MONTANA GEOLOGICAL SOCIETY NEWSLETTER

September 2022

Vol 66 No. 9

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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

President's Letter

Greetings MGS members!

Thanks to the obliquity of our planetary axis and reliable orbit around our sun, MGS members in the northern hemisphere will see shorter days, longer nights and a cooling of our observed surface temperatures. As we approach the autumnal equinox other neat things happen like the color change in deciduous foliage, the majestic bugling of bull elk, feasts of harvest, and football to name just a few! September is also the time at the MGS when we recruit and elect a new group of Officers and Board Members. If you would like to serve in any of these capacities please reach out to one of us. We are also kick-starting our speaker season and look forward to bringing the membership a varied array of topics and venues this year (look for the Sept luncheon talk announcement here and via social media).

The MGS hosted two short field trips in August out of the Billings area. Thank you Ennis Geraghty for sharing your unrivaled knowledge of the Stillwater Complex! We shared a beautiful day trekking up the Benbo Road into the Beartooth Range with cool outcrop revelations and panoramic views. Thank you Ted Doughty for showing us a really cool structural & topographic paradox just minutes south of Billings! The day culminated with an overland trek via vehicles and then on foot to a fabulous outcrop vista. Check out a few photos of these fun trips later in the newsletter.

As we look toward a new year of the MGS starting in October, please consider joining us again in support of the geosciences through your renewed membership. Renewal is easy on the website or you can send in the hard copy form which is included in every newsletter.

Thank you all for your interest in Montana geology and your support of geoscience research and education. Happy harvest or hunting!

Jim Suydam
Geologist & MGS President

2021-2022 MGS Officers

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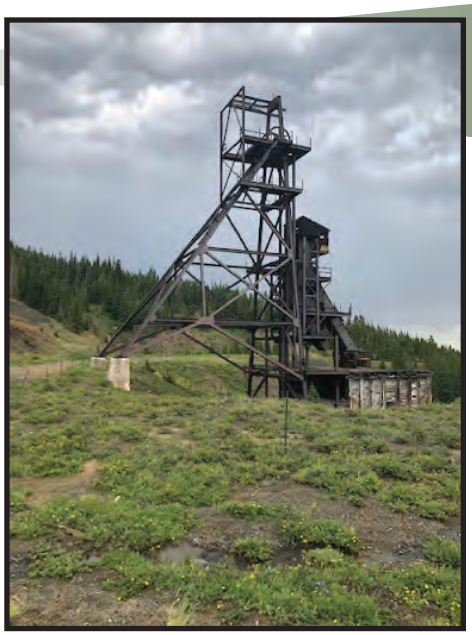
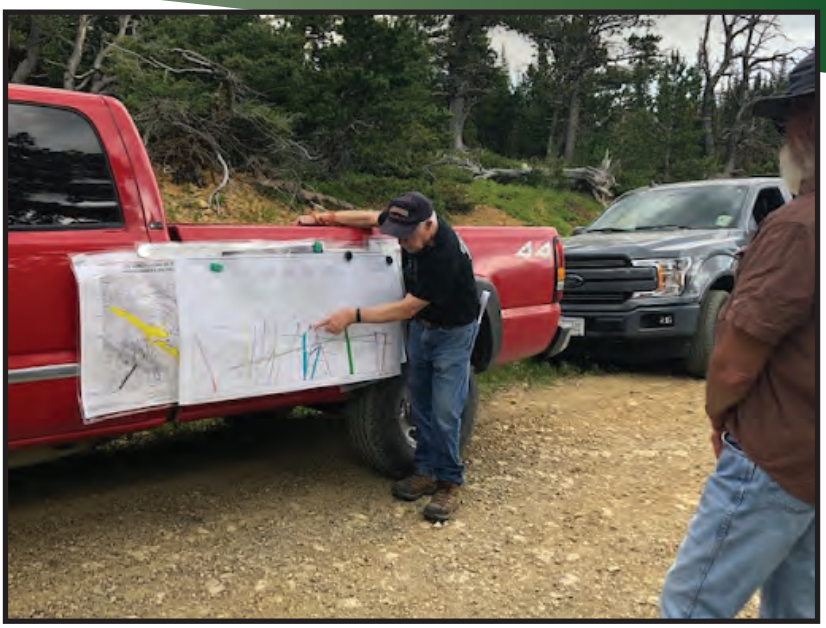
Do you Love Geology & Helping Your Community?

