



FOUR CORNERS GEOLOGICAL SOCIETY NEWSLETTER

March 2006

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Next Meeting and Presentation

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Four Corners Geological Society

March Meeting and Presentation

DATE:

Friday, March 24, 2006

SPEAKER:

Dr. John W. Geissman, Professor of Earth & Planetary Sciences, University of New Mexico (see bio on page 5)

TOPIC:

“Complexities in the Early Cenezoic Extrusion of Crustal Fragments around the Eastern Himalayan Syntaxis” (see abstract on page 4)

PLACE: Courtyard Marriott, PINE ROOM, 560 Scott Ave, Farmington, New Mexico, (505) 325-5111

AGENDA:

5:30 PM Social Hour

6:30 PM Dinner-----Chicken Cordon Blue, green salad, potatoes or rice and desert

7:30 PM Presentation

COSTS:

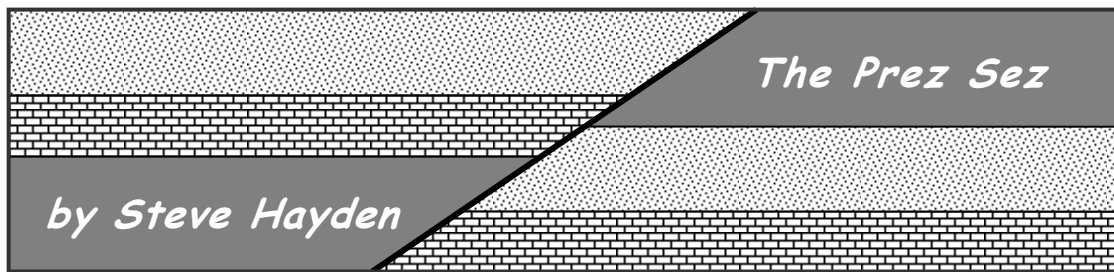
\$20.00 per person (dinner and talk), \$2.00 per person (talk only), students free (talk only)

Reservations! for the meeting and presentation should be made by Wednesday, March 22.

Farmington Contact: Mike Dawson – email: mdawson@br-inc.com, phone: (505) 326-9770

Durango Contact: Steve Cossey – email: mdawson@br-inc.com, phone: (505) 326-9770





Greetings! March is here already.

This month we will meet in Farmington. The speaker will be Dr. John Geissman from the University of New Mexico. John has been involved in paleomagnetic investigation of tectonics for many years. He has worked extensively in the Cordillera of western North America and the Colorado River extensional corridor. He has been instrumental in the revolution in extensional tectonic understanding that has occurred over the last twenty-five years. He was involved in the development of fold testing using paleomag and studies of tectonic block rotation. He will talk this month about accommodation zones in the collisional interaction between the Indian and the Eurasian plates. I hope to see everyone at the meeting.

For everyone's information, the society is considering hosting the AAPG Rocky Mountain Section meeting in 2010. We are looking for people to help organize the meeting, sessions and field trips. Please talk to Ed Heath or one of the officers (including me) if you are interested in becoming involved.

