was strategically located in an area enhanced by the Derby Fire. It was much easier to see the dikes and lahars of the Sliderock Volcano now that those pesky conifers have been stripped of their evergreen branches.

Last weekend, I had the chance to explore the ridges of western Washington elk hunting north of Portland. Without the road cuts, clear-cuts, gravel quarries, and slides produced from



2016-2017 MGS Officers

President	Kevin Chandler	406-272-1605
Vice President	Felipe Pimentel	352-514-3607
Treasurer	Sarah Friedman	406-896-5931
Secretary	Tom Hewett	406-281-8203
Past President	Riley Brinkerhoff	

logging over-steepened slopes, I would have not been able to see any of the weathered basalt and columnar jointing.

Another benefit of removing vegetation from the landscape could be a study in global warming. We could test the impact of increasing the atmospheric CO2 to higher than predicted levels in a controlled way, and study the outcome. In any case, I have a hunch that this movement will gain momentum and thousands of people will go out and kill perfectly healthy young conifers in the near future to show their support.

On a more realistic note, please show your support of MGS by renewing your membership and attending the upcoming Oilies Christmas party.

Cheers,

Kevin Chandler
MGS President



ENVIRONMENTAL CONSULTING SERVICES

Hydrology | Geology | Engineering | GIS

- NEPA: CAT EX/EA/EIS
- GIS
- Expert Testimony
- Engineering Design
- Environmental Permitting
- Environmental Compliance
- Water Management
- Environmental Due Diligence
- Remediation

Independent Expertise in
Water Resources and the Environment

BILLINGS: 1500 Poly Drive Suite 103 | Billings, MT 59102 | 406.655.9555
HELENA: 303 Clarke Street | Helena, MT 59601 | 406.443.6169

www.hydrosi.com  **HydroSolutions[®]**



SES



**Geosteering
Software**

**If horizontal
wells affect
your bottom
line, visit us
online or call.
You'll be glad you did!**

SES is for geologists who are dissatisfied with drafting-tool methods of geosteering horizontal wellbores. **SES** is 3D technical geosteering software that makes wellbore stratigraphic tracking quick-n-easy, accurate, and easily shared. Unlike any other geosteering software, **SES** provides a complete suite of software features to handle your horizontal drilling needs.

Ph. 720-279-0182

SES Geosteering
Software

www.makinhole.com

Who's Who of the MGS

BOARD OF DIRECTORS

Mike Bryant
Steven W. VanDelinder
Betsy Campen
Robert Schalla

AAPG-ROCKY MOUNTAIN SECTION

Delgate: Mark Millard
Alternate: Don French
Foundation: Rob Diedrich 303-830-5875
Chair for 2017 AAPG Section Meeting:
Robert Schalla

COMMITTEES

Awards and Continuing Education:
Anna Phelps

Field Trips:
Gary Hughes 861-2072

Social:
Betsy Campen 652-1760

University Liaison:
Steven W. VanDelinder

Publications:
Duncan McBane 252-3170

Montana Oil & Gas Fields Update:
Jim Halvorson 656-0040

PUBLICATION SALES
Doretta Brush 259-8790

NEWSLETTER EDITOR
Jessica Renstrom 294-7841

MGS Classifieds

Have something geological to sell, give, or find? Place a free ad in our MGS Classifieds! Contact the Newsletter Editor for more information.

Have you renewed your Membership for 2017?

If not, get it done now!

Use our convenient online renewal system at mtgeo.org, or print & complete the renewal form at the back of the Newsletter!

Riley Wellsite Geosteering

- Observe.
- Report.
- Adjust.
- Drill Ahead.