Consider joining the MGS Officer Team in the upcoming year. Interested? Please contact montanageologicalsociety@gmail.com

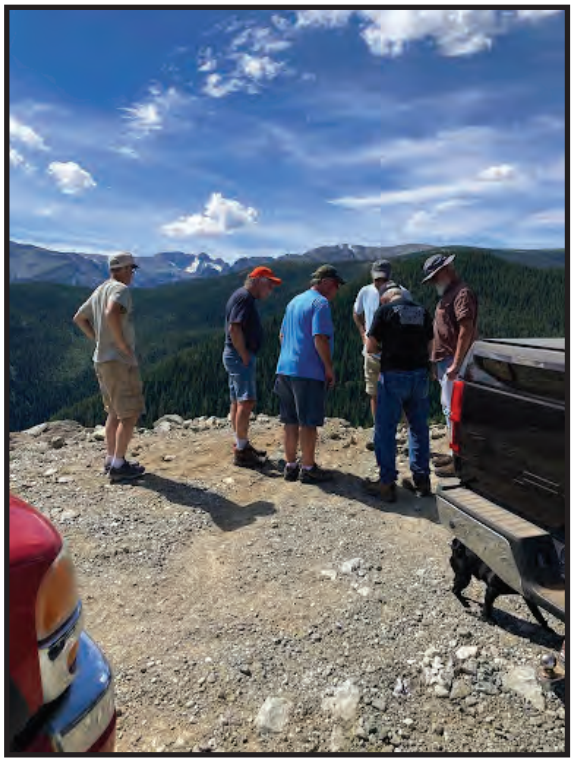
Look Back at:
MGS Field Trip -- Beartooth Front



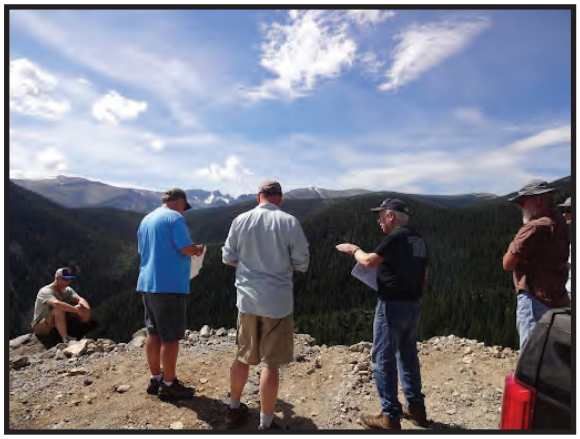
Headframe of the chromium mine active for a short time in the 1940s

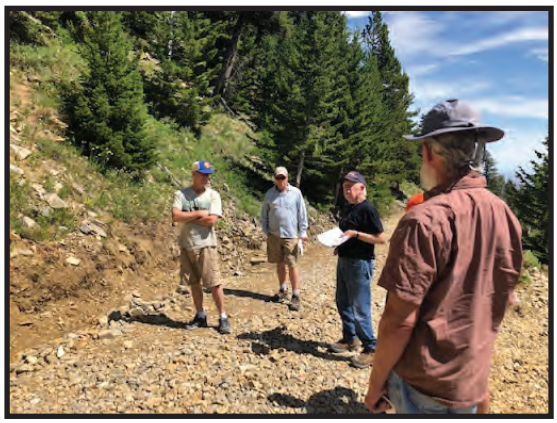


Ennis Geraghty describing the observed structural style along the Beartooth Front



View to the northeast from the Beartooth Front overlooking Dean Dome; an asymmetric south verging structural closure.