Steve



March 24, 2006 Presentation



**COMPLEXITIES IN THE EARLY CENOZOIC EXTRUSION OF
CRUSTAL FRAGMENTS AROUND THE EASTERN HIMALAYAN
SYNTAXIS**

John W. Geissman

Professor of Earth and Planetary Sciences,
University of New Mexico

ABSTRACT

How the early Eocene to contemporary large-magnitude penetration of the Indian subcontinent into Eurasian lithosphere has been accommodated has been a subject of considerable interest and debate, particularly with respect to the general problem of deformation around indentation syntaxial corners. We have obtained new paleomagnetic data from upper Jurassic to lower Tertiary hematite-cemented sedimentary rocks within the Lanping-Simao tectonic unit, a laterally continuous fold thrust belt in western Yunnan province, to test the hypothesis that, during early Cenozoic time, much of the Indochina lithospheric fragment was strongly and probably heterogeneously deformed at the eastern Himalayan syntaxis during some 3000+ km of post-collisional northward translation of the Indian subcontinent. Data from a total of over 900 sites from over 100 separate localities, ranging from 22.5°N, near Mengla, to 26.5°N, near Lanping, reveal considerable declination discordances with respect to both Eurasian and South China reference frames, and imply that most of the area has been affected by clockwise-sense, vertical axis rotation, with the estimated magnitude of rotation typically ranging from ~45° to ~90°. The overall rotation pattern of the belt, however, reveals notable heterogeneities, in particular showing large magnitude changes in vertical axis rotation between the western and southeastern part of the Lanping-Simao unit. The boundary between these two parts of the Lanping-Simao unit is interpreted to be an important left-lateral fault zone, one of several such zones that

were active within the Indochina fragment during extrusion. On the basis of a discrepancy between observed (paleohorizontal referenced) inclination data (steeper) and expected inclinations in both Eurasian and South China reference frames, a modest (10o +/- 10o ... actual values to be filled in by JG, the point is this is best left expressed as latitudinal anomaly in degrees, with uncertainties explicitly quoted) southward translation of the Lanping-Simao unit is inferred. Such southward translation is consistent with both models positing extrusion of large lithospheric blocks and with interpretations of semi-continuous right-lateral shear of geologic units north and east of the eastern Himalayan syntaxis. Permissible reconstructions of the Lanping-Simao unit involve either interleaving this crustal fragment with the middle or northern part of the Qiangtang terrane, or making the Lanping-Simao belt the eastward continuation of the Qiangtang terrain. What remains unresolved is whether, in order to make sufficient room for the Lanping Simao unit and other elements of the Indochina fragment during pre-collisional time, the Qiangtang element should be restored to a location farther to the west. Combining our paleomagnetic results with the geology of the area east of the syntaxis indicates that several large strike-slip systems were active during extrusion, and that the lithospheric/crustal fragments these faults bounded were strongly deformed by smaller scale faulting, fragment rotation and folding. We propose that much of the strongly deformed Indochina fragment was subject to large-scale clockwise rotation around the syntaxis during early Cenozoic extrusion, perhaps similar to the late Cenozoic pattern of deformation around the syntaxis. However, partially superposed late Cenozoic deformation has strongly disrupted the early Cenozoic structures. Although the role of large-magnitude displacement along strike-slip fault systems cannot be overlooked in explaining deformation in Southeast Asia, penetrative, heterogeneous deformation between the better-known major strike-slip systems characterized the tectonism of much of Indochina occurred during India's penetration into Asia at the eastern Himalayan syntaxis.



Speaker Biography

John W. Geissman

Born: 29 October, 1952, Rockford, Ill.

Wife: Molly A. Geissman

Son: Thomas James, born 7 January, 1984

Professional Preparation:

University of Michigan	Geology	B.S. 1973, Highest Honors
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University of Michigan	Geology	M.S. 1976
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University of Michigan	Geology	PhD. 1980
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Appointments:

1993- present: Professor of Earth and Planetary Sciences, University of New Mexico

Teaching introductory geology, field geology, structural geology, tectonics, geophysics, paleomagnetism, scientific presentations, etc. Research on the structural evolution of highly extended parts of the Basin and Range Province, Triassic paleomagnetism and magnetostratigraphy and bearing on Colorado Plateau rotation, Pennsylvanian/ Permian redbeds along the eastern and northern margin of the Colorado Plateau, deformation along the eastern margin of the eastern Himalayan syntaxis, Precambrian paleomagnetism in the western US

2001-present: Editor, Eos

1999-2002: President, University of New Mexico Faculty Senate

Working with a spectrum of faculty and the UNM administration to assure the role of faculty in governance.

