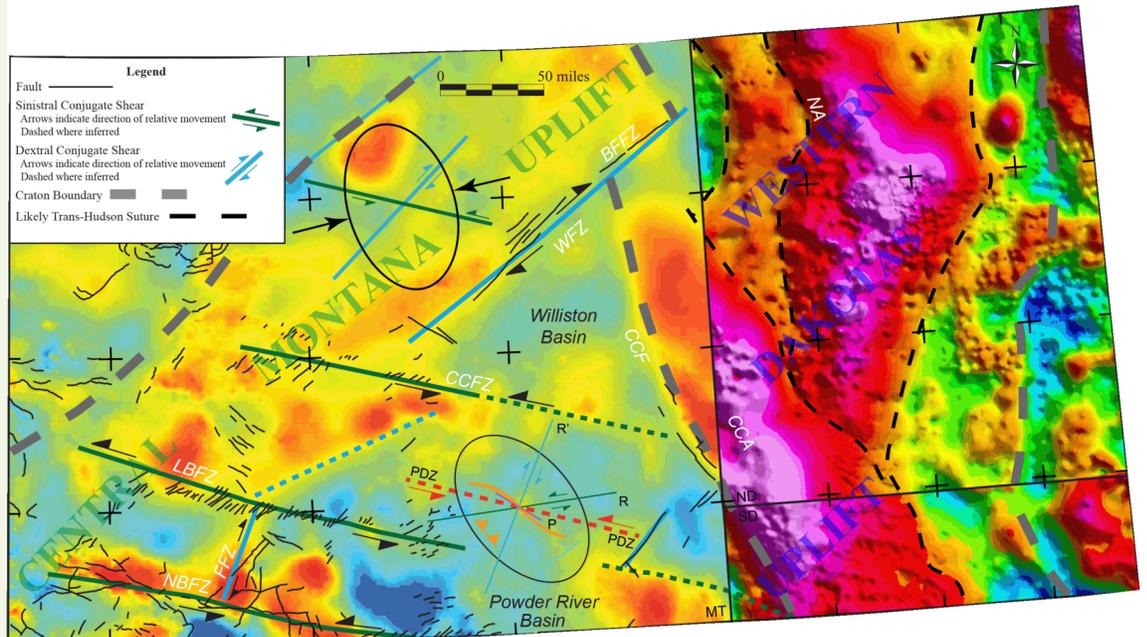




FCGS Newsletter

P.O. Box 1501 | Durango | CO 81302 | www.fourcornersgeologicalsociety.org

February 2021



Isostatic residual gravity map of eastern Montana and western North Dakota with superimposed structural / tectonic interpretation.

- SPEAKER:** Mr. Jeffrey W. Bader, North Dakota Geological Survey
- TITLE:** *Structural Inheritance for the Laramide, Central Montana Uplift: A Wrench-Fault Tectonic Model Related to Proterozoic Orogenesis in the Foreland of the North American Cordillera*
- DATE:** Thursday, February 18th, 2021
- TIME:** Please login to meeting a little before 5:30. From 5:30 - 6:00 attendees will be randomly assigned to break out rooms for three, ten-minute sessions, 6:00 - 6:15 back to meeting for society business announcements and introductory remarks, 6:15 - 7:15 talk & Q&A.
- LOCATION:** Your own home! This is a Zoom meeting hosted by FLC. Link to join meeting on page 3.
- COST:** Free but please renew your membership!
<https://fourcornersgeologicalsociety.org/membership/>

February 2021

Officers of the Society

Past President

Sabina Kraushaar

President

Jon Harvey

President-Elect

David Schiowitz

Treasurer

Tom Staatz

Secretary

Jolin Cordalis

Newsletter Editors

Kim Gerhardt
Tom Ann Casey

Website

Rachael Medina.