Photos by:
Gary Hughes
Jim Gruber
Jim Suydam

MGS Classifieds

Who's Who of the MGS

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Debra Hanneman
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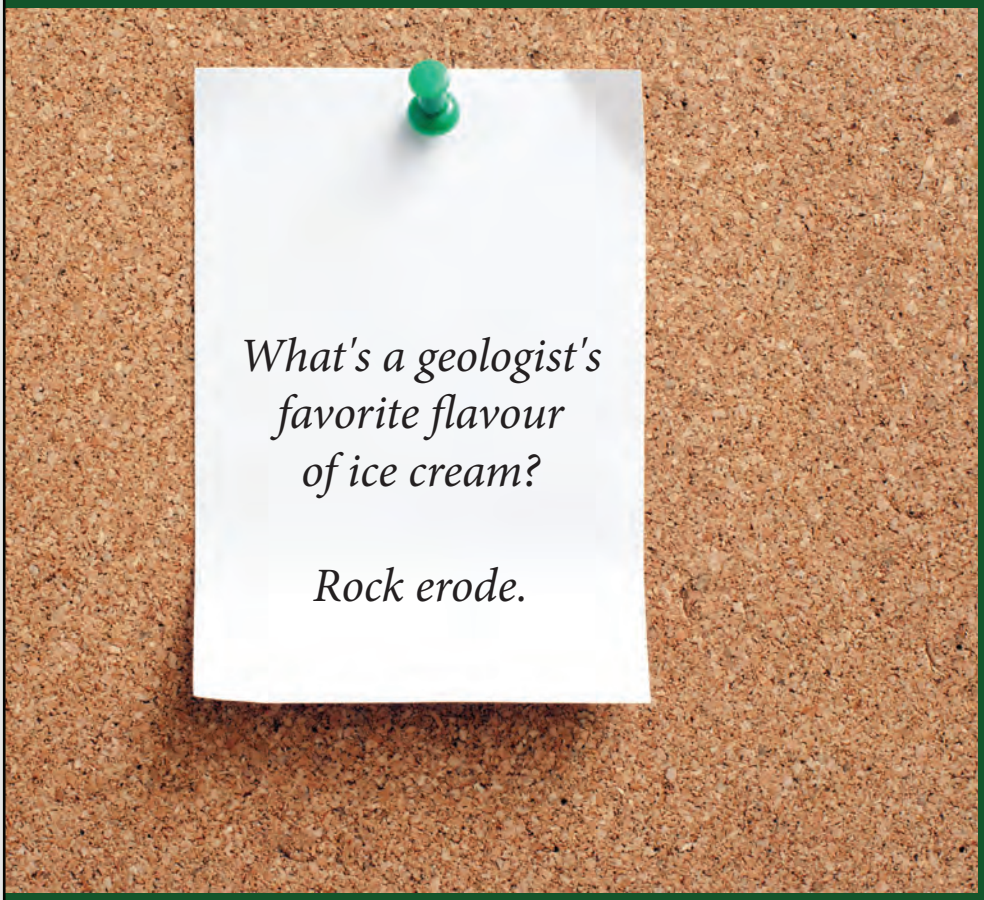

Have something geological to sell, give, or find?
Place a free ad in our MGS Classifieds!

Contact the Newsletter Editor for more information.

MGS Luncheon – 2021 MGS Scholarship Recipients
Wednesday, September 21st from 11:45am to 1:30pm

Location: Billings Public Library – Community Room

RSVP to montanageologicalsociety@gmail.com by latest Monday September 19th!

If you prefer to join us on Zoom, RSVP by Tuesday September 20th to receive the Zoom link

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Speaker: Celine M. Beaucamp (2021 MGS Scholarship Recipient)

Montana Technological University, Butte, MT

A geological and geochemical study of the Philipsburg mining district, Granite County, Montana