1997-present: Adjunct Professor, University of Michigan

Teaching/curriculum development at summer field geology course, northwest Wyoming

1995-2000: Editor, Bulletin of the Geological Society of America

An educational and time-consuming experience and I hope useful to the community

1987-1993: Associate Professor of Earth and Planetary Sciences, University of New Mexico

Teaching courses similar to those above. Research activities included emplacement temperature determinations for pyroclastic rocks, Basin and Range structure, magnetostratigraphy, remagnetization processes.

1984-1987: Assistant Professor of Geology, University of New Mexico

Teaching courses similar to those above. Research in Precambrian paleomagnetism, Basin and Range tectonics.

1980-1984: Assistant Professor of Geological Engineering, Colorado School of Mines

Teaching structural geology, tectonics, paleomagnetism, field geology. Research in Basin and Range extensional processes, evolution of the Yellowstone hot spot, Precambrian paleomagnetism

Publications:

Petronis, M.S., and Geissman, J.W., 2005, Volcanic Stratigraphy and Anisotropy of Magnetic Susceptibility Data Bearing on the Probable Source Area and Transport Direction of Mid-Tertiary Ignimbrites, Candelaria Hills Area, West-Central Nevada, in review, Bulletin of Volcanology

Weil, A. B., J. Geissman, M. Heizler, and R. Van der Voo, 2003, Paleomagnetic results from Middle Proterozoic mafic intrusions and Upper Proterozoic (Nankoweap) red beds from the Lower Grand Canyon Supergroup, Arizona: Tectonophysics, v. 375, p. 199-220.

Geissman, J. W., and S.S. Harlan, 2002, Late Paleozoic remagnetization of Precambrian crystalline rocks along the Precambrian/Carboniferous

nonconformity, Rocky Mountains: A relationship among deformation, remagnetization, and fluid migration: *Earth and Planetary Science Letters*, v. 203, p 905-924.

Geissman, J. W., and S.S. Harlan, 2004, Paleomagnetism and Rock Magnetism of Large Sandstone Pipes and Host Upper Middle Jurassic (Callovian) Summerville Formation and Bluff Sandstone Near Mesita, West-Central New Mexico: *Journal of Geophysical Research*, V. DOI 10.1029/2003JB002463, p. 16 p.

Armour, J., Fawcett, P.J., and Geissman, J.W., 2002, A 15,000-year paleoclimatic and glacial record from northern New Mexico, USA: *Geology*, v. 30, p. 723-726.

(ii) five other publications:

Geissman, J. W., Burchfiel, B. C., Studnicki-Gizbert, C., Akciz, S., Lianzhong, C., and Brocklehurst, S., 2005, Complexities in the early Cenozoic extrusion of crustal fragments around the eastern Himalayan syntaxis: *Geospheres*, *Electronic Journal of the Geological Society of America*, in review.

Keating, G. N., Geissman, J.W., and Zyvoloski, G.A., 2002, Multiphase modeling of contact metamorphic systems and application to transitional field changes during a geomagnetic reversal: *EPSLet.*, v. 198, p. 429-448.

Petronis, M. S., Geissman, J.W., Oldow, J.S., and McIntosh, W.C., 2002, Paleomagnetic and $^{40}\text{Ar}/^{39}\text{Ar}$ geochronologic data bearing on the structural history of the Silver Peak Range, west-central Nevada: *Bulletin of the Geological Society of America*, v. 114, p. 1108-1130.

Petronis, M. S., Hacker, D. B., Holm, D. K., Geissman, J. W., and Harlan, S. S., 2004, Magmatic flow paths and paleomagnetism of the Miocene Stoddard Mountain Laccolith, Iron Axis region, southwest Utah, USA, *Applications of Anisotropy of Magnetic Susceptibility in the Geosciences*, *Geol. Soc. London Sp. Volume Series*

Wawryzniec, T. F., Geissman, J.W., Melker, M.A., and Hubbard, M., 2002, Dextral shear along the eastern margin of the Colorado Plateau--a kinematic link between the Laramide orogeny and Rio Grande rifting (ca. 75 to 13 Ma), *Journal of Geology*, 110, 305-324.