Jackson Riley, Geologist
406.780.0627 (cell) • 406.633.9487 (office)
geology@rileywellsite.com

SUNBURST CONSULTING

A GEOLOGY SERVICE

Well Site Geology
Remote Geosteering
Petrographic Analysis
Field Geologic Studies

406.259.4124 sunburstconsulting.com

Spotlight on Charles A. Sandberg

Last month's issue contained a report of the RMS-AAPG Section Meeting which mentioned only two of the three award recipients from the MGS membership. The MGS wishes to issue an apology to Charles A. Sandberg, long-standing MGS Member, who was not mentioned but also received an award at the Section Meeting. Charles Sandberg, co-recipient with his coauthor, F. G. Poole, were awarded the 2016 John Haun Publication Award. Below is an autobiographical account of MGS member Charles A. Sandberg:

“Probably I am the longest, oldest, and scientifically active member of the Montana Geological Society and its predecessor, the Billings Geological Society (BGS). I joined the BGS in 1951 and have maintained continuous membership in both organizations except for 1952-1953 when I served with the 2nd Division of the U.S. Army in Korea. Moreover, I have been a member of the AAPG since 1954.

Some current members of the MGS might be interested in my early history as I was a pioneer in research on the Devonian and Mississippian of the Williston Basin and the original advocate of the importance of the Bakken Formation as a source rock. I joined the Fuels Branch of the U.S. Geological Survey in Billings in June 1950 and worked from our office upstairs in the Post Office. That summer I worked on the Eocene Lake De Smet coalfield in the Powder River Basin. In the winter my first wife and I lived in a renovated chicken coop on the property of A. G. Peterson, president of Rocky Mountain College, at 923 Rimrock Road. The next summer I worked on the Paleocene Girard coalfield in northeastern Montana. It was while driving to my summer duty station in Sidney that the radio announced the discovery of the first pint of oil from the Amerada No. 1 Clarence Iverson well in the Williston Basin. Returning to Billings from the service in 1954, I joined the USGS Williston Basin Project and undertook correlation of Devonian and Mississippian rocks from the subsurface to outcrops in Montana and Wyoming. I worked closely with geologists of Shell Oil and other oil companies. In 1956, I married my second wife, Dorothy Ann Taylor, also with the USGS, who was working on the subsurface Jurassic northern Montana. In late 1957, Dorothy and I were transferred to Denver, when the Survey closed its regional Fuels Branch offices in Billings, Laramie, Albuquerque, and Tulsa, and moved their staff to the Denver Federal Center. I have been with the Survey ever since, as a full-time employee until 1994 and as a Scientist Emeritus and Bradley Scholar thereafter. I have worked on Devonian and Mississippian conodont biostratigraphy and regional paleogeography from Alberta to Sonora and throughout Western Europe. I have also worked extensively on the Late Devonian Alamo Impact about 100 miles north of Las Vegas, Nevada.

Following is a list of some of my early publications, omitting abstracts, on the geology of Montana, Wyoming, and the Williston Basin, as well as some publications and one of my abstracts from the past two years:

1. Sandberg, C.A., and Hammond, C.R., 1958, Devonian system in Williston basin and central Montana: American Association of Petroleum Geologists Bulletin, v. 42, no. 10, p. 2293–2334.
2. Sandberg, C.A., 1961, Widespread Beartooth Butte Formation of Early Devonian age in Montana and Wyoming: American Association of Petroleum Geologists Bulletin, v. 45, no. 8, p. 1301–1309.
3. Sandberg, C.A., 1961, Description of cores of Middle Devonian and uppermost Silurian rocks in Mobil Producing Company's No. 1 Birdbear well, Dunn County, North Dakota, in Stratigraphy of the Williston basin, Devonian System: North Dakota Geological Society, p. 45–47.
4. Sandberg, C.A., 1961, Distribution and thickness of Devonian rocks in Williston basin and in central Montana and north-central Wyoming: U.S. Geological Survey Bulletin 1112-D, p. 105–127, pls. 6–11.
5. Sandberg, C.A., 1962, Salt of Middle Devonian age, in Pierce, W.G., and Rich, E.I., Summary of rock salt deposits in the United States as possible disposal sites for radioactive waste materials: U.S. Geological Survey Bulletin 1148, p. 51–56.