Officers of the Foundation

President

Mary Gillam

Treasurer

Ron Brogdon

Secretary

Patti Phillips

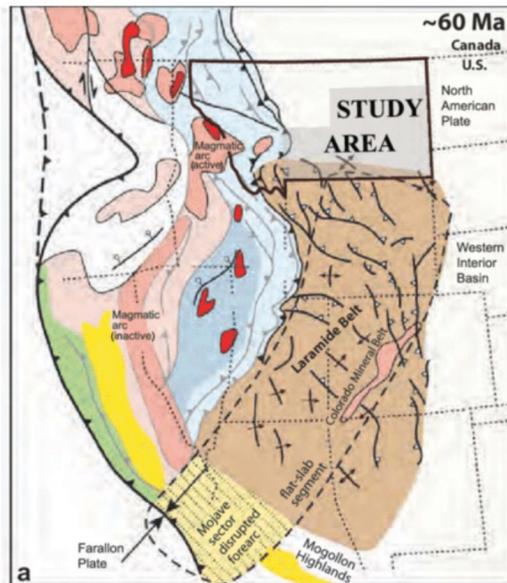
Grants Committee Chair

Jim Fassett

Director

Position Vacant

ABSTRACT



From Bader, J.W., 2019, Structural Inheritance for the Laramide, Central Montana Uplift: A Wrench-Fault Tectonic Model Related to Proterozoic Orogenesis in the Foreland of the North American Cordillera. https://www.researchgate.net/profile/Jeffrey_Bader2

The Central Montana uplift of eastern Montana lies adjacent to the Northern Rocky Mountains on the western edge of the Northern Great Plains Physiographic Province, and just north of the Laramide belt of the Central Rockies. The origins of this deformed region have received little attention relative to Laramide tectonism and Precambrian basement interrelations, particularly within the overall context of plate tectonic evolution of the North American Cordillera.

The Central Montana uplift is characterized at the surface by six well-defined fault zones with general trends to the WNW and NE. Previous work attributes development of these fault zones to transcurrent motion on basement-rooted faults that deformed the sedimentary

cover during Laramide orogenesis.

A Paleoproterozoic origin for these fault zones is proposed, with the faults initially forming in cratonic basement as pure-shear conjugates during SW-NE convergence at the northeastern margin of the Wyoming Province. It is further proposed that the conjugate shears were re-activated as simple shears during the Laramide orogeny under similar SW-NE stress conditions as those in the Precambrian.

Structural analysis of basement fabrics of the western Beartooth Mountains and Laramide surface structures (compiled from previously published data) indicate that these major, and likely regional, crustal anisotropies (conjugate shears) may have guided Laramide deformation across eastern Montana. Isostatic gravity data support these interpretations. Precambrian development of conjugate shears was likely related to Trans-Hudson (1.78-1.74 Ga) orogenesis along the northeastern Wyoming Province boundary. Data also indicate that these structures were re-activated as wrench faults during the Laramide orogeny, forming the Central Montana uplift. The structural style of the Laramide orogenic system, as exemplified by the Central Montana uplift, and relation to basement anisotropy has significant implications for the many petroleum systems of the entire Williston Basin of North America.



In this Issue:

Meeting Information	P. 1	Upcoming Meetings	P.3
Abstract	P. 2	Events and Training	P. 3-4
Biography	P. 3	Membership Form	P. 5
Prez Sez	P.3		

February 2021

BIOGRAPHY

Jeffrey W. Bader, North Dakota Geological Survey, 2835 Campus Rd., Stop 8156, Grand Forks, ND 58202
email: jwbader@nd.gov.

Jeff Bader has been a geologist for over 40 years and is a Professional Geologist in Wyoming and Utah. He has a BA in Geology from the University of Colorado and a MS in Petroleum Geology from San Jose State University. He spent the first 8 years of his career at the USGS, Branch of Petroleum Geology. He then was a consultant for more than 20 years and for the last 6 years has served with the North Dakota Geological Survey where he is presently Director of the Wilson M. Laird Core and Sample Library. He also is an Adjunct Professor of Geology at the University of North Dakota. His research interests center on cratonic origins/development and resulting influences on the Phanerozoic tectonic, structural, stratigraphic, and sedimentological evolution of sedimentary basins. Jeff has authored over 50 publications on these topics, mostly in the Rocky Mountain region.