General Announcements/News from other Geo-Societies

2006 Dues!

Kim Gerhardt – FCGS secretary

Have you paid your 2006 dues? Our records show that 87 members are delinquent as of March 9. According to our bylaws, membership fees are due within 60 days of the start of the calendar year. This week we are sending out notices to those who have not yet paid. If we do not receive your payment by the end of the month, we will drop you from our rolls in April.

You are a valued member of the Society and we encourage you to bring your dues up to date in order to continue receiving our newsletter, invitations to our monthly meetings, access to our publications, and fieldtrip opportunities.

Rocky Mountain Section of AAPG - Hosting the 2010 Convention

Ed Heath – former FCGS president

For the past couple of years, officers of the Rocky Mountain Section - AAPG have been inquiring about the possibility of the FCGS hosting a Section meeting. Believing that this was something our society should be interested in considering, I have not discouraged the idea. Now the Rocky Mountain Section has formally invited us to host their annual meeting in 2010.

Anyone who has been involved in organizing such a meeting knows it requires a lot of work by dedicated, capable and conscientious members. Meeting with the FCGS Executive Committee, along with several key persons who have in the past worked in various positions in the Society, a general consensus is that this is a challenge that we can and should commit to. There have been many questions asked, and some reluctance expressed by several members, and rightly so. This leads to why this article is being written.

A commitment to host the Rocky Mountain Section meeting should not rest solely with the Exec. Committee along with a few others, it should be a decision by all the FCGS membership. Fort Lewis Collage, with the help of

David Gonzales and Scott White, has agreed to work with the Society in providing meeting space and technical program support as needed. Now it is time for the FCGS membership at large to step up and agree to hosting a Section meeting, realizing that many of you will be called upon to work on committees, etc.

I am convinced that the FCGS can do the job. It will be good for our Society, good for our profession, good for Fort Lewis Collage and good for the greater Durango and Farmington area. Should anyone have comments to make, pro or con, feel free to contact me at ewheath@frontier.net or pH. (970) 375-1997.

[American Association of Petroleum Geologists](#)

Call for papers – 2006 Rocky Mountain Section, AAPG Annual Meeting, June 10-13, 2006 at the Holiday Inn Grand Montana, Billings, Montana. There will be both oral and poster sessions covering: Oil and natural gas in the Rocky Mountains, Advances in stratigraphic and structural analysis, Technological advancements, and Environmental and Regulatory matters. The deadline for abstracts has passed, but for more information on the technical program contact Steve VanDelinder or David Lopez at (406) 657-2632.

The AAPG annual meeting will be held April 9-12, 2006 in Houston, Texas at the George R. Brown Convention Center. Register online www.aapg.org by February 17th and save. There will be 465 oral presentations and 415 posters.

The AAPG is running several short courses and field trips this spring. These include; “E&P Methods and Technologies: Selection and Applications” April 7-9, 2006, “Modern Terrigenous Clastic Depositional Systems” April 23-30, May 22-29 and September 18-25, “Strategic Play Analysis”, April 8-9, and “Clastic Reservoir Facies and Sequence Stratigraphic Analysis of alluvial Plain, Shoreface, Deltaic, and Shelf Depositional Systems” April 23-29. There will also be a Geologic Field trip to Trinidad and Tobago April 26-May 2. For more information email the AAPG education department at educate@AAPG.org, log on to www.aapg.org/education/index.cfm, or call (918) 560-2678.

Arizona Geological Society

The AGS' conference, "Ores and Orogenesis: Circum-Pacific Tectonics, Geologic Evolution, and Ore Deposits" honoring the career of William R. Dickinson has a new co-sponsor. The Tucson Section of the Society for Mining, Metallurgy and Exploration (SME) is developing a full day of talks of technical and business aspects of the future of mining. The other co-sponsors are USGS, SEG and the Geological Society of Nevada. They have issued their first call for papers. The meeting will be held September 24-30, 2007 in Tucson, Arizona. Visit their website for more information, <http://www.agssymposium.org/>.