The Philipsburg mining district is a polymetallic lode deposit in Granite County, Montana. The district produced interesting amount of silver and battery-grade manganese, with minor zinc, lead, copper and gold in the late 1800 to late 1900. The regional geology is dominated by the 75 Ma Philipsburg Batholith which has intruded into folded and thrusted Mesoproterozoic through Cretaceous sedimentary rocks. A 65 Ma Mo-Cu porphyry stock and associated skarn is poorly exposed in the north-west edge of the district, and its relationship to the polymetallic vein mineralization is unclear. A zonation similar to Butte's Main Stage Vein has been identified with detailed mineralogy and stable S-isotopes. Sphalerite from the central area is a mineral of interest due to its unusual fluorescence and its concentration of critical elements (Ga, Ge, W, In). The Philipsburg district has many similarities to the nearby Butte porphyry-lode district and likely belongs to the same Cordilleran polymetallic lode deposit type. Domestic production of raw materials is increasing as our society transitions to a net-zero carbon economy and improves national security by lowering the country's dependence on global production. The re-evaluation of historic district such as Philipsburg's can contribute to the demand for precious and base metals, especially critical minerals that were not desirable during the mine's activity.

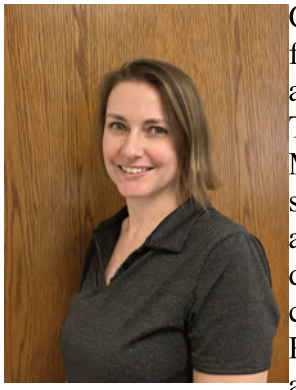
Speaker: Courtenay Duzet (2021 MGS Scholarship Recipient)

University of Montana, Missoula, MT

1D Crustal Seismic Velocity Models for West-Central and Western Montana

In seismically active areas with infrequent, large-magnitude earthquakes, high-quality seismic data are critical for determining high-resolution, accurate seismic velocity models. Here, we present a new local-scale seismic velocity model for the crust in west-central Montana as well as a new regional-scale seismic velocity model for the crust and upper mantle across broader western Montana. The new models are constrained by phase arrivals from several passive seismic networks, including the University of Montana Seismic Network (UMSN), the Montana Regional Seismic Network (MRSN), the Advanced National Seismic System (ANSS), temporary deployments by the United States Geological Survey (USGS), and the USArray Transportable Array (TA). The "local" seismic velocity model is the first model specific to west-central Montana, constrained primarily by P-wave arrivals from aftershocks that followed the 2017 M 5.8 Lincoln, Montana, earthquake. The local model consists of eight distinct layers down to 30 km depth below mean sea level and spans a region of about 40,000 km^2 (200 km by 200 km). Using an expanded dataset across a broader geographical area, we develop a "regional" seismic velocity model that represents spatially averaged velocity structure across western Montana. The regional model consists of thirteen distinct layers down to 45 km depth below sea level and is appropriate to an area of about 160,000 km^2 (400 km by 400 km). The new models are similar to prior velocity models for western Montana and include enhanced depth resolution.

Biography



Celine Beaucamp is studying for her Ph.D. in Earth Science and Engineering at the Technological University of Montana in Butte. She specializes in the geological and geochemical study of ore deposits and their tectonic context. She also teaches Physical Geology, Sedimentary and Petroleum Geology, Structural Geology, and Field Mapping. After obtaining her Masters' degree in Geology from the University of Montreal Quebec, she spent five years in Nevada as an open pit geologist and geotechnical engineer, but eventually came back to academy to teach and do research.

Biography

Courtenay recently completed her M.S in Geosciences at the University of Montana where she researched the derivation of seismic velocity models for west-central and western Montana. Courtenay received a B.S in Environmental Sciences at Oregon State University in 2018 and is currently working for the U.S Geological Survey as a Science Communication Specialist.

In Remembrance:
Betsy Campen

The MGS is deeply saddened to learn of the passing of long-time MGS member and geologist Betsy Campen.

An enthusiastic supporter of the MGS, Betsy served as president and social chair for a number of years, as well as often volunteering for events such as Girls-N-Science to get youth excited about geology and mineralogy.

Originally from Massachusetts, Betsy received her degree in geology from Smith College as one of only three geology majors. Before she was able to practice geology, she married a rancher, Pud Alderson, and spent the next 17 years as a ranch wife in southeastern Montana while raising three children. After leaving the ranch, she became an assistant at Pickens and Black Oil Company where she was able to begin using her degree.