(continued on p. 6)

6. Sandberg, C.A., 1962, Geology of the Williston basin, North Dakota, Montana, and South Dakota, with reference to subsurface disposal of radioactive wastes: U.S. Geological Survey TEI-809, Open-File Report, 148 p., 28 figs.
7. Sandberg, C.A., 1962, Stratigraphic section of type Three Forks and Jefferson Formations at Logan, Montana, in Symposium, the Devonian System of Montana and adjacent areas, Billings Geological Society Guidebook, 13th Annual Field Conference, September 1962: p. 47–50.
8. Sandberg, C.A., 1963, Spirorbial limestone in the Souris River(?) Formation of Late Devonian age at Cottonwood Canyon, Bighorn Mountains, Wyoming, in Short papers in geologic and hydrologic sciences: U.S. Geological Survey Professional Paper 475-C, Art. 63, p. C14–C16.
9. Sandberg, C.A., 1963, Dark shale unit of Devonian and Mississippian age in northern Wyoming and southern Montana, in Short papers in geologic and hydrologic sciences: U.S. Geological Survey Professional Paper 475-C, Art. 64, p. C17–C20.
10. Sandberg, C.A., and McMannis, W.J., 1964, Occurrence and paleogeographic significance of the Maywood Formation of Late Devonian age in the Gallatin Range, southwestern Montana, in Geological Survey Research 1964: U.S. Geological Survey Professional Paper 501-C, p. C50–C54.
11. Sandberg, C.A., and Prichard, G.E., 1964, Petroleum and natural gas, in Mineral and Water Resources of South Dakota: South Dakota Geological Survey Bulletin 16, p. 151–160.
12. Sandberg, C.A., 1965, Nomenclature and correlation of lithologic subdivisions of the Jefferson and Three Forks Formations of southern Montana and northern Wyoming: U.S. Geological Survey Bulletin 1194-N, p. N1–N18.
267. Poole, F.G., and Sandberg, C.A., 2015, Olistostrome shed eastward from the Antler orogenic forebulge, Bioni-McKay area, Fish Creek Range, central Nevada, in Poole, F.G., and Sandberg, C.A., Unusual central Nevada terranes produced by Late Devonian Antler orogeny and Alamo impact: Geological Society of America Special Paper 517, p. 1–38, 1:8,000 scale geologic map.
268. Poole, F.G., and Sandberg, C.A., 2015, Alamo impact olistoliths in Antler orogenic foreland, Warm Springs—Milk Spring area, Hot Creek Range, central Nevada, in Poole, F.G., and Sandberg, C.A., Unusual central Nevada terranes produced by Late Devonian Antler orogeny and Alamo impact: Geological Society of America Special Paper 517, p. 39–104, 1:10,000 scale geologic map.
270. Navas-Parejo, P., Sandberg, C.A., and Poole, F.G., 2016, New evidence from Sonora for close approach of Gondwana to Laurentia in Late Devonian: GSA Annual Meeting in Denver, Colorado, Paper 347-34, available on line.”

Interested in placing an ad?

Contact Jessica Renstrom at jess.renstrom@gmail.com with your ad or pricing to create one for your business or event.

2016 Advertising Rates:
Full Page \$100/month;
½ Page \$50/month;
¼ Page \$25/month;
Business Card \$10/month.

All ads must be prepaid.
Send ad and payment to:
MGS, P.O. Box 844
Billings, MT 59103.

Hydrometrics, Inc.

WWW.HYDROMETRICS.COM

Founded in 1979, Hydrometrics provides an expansive range of science and engineering services. We have serviced many projects, large and small for the petroleum and mining industries, ranging from the Arctic Circle to South America.

For more information Contact:

Billings, MT - Al Hilty, P.G.
(406) 656-1172 ahilty@hydrometrics.com

Helena, MT - Mike Wignot, P.E.
(406) 443-4150 mwignot@hydrometrics.com

Missoula, MT - Doug Parker, P.G.
(406) 721-8243 dparker@hydrometrics.com

- Environmental/Civil Engineering
- Geotechnical Engineering & Soil Testing
- Water Resources Engineering
- Storm Water Management, Dam Design & Investigation
- Hydrogeology & Geochemistry
- Design Plans & Specifications
- Graphic/Drafting Services
- Data Management Services
- Regulatory Compliance
- Environmental Analysis
- Industrial & Mining Services
- Solid & Hazardous Wastes
- Soil & Water Field Testing
- PowerProbe & Auger Drilling