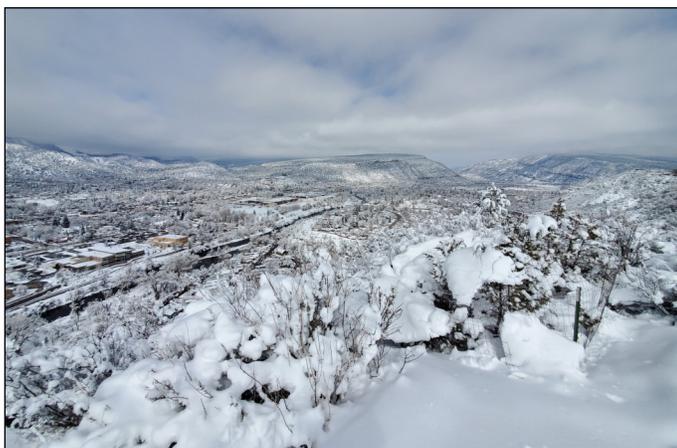


Jon Harvey on 2019
hike / train fieldtrip

PREZ SEZ

Greetings FCGS Community,

I hope you all are healthy and well as we approach the latter days of winter. Today I am looking out on a nicely coated landscape from the Fort Lewis College campus. Amazing what a strong storm cycle can do for the soul in an otherwise droughty time!



We still have several exciting events lined up for this year of FCGS talks. Please join us on Thursday for this month's (virtual) talk from Jeff Bader (North Dakota Geological Survey), who will show us how 1.7-billion year old faults influence modern petroleum systems in the Williston Basin. Next month we'll hear from Bob Biek of the Utah Geological Survey about the gigantic Markagunt gravity slide. In April we'll have a series of research talks from graduating seniors from Fort Lewis College's Geology program, and in May we host Erik Hulm speaking on the North American cordilleran foreland megasequence. Please join us for some or all of these virtual events as we march toward longer days and, hopefully, a more 'open' social landscape!

Thank you for your continued interest in and support of the Four Corners Geological Society.

-Jon

ZOOM MEETING LOGIN INFO

Topic: Four Corners Geological Society February Meeting

Time: February 18th, 2021 05:30 PM Mountain Time (US and Canada)

Link to Join Zoom Meeting:

<https://fortlewis.zoom.us/j/94286084881>

UPCOMING FCGS EVENTS

Thursday, Mar 18

Speaker: Bob Biek (Utah Geological Survey),
Topic: Markagunt Gravity Slide in Utah (possibly the largest mass wasting feature recognized in geologic record?)

Thursday, April 29

Speakers: FLC senior research presentations
Topics: a fun variety, depending on each student's thesis topics

May, Date TBA

Speaker: Erik Hulm, TeoGeo Consulting
Topic: Seeing the Forest for the Trees Across North America's Cordilleran Foreland Megasequence

EVENTS AND TRAINING

The following listings are provided by Douglas Peters, CO-AIGP

February 2021

Members in Transition Virtual Talk

February 18, 2021; 12 pm-1 pm (MST).

Speaker: Caley Van Cleave

Topic: "Interview Skills in the Current Virtual Reality"

Interviewing has always been scary, but today's increasingly virtual world has made it a new challenge. Join us to learn tips and tricks for acing a precious interview in a virtual environment. Step up your interview game to effectively communicate why you're the choice for the position.

Rocky Mountain Members in Transition (MiT) is a joint effort of members of AAPG, SPE, WOGA, COGA, DWLS, and RMAG in the Rocky Mountain region to help association members in the midst of a career transition. Webinars are free and open to all.

Register at:

<https://www.rmag.org/index.php?src=events&srctype=detail&refno=142&category=Special%20Events>

Denver Museum of Nature and Science Virtual Presentation

February 24th, 7-8p.m.

Topic: "60 Minutes in Space"

Go "behind the stories" with space scientists as they use the best images and animation available to help understand new developments in our solar system and beyond.