During an interview in 2013 for Smith College, Betsy spoke of her entrance into geology in Billings:
"And then when I went into geology which was very interesting and petroleum geology, I was obviously such a newcomer, but people were wonderful. I mean I really am a pioneer in Billings because just by chance I was one of the first women, because 10 years later there were lots of them, but back then I really was a pioneer. And I was so excited about actually becoming a geologist, and I wanted to be out on drilling rigs and I wanted to be involved in all of it, and so I just did it, and all those men who were my age and maybe five and 10 years older, because that's when the boom had been before that, couldn't have been more helpful."

Although it was well-known in the 1970s that women didn't go well-sitting, Betsy persisted and finally had the opportunity to go out on her first well on Christmas Day in 1979. After marrying Warren Shepard, they worked together consulting and generating oil and gas prospects. Throughout her career, she also worked for Montana Power and Great Northern Drilling Company, and eventually married Ted Campen.

Members may remember her positive and cheerful disposition, despite suffering with chronic back pain for a number of years. In addition to her work with the MGS, she was active in leadership positions at the Rocky Mountain Section of the American Association of Petroleum Geologists.

The MGS would like to send condolences to all family members and friends impacted with grief over the loss of such an amazing woman, a pioneer for women of all ages in geology.

Also, a special thanks to members Don French & Jack Warne for assistance in providing information about Betsy's life.

Geology: *In the News*

"Diamonds and rust at Earth's core-mantle boundary"

"Scientists discover that a potential 'diamond factory' may have existed at Earth's core-mantle boundary for billions of years."

To read the article, please visit:
https://www.sciencedaily.com/releases/2022/08/220830203129.htm

"Comet impacts formed continents when Solar System entered arms of Milky Way"

"New research has found evidence that Earth's early continents resulted from being hit by comets as our Solar System passed into and out of the spiral arms of the Milky Way Galaxy, turning traditional thinking about our planet's formation on its head."

To read the rest of the article, please visit:
https://www.sciencedaily.com/releases/2022/08/220824102928.htm

"Ancient landslide destroyed area size of Cincinnati"

"University of Cincinnati geologists reconstructed a massive landslide in Nevada that wiped out an area the size of a small city more than 5 million years ago. Researchers pieced together details of the Blue Diamond landslide, a natural disaster that sent rocks and boulders tumbling more than 6 miles across what is now a desert outside Las Vegas. "

To read the rest of the article, please visit:
https://www.sciencedaily.com/releases/2022/08/220829125959.htm

