

## Jeffery A. Grambling (1953-1993)

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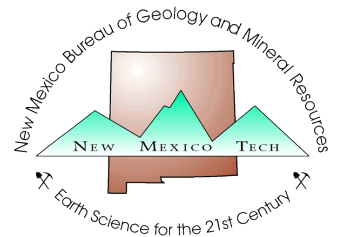
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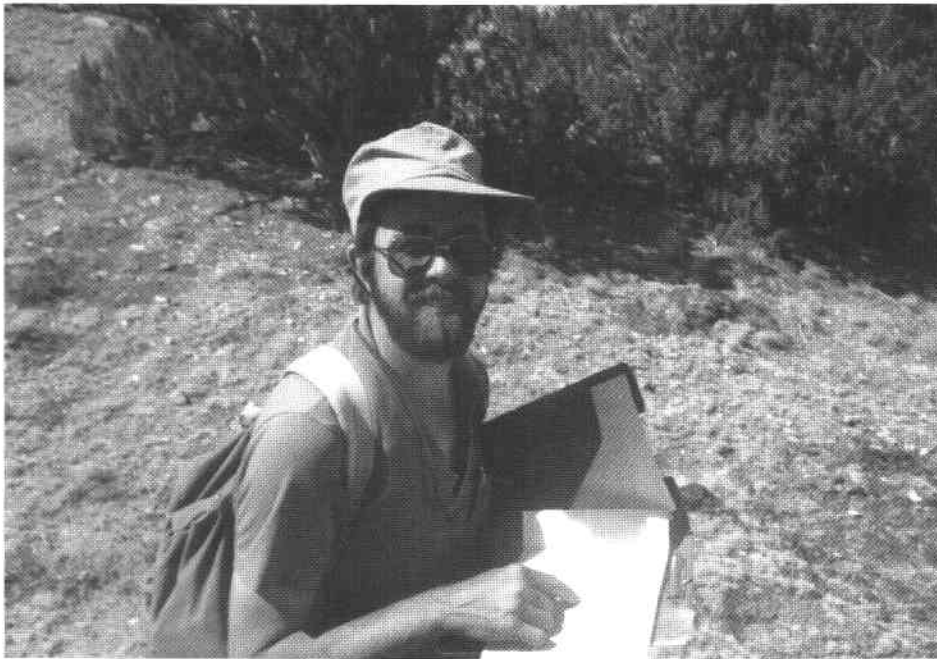
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**Jeffrey A. Grambling  
(1953–1993)**

Jeffrey A. Grambling died on August 2, 1993, from a brain tumor. He was 40 years old. Jeff's youth comes as a surprise to many who knew him only by his worldwide reputation and his numerous publications. For more than a decade, Jeff Grambling has been at the center of Precambrian research in New Mexico and on the cutting edge of many theoretical aspects of metamorphic petrology. He was a superb teacher, writer, researcher, colleague, and friend.

Jeff Grambling was born in Milwaukee, Wisconsin on April 1, 1953. His family moved to New Jersey, Pennsylvania, and Oklahoma before Jeff was eight years old. When he was sixteen, his family moved to Binghamton, New York where they still live. Jeff attended Colgate University. He started out in mathematics, discovered geology, and finished with a double major in math and geology in 1975. After college, Jeff married Gail Johnston, his high school sweetheart. They moved to Princeton where Jeff completed his PhD under the direction of Lincoln Hollister only four years after graduating from Colgate.

Jeff's PhD research, beginning in the Santa Fe Range of New Mexico and ultimately settling in the Truchas Range, gave him his first contact with the Proterozoic rocks of the southwestern USA and his first contact with the diverse culture of New Mexico. Neither association would ever be broken. In the Truchas Range, Jeff found the opportunity to combine high-country backpacking, complex geology, metamorphic petrology, and especially the aluminum silicate polymorphs: kyanite, andalusite, and sillimanite. Jeff's research provided a classic example of metamorphic petrology as a field science. He

mapped metamorphic isograds and metamorphic equilibrium as a function of topography and structure, and he made the Truchas Range one of the classic metamorphic localities in the world (Grambling, 1981a). In any discussion of the significance of 3-polymorph, "triple-point" localities, the Truchas Range and Jeff Grambling are prime references.

Jeff Grambling came to the University of New Mexico in 1980 after one year as an Assistant Professor at the University of Oklahoma. The move allowed him to immerse himself in the rocks he loved, and for both Gail and him to immerse themselves in the culture they loved. Jeff could now conveniently incorporate field trips and field research into his teaching, and he could develop his enviable graduate program attacking all aspects of the largely unstudied Precambrian terrane of northern New Mexico. It was at this time that Jeff fought his first battle with cancer, but few would have known it from his high spirits, his productivity, or his enthusiasm for his research and his students.

Jeff set a pattern during his PhD research that he continued through his career. He studied the rocks in order to understand the history and significance of this important geologic terrane, but in addition, he found ways to use the extraordinary rocks to illustrate and clarify theoretical aspects of metamorphic petrology. These successes brought Jeff his worldwide reputation. He was always aware of new techniques and new ideas and was generally among the first to use them as tools in his own research, but he also used his field relations as a tool to evaluate the importance of the new ideas.

Jeff's early papers remain topical today, and several are so widely quoted that they are properly called classics. He was one of the first petrologists to use the Gibbs method in a broad range of applications, including constraining fluid equilibria in the Truchas Range (Grambling, 1981a, 1986b), clarifying aluminum silicate equilibria (Grambling, 1981a; Grambling and Williams, 1985), and developing a variety of new quantitative petrologic tools for thermobarometry, fluid equilibria, and oxygen barometry (Grambling 1986a; Grambling, 1990; Williams and Grambling, 1990; White, Grambling, and Yapp, 1992).

Jeff's recent research kept him at the heart of controversies concerning the tectonic significance of the Proterozoic terrane of northern New Mexico. Just when most workers seemed to be converging on a simple straightforward model for the Proterozoic history (involving one major event of plate collision, deformation, and metamorphism), a model which he himself helped to develop (Grambling, 1986b), Jeff threw a wrench into the works. He suggested that the metamorphism may not have happened during collision at all, but during extension, and that much of the tectonism occurred not at 1.7 Ga but at 1.4 Ga or even during the Grenville orogeny (Grambling, Williams, Smith, and Mawer, 1989; Grambling and Dallmeyer, 1993). This was typical of Jeff's style. He could critically examine even his own models and revelations and cleanly change directions when the need arose. Although the younger deformation and metamorphism in New Mexico has been analyzed and refined, its importance is

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only now being fully realized and the implications appreciated. The various roles of 1.7 and 1.4 Ga tectonism are perhaps the central theme of current research in the Proterozoic terrane.

Back-country hiking and camping were an integral part of Jeff Grambling's research, teaching, and personal life. It seems that each of Jeff's colleagues and each of his students can tell a different story of talus-slope field trips, 5,000-ft. climbs with