Rocky Mountain Section Annual Meeting

CALL FOR PAPERS

RMS-AAPG

2017 JUNE 25-28
BILLINGS MONTANA



SUBMISSION DEADLINE FEBRUARY 28, 2017

<http://rmsaapg2017.com/>

For more information contact:

General Chairman

Robert Schalla

(406) 294-3525

covecreekresources@msn.com

Technical Program Chairs

Steve Van Delinder

svandelinder@ballardpetroleum.com

Mark Millard

mmillard@sm-energy.com



Meet Your MGS Officers



Felipe Pimentel

Vice President

Felipe grew up in South Florida and received his B.S. in Geology from the University of Florida. After moving to Montana to become a well-site geologist with Sunburst Consulting, he later transitioned into management. His experience includes the Williston, Powder River and DJ Basins. Felipe has been with the MGS since 2011 and has served as Secretary and Speaker Coordinator. He enjoys promoting science education, especially with kids, and often volunteers his time toward that goal.

Sarah Friedman

Treasurer

Sarah obtained her B.S. degree in Geology from Eastern Illinois University in 2008. While at EIU she also studied education where she decided that she wanted to be a college professor. She spent the next six years getting her M.S. and PhD at Southern Illinois University, finishing in 2015. Her time in grad school took her all over the world: a summer in Japan, 3 months at sea drilling into the Pacific Ocean crust, Corsica, and all over the United States. Her research was looking into the possibility that the upper mantle could be a contributing source of magnetization seen by long-wavelength satellites like MagSat and Swarm. She worked with ultra-pure mantle xenoliths; exposing them to varying magnetic fields and analyzing their behavior within those fields. Currently, she works at Montana State University in Billings, teaching the first two years of a geologist's education. She has the capability to use an SEM for continuing research on her mantle xenoliths. As a hobby, she enjoys geocaching in her downtime.



Tom Hewett

Secretary

Tom Hewett is a senior geophysicist at Ballard Petroleum Holdings, LLC in Billings, MT. He began his career with Ballard's previous entity as a junior geophysicist in 1999, moving to Denver in 2001 when Alberta Energy bought Ballard. After 4 years with Alberta Energy/EnCana, he joined Berry Petroleum and later, Rosetta Resources as senior geophysicist. Hewett returned to Ballard in 2010. He holds a B.S. in Geophysical Engineering from Montana Tech of the U. of M.

GEOLOGY *in the Headlines*

"New maps of the geologic forces contributing to earthquakes in Texas and Oklahoma could help reduce the likelihood of humanmade temblors associated with wastewater injection, say investigators."

Source: Stanford's School of Earth, Energy & Environmental Sciences November 11, 2016

"Australia shifts and tilts back and forth by several millimeters each year because of changes to Earth's center of mass, according to a new study. The findings could help scientists better track the precise location of Earth's center of mass, which is important for GPS and other satellite measurements, according to the study's author."

Source: American Geophysical Union November 10, 2016

"A new study providing an unprecedented regional view of the earth's crust beneath Yellowstone National Park will begin with a helicopter electromagnetic and magnetic (HEM) survey on November 7, 2016. Scientists hope to distinguish zones of cold fresh water, hot saline water, steam, clay and unaltered rock from one another to understand Yellowstone's myriad hydrothermal systems. The flights will continue for the next two to four weeks."

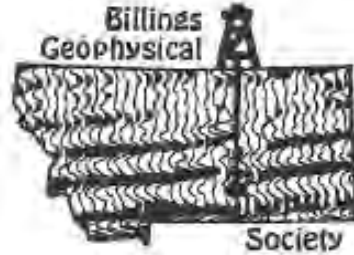
Source: USGS November 8, 2016

For more information on these topics, please visit ScienceDaily.com

We want to hear from you!

If you'd like to share a geological experience (trip, hike, etc.) or an upcoming event in next month's newsletter, please submit your text & images to jess.renstrom@gmail.com.