The AGS is holding a **spring field trip** called, "Investigation of Breccia Pipe and Shear Zone Systems in West Central Arizona", from Friday, March 24 – Sunday, March 26. The trip will be led by Rich Lundin of Carothers Environmental, Patrick O'Hara of Caaterskill Exploration and Jon Spencer of the Arizona Geological Survey. The trip will begin in Yarnell, moving on to Wickenburg, Aguila and Congress. For more information contact Rich Lundin at (866) 203-9930.

Geological Society of America

The GSA annual meeting will be October 22-25 in Philadelphia, Pennsylvania. The Four Corners Geological Society has received a solicitation from GSA to set up an exhibit in their vendor hall. This is in the form of two folding brochures with attached postcards to be sent in for more information. If the holder mentions this flyer when purchasing a booth, they receive \$100 off of premium space, \$75 off of prime space or \$50 off of a standard booth. Because Pennsylvania is too far away for us to man a booth, we are willing to donate these brochures to any member who wants one. Please contact Kim Gerhardt at (970) 375-2700 if you are interested.

Nevada Petroleum Society

The NPS will organize a field trip over July 18-24, 2006, titled "The Great Field Trip - Great Basin Paleozoic Carbonate Platform: Facies, Facies Transitions, Depositional Models, Platform Architecture, Sequence Stratigraphy, and Predictive Oil and Gas Reservoir and Mineral Host

Models”. The trip will be led by Harry Cook, USGS. Call Jon Price for information and reservations (775) 784 – 6691.

[Rocky Mountain Association of Geologists](#)

The Colorado Oil and Gas Association and the Rocky Mountain Association of Geologists are again presenting, “Two Great Meetings, One Great Event” August 7-9, 2006 at the Colorado Convention Center. This event will focus on the business side and the scientific side of Rocky Mountain natural gas. The deadline for abstracts is already passed, but for information on attending contact the RMAG at RMNG2006@aol.com

[Wyoming Geological Association](#)

WGA in conjunction with AAPG have had all their publications scanned from 1946 up to their 2000 Guidebook. This publication should already be available by the time of our March FCGS newsletter. Visit their new, updated website, www.wyogeo.org or email them at info@wyogeo.org for more information.



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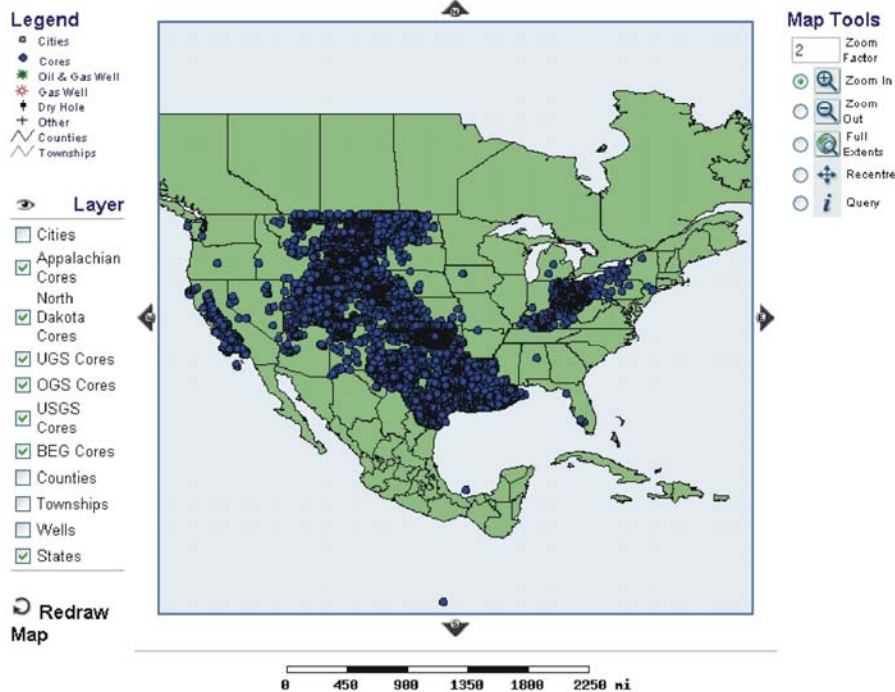