The Groundwater Association (NGWA) / National Groundwater Awareness Week

March 7-13, 2021

This year, we are speaking up for groundwater. Our most valuable and precious resource needs advocates who

understand the importance groundwater plays in our lives and community. Any resource taken for granted is a resource at risk of being lost, which is why we are dedicating National Groundwater Awareness Week 2021 to the advocacy of groundwater safety and protection and increasing its access across the country.

The first step in advocacy is almost always education. How do we educate our friends, families, and leaders about the role of groundwater? How do we teach our neighbors about the importance of proper groundwater management, remediation, and increase awareness of water testing in private water systems? How do we ensure our voice is heard? It all starts with you, and we are excited to work with our partners this year in providing materials and opportunities to help them advocate and support the importance of groundwater in their community. Because if we don't speak up for groundwater, who will?

To get more info or to get involved, go to

<https://www.ngwa.org/get-involved/groundwater-awareness-week/groundwater-awareness-week-2021>

NMGS Fall Field Conference - Call for Papers - Geology of the Mount Taylor Area, September 15-18th. **Deadline: April 1st.**

This field conference was originally scheduled for the fall of 2020, and papers for the accompanying guidebook were collected last year as NMGS Special Publication 14. The trip was then postponed due to the Covid pandemic and is now rescheduled for fall 2021. The majority of the 2021 guidebook will draw from SP 14, however, Guidebook 71 will also include road logs and a few new technical papers. If you would like to submit a paper or mini-paper, please contact Bonnie Frey (bonnie.frey@nmt.edu). All papers must be reviewed by two colleagues before submission as described in the Instructions For Authors page.

New Mexico Geological Society 2021 Fall Field Trip - Mt. Taylor Area



View of Mt. Taylor and La Jara Mesa from Day 1, Stop 2. Slopes in the foreground, Morrison Formation. Image from NMGS website.



FOUR CORNERS GEOLOGICAL SOCIETY

P.O. Box 1501, Durango, CO 81302

MEMBERSHIP RENEWAL or APPLICATION: June 1, 2020 to May 31, 2021



*Name: _____

*Address: _____ City: _____ State: _____ Zip: _____

*Email: _____ Phone: _____

*Employer: _____

Please Identify a Membership Category:

***Please check your interests:**

- Sedimentology & stratigraphy
- Structure & tectonics
- Mineralogy, petrology, geochemistry
- Igneous geology, volcanology
- Ore geology and hard rock mining
- Other mineral extraction
- Petroleum geology
- Geophysics
- Geological engineering
- Geomorphology
- Quaternary geology
- Hydrology & water resources
- Environmental geology
- Geography / GIS
- Other interest (see box)

Active Member	\$25	Any person engaged in the practice or teaching of geology or who holds a Bachelor's Degree in geological science from a college of acceptable academic standards. Degree requirement may be waived if applicant has adequate professional experience. <i>*Highest Degree, Type and Year:</i> _____ <i>*College / University:</i> _____
Associate Member	\$25	Any person who is a graduate of a college of acceptable academic standards with major studies related to, or associated with, geology. Degree requirement may be waived if applicant has adequate professional experience. <i>*Highest Degree, Type and Year:</i> _____ <i>*College / University:</i> _____
Student Member	Free	Any undergraduate or graduate student majoring in geology at a college of acceptable academic standards. <i>*College / University:</i> _____ <i>*Year expected to graduate:</i> _____
Emeritus Member	Free	An Active Member of 65 years old or older who has been a member for 25 years including time spent in military service. <i>*Year emeritus status was awarded:</i> _____
Honorary Member	Free	An Active Member who has contributed distinguished service to the profession of geology and to the betterment of the FCGS. Determination is made by the FCGS Executive Committee. <i>*Year honorarium was awarded:</i> _____

Other Professional Interests:

** Required information for new members. Current Members, please update.*

Please either print, complete and return this form with your check for dues made payable to: "Four Corners Geological Society" and mail to the address above or go online to fourcornersgeologicalsociety.org .