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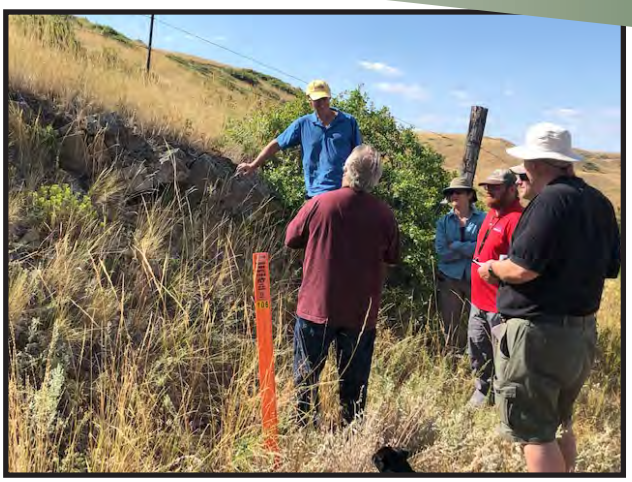
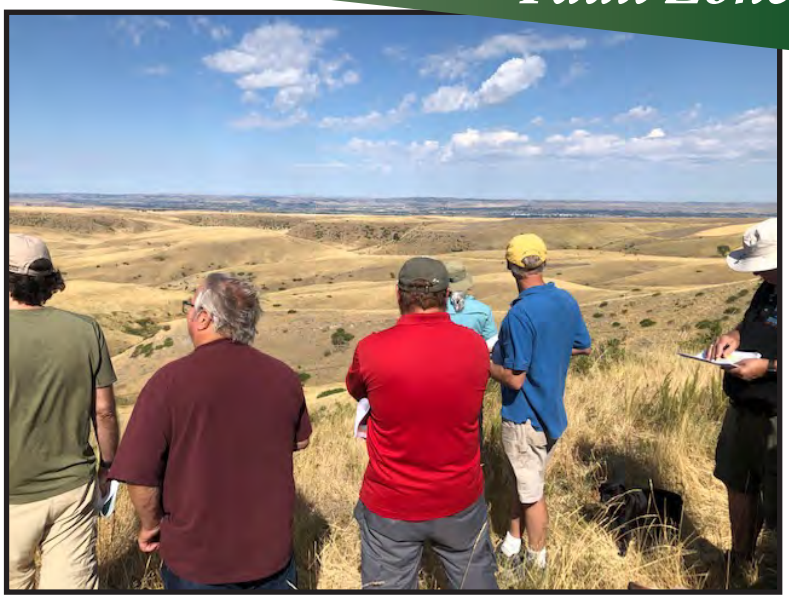
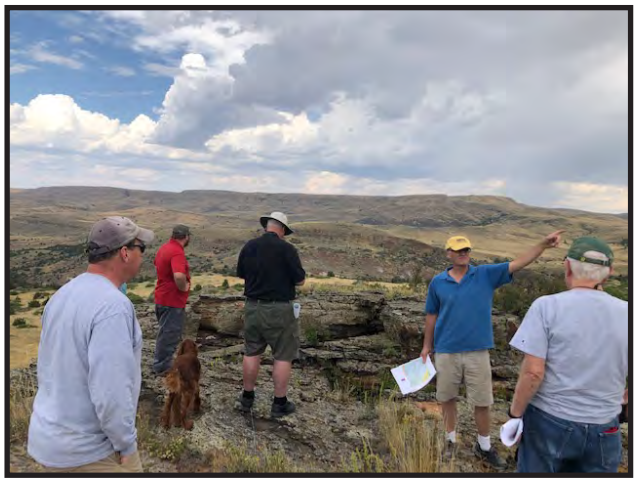
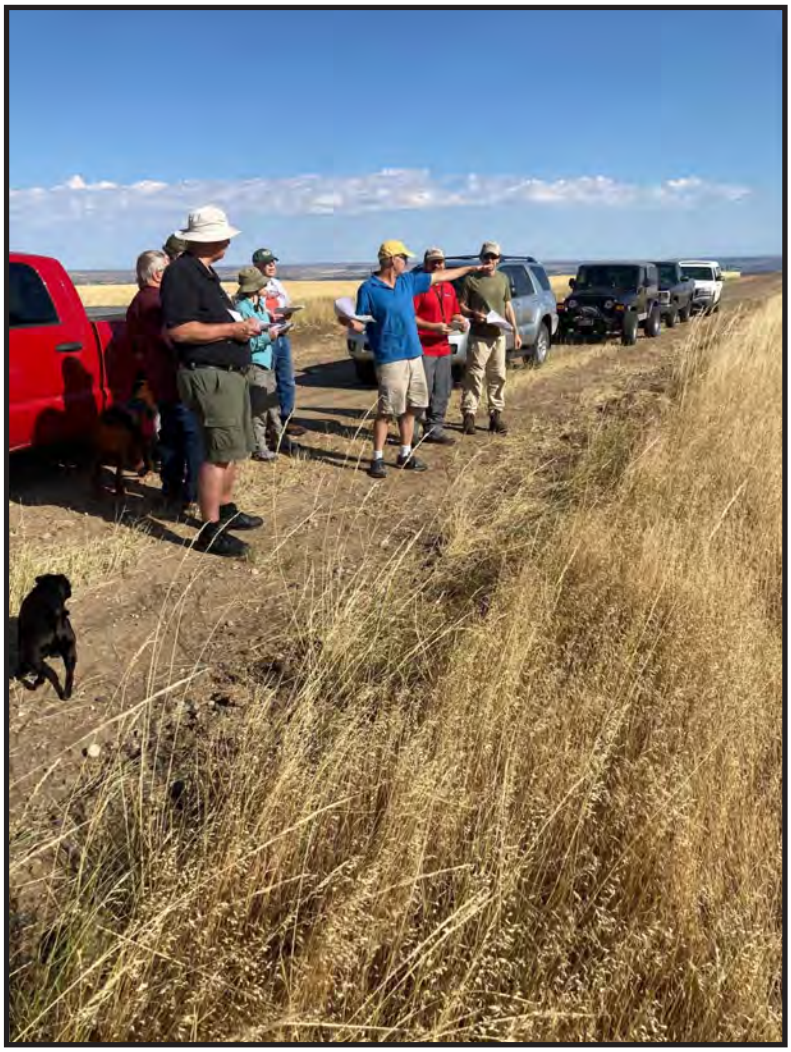
Look Back at:

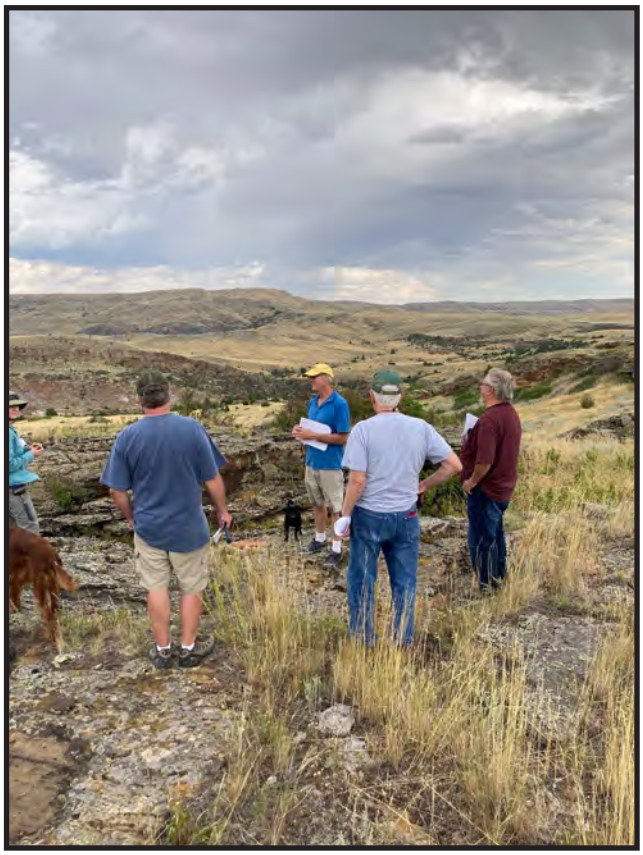
MGS Field Trip -- Fromberg/Bluewater Fault Zones











Photos by:
Gary Hughes and Jim Suydam

MONTANA GEOLOGICAL SOCIETY

P.O. Box 844 Billings, MT 59103

Membership Renewal

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First Name _____ **Middle Initial** _____

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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		$20.00	
1999 Thrust Systems of the Helena Salient		$20.00	
1998 8th Int'l Williston Basin Symposium		$20.00	
1998 8th Int'l Williston Basin Symposium Core Workshop		$20.00	
1997 Big Horn Basin Symposium		$20.00	
1997 MGS-TRGS: The Edge of the Crazies		$20.00	
1997 AAPG - Rocky Mtn. Section Meeting / Abstract Volume		$10.00	
1996 AAPG - Rocky Mtn. Section Meeting / Abstract Volume		$10.00	
1993 Energy and Mineral Resources of Montana		$20.00	
1991 6th International Williston Basin Symposium		$20.00	
1991 Geology & Horizontal Drilling of the Bakken		$20.00	
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		$10.00	
1989 Geologic Resources of Montana		$20.00	
1986 Geology of the Beartooth Uplift		$20.00	
1985 Montana Oil & Gas Fields		$20.00	
1971 Stratigraphic Names of Montana		$10.00	
1969 Economic Geology of Montana		$20.00	
Shipping and Handling charges - $5.00 per CD/DVD $8.00 per book			
Total Due			

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