You Are Cordially Invited



Present

2016 Oilies Christmas Party

Where: **The Petroleum Club**

22nd floor of the Double Tree Hotel (formerly Crowne Plaza)
27 N. 27th Street, Billings, Montana

When: **Thursday, December 15th, 2016**

Time: **5 p.m. to 10 p.m.**

Let us eat, drink and be merry, and share the spirit of the season with friends. Great food. Free beer and wine. Cash bar for well drinks.



MONTANA GEOLOGICAL SOCIETY

P.O. Box 844

Billings, MT 59103

Membership Renewal

Last Name _____

First Name _____ **Middle Initial** _____

ANNUAL DUES:

_____ **\$20.00 Regular**

_____ **\$10.00 Student**

Please update the information below if needed. Please leave blank if nothing has changed:

Company/Affiliation _____

Mailing Address (work or home)

Street _____

City _____ **State** _____ **Zip** _____

Phone (w) _____ **Phone (h)** _____ **Phone (c)** _____

E-Mail _____

AAPG Member (please circle) YES NO

Education (School, Degree, Year)

Degree #1 _____

Degree #2 _____

Degree #3 _____

MONTANA GEOLOGICAL SOCIETY

PUBLICATION	QUANTITY	PRICE	TOTAL
2006 Montana Oil & Gas Fields CD		\$65.00	
2006 AAPG Datapages - MGS Publications DVD		\$180.00	
2006 AAPG Datapages - MGS Publications DVD (MGS Member price)		\$150.00	
2000 50th Anniversary Symposium		\$125.00	
1998 8th Int'l Williston Basin Symposium		\$55.00	
1998 8th Int'l Williston Basin Symposium Core Workshop		\$30.00	
1997 Big Horn Basin Symposium		\$50.00	
1997 MGS-TRGS: The Edge of the Crazyes		\$25.00	
1997 AAPG - Rocky Mtn. Section Meeting / Abstract Volume		\$16.00	
1995 7th International Williston Basin Symposium - Core Workshop		\$30.00	
1995 7th International Williston Basin Symposium		\$100.00	
1995 Big Horn Basin Symposium		\$40.00	
1996 AAPG - Rocky Mtn. Section Meeting / Abstract Volume		\$25.00	
1993 Energy and Mineral Resources of Montana		\$54.00	
1991 6th International Williston Basin Symposium		\$55.00	
1991 Geology & Horizontal Drilling of the Bakken		\$50.00	
1991 AAPG - RMS Field Trip: Beartooth Mountains		\$7.50	
1991 AAPG - RMS Field Trip: Eagle Sandstone, Billings		\$7.50	
1991 RMS Field Trip #1 Nye-Bowler Linemont		\$7.50	
1991 Sequence Stratigraphy of Eagle Sandstone		\$7.50	
1990 Bakken Workshop Short Course Study Notes #1		\$12.00	
1989 Geologic Resources of Montana		\$80.00	
1986 Geology of the Beartooth Uplift		\$45.00	
1985 Montana Oil & Gas Fields		\$55.00	
1984 Northwest Montana & Adjacent Canada		\$45.00	
1978 Economic Geology of the Williston Basin		\$100.00	
1971 Stratigraphic Names of Montana		\$10.00	
1957 BGS 2nd Annual Centrail Montana Field Conference		\$12.50	
Shipping and Handling charges - \$5.00 per CD/DVD \$8.00 per book			
Total Due			

Billing / Shipping Information

Name _____ Company _____
 Address _____ City, State, Zip _____
 Email Address _____

Please make checks payable to: Montana Geological Society. Visa and MasterCard also accepted.

Visa / MasterCard (circle one) _____ Expiration Date _____
 Name as it appears on the Card _____
 Phone Number (_____) _____

Mail orders: Montana Geological Society, PO Box 844, Billings, MT 59103

Fax orders: Doretta Brush, MGS Publications sales, (406) 259-3884

Email orders: dbrush@ballardpetroleum.com

Phone orders: Doretta Brush (406) 281-8228