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✦ Around the Corner ✦

Announcing the Four Corners Geological Society Lower San Juan River Float Trip



Destination - Goosenecks!

Goosenecks of the San Juan, view to east. Photo credit – Kim Gerhardt

New FCGS member Deb Snyder has received a float permit for the lower San Juan River (Mexican Hat to Clay Hills), which she is willing to donate to the society. Dr. Gary Gianniny from Fort Lewis College, who did his dissertation on this section of the San Juan, will lead the trip. Tom Ann Casey, an experienced rafter, and Kim Gerhardt, the FCGS fieldtrip chairperson, will help organize it. The permit is for 15 people total.

Dates: Put-in Monday, June 12 at Mexican Hat, Utah. Take-out Saturday, June 17 at Clay Hills.

Costs: Each participant must send in a \$15, non-refundable, deposit to hold their place. This will cover the BLM group permit fee, and our mailings. We will be asking all participants for a second check in May, probably for around \$120-\$150, to buy group supplies.

To reserve your spot: Your name will be placed on the trip list in the order that you contact me, but to hold the spot, you will need to send your \$15 check, made out to “Kim Gerhardt” to: Kim Gerhardt / Secretary, FCGS / P.O. Box 1510 / Durango /Colorado 81302. My phone is: (970) 375-2700 and my email is: kim@mydurango.net

Participants with rafts and/or inflatable kayaks will be bumped up the list until we have enough.

You must be a current member of the society to participate in the fieldtrip.



Four Corners Geological Society

MEMBERSHIP RENEWAL or APPLICATION for 2006

PAGE 1

*** Please Print and Complete BOTH Pages***

NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

EMPLOYER: _____

Bus. PHONE: (____) _____ Res. PHONE: (____) _____

Fax Number: (____) _____ E-Mail: _____

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Please Identify a Membership Category:

- | | | | |
|--------------------------|---------------------------|----------------|--|
| <input type="checkbox"/> | ACTIVE MEMBER 1 | \$20.00 | Person holding a degree in geology or an allied science and receiving the FCGS Newsletter via <u>email</u> |
| <input type="checkbox"/> | ACTIVE MEMBER 2 | \$25.00 | Person holding a degree in geology or an allied science and receiving the FCGS Newsletter via <u>U.S. mail</u> |
| <input type="checkbox"/> | ASSOCIATE MEMBER 1 | \$20.00 | Person whose interests are closely associated with geology or an allied science and receiving the FCGS Newsletter via <u>email</u> |
| <input type="checkbox"/> | ASSOCIATE MEMBER 2 | \$25.00 | Person whose interests are closely associated with geology or an allied science and receiving the FCGS Newsletter via <u>U.S. mail</u> |
| <input type="checkbox"/> | HONORARY MEMBER | no charge | Year Honorarium was awarded _____ (optional) |
| <input type="checkbox"/> | EMERITUS MEMBER | no charge | Year Emeritus status was awarded _____ (optional) |
| <input type="checkbox"/> | STUDENT MEMBER | \$5.00 | Undergraduate student majoring in geology or an allied science
Year you expect to graduate: _____ |

Four Corners Geological Society

MEMBERSHIP RENEWAL or APPLICATION for 2006 PAGE 2

My professional interests are:

I would like to include a Tax Deductible Contribution to the Four Corners Geological Society Foundation.

Amount of Donation: _____
(Please include a separate check made payable to the Foundation.)

In Memory of (optional): _____

To be used for (optional): _____

SIGNATURE: _____ DATE: _____

The dues year begins on January 1.
For dues paid after March 1, add a \$5 late fee (does not apply to new members).

Please print, complete and return **both pages** of this form with your check for dues made payable to:

**Four Corners Geological Society
P.O. Box 1501,
Durango, CO 81302**

[Letter from the Editor](#)

Hola!

Today is Sunday March 12, 2006 and I am trapped inside watching it finally snow here in Aztec, New Mexico. I guess the only complaint I have about this much needed moisture, is that it came on the weekend I was supposed to kayak the San Juan River with fellow nerdy geologist Charles Head from Burlington Resources a.k.a ConocoPhillips.

Part of the reason I am writing this letter is to again remind our FCGS members to get their dues in! Yes, yes, I am one of those members that have not paid yet either and I have all sorts of reason why, like “Mike Dawson usually pays for mine, but since I have left Burlington Resources to work at Cedar Ridge LLC I guess Mike thinks I can pay my own way now.” But, I guess that’s not really the point, we all have an obligation to the Society and to the Staff that works to bring us all together each year. So tie a reminder string around that rock hammer and get those dues in and somebody remind Mike to pay for mine....

As many of you might be aware of we have a website!! I have been asked to promote the site through the newsletter so I have added a link on the front page of the newsletter. Our web master has done a fine job of getting the page up, but now we need input from the society. We are looking for content ideas like FCGS history, organizational structure, contact info, event scheduler, a geology blog, links...Get the idea. Good, now get those geo-creative minds to work and e-mail our webmaster at info@thedigitalhorse.com before she starves to death.

I am looking forward to seeing everyone at this months meeting and I hope you pay your dues.

Luke Titus
FCGS Newsletter Editor
ltitus@cedarridgellc.com

Advertising rates for the Four Corners Geological Society newsletter:

Full Page Ad (7½" x 9½") \$100/mo. or \$1000/yr. Half Page Ad (7½" x 4½") \$50/mo. or \$500/yr.
¼ Page Ad (3½" x 4½") \$25/mo. or \$250/yr. Business Card (3½" x 2") \$10/mo. or 100/yr.

Odd sizes are \$3.50 per column inch per month, minimum \$10.00

For more information, please contact the FCGS Treasurer, (vacant). Proceeds will go toward the further development of the Society (i.e., offset meeting costs, publications, etc.).

Four Corners Geological Society

P.O. Box 1501, Durango, CO 81302

<http://www.canyonwinds.com/FCGS/index.html>

2005-06 Officers

President – Steve Hayden: phone: 505.334.6178, email: Steve.Hayden@state.nm.us

Vice President – Mike Dawson: phone: 505.3269770, email: mdawson@br-inc.com

Secretary – Kim Gerhardt: Phone: 970.375.2700, e-mail: kd@mydurango.net

Treasurer – Steve Cossey: phone: 970-385-4800, email: cosseygeo@aol.com

Book Chairperson – Tom Ann Casey: phone: 970-247-1500, email: mtmassive@frontier.net

Newsletter Editor – Luke Titus: phone: 505.324.6108, email: jtitus@cedarridgellc.com

Past President– Ed Heath: phone: 970-375-1997, email: ewheath@frontier.net

Web Coordinator– Tom Getts email: getts@mindspring.com

Field Trip Coordinator– Kim Gerhardt: Phone: 970.375.2700, e-mail: kd@mydurango.net

Foundation President– Doug Brew: phone: 970-259-5350, e-mail: dcbrew@frontier.net

Foundation Secretary – Joe Hewitt: phone: 505.599.6365, email: jhewitt@blm.gov

Foundation Treasurer – Jim Hornbeck: phone: 505.325.8874, email: arg@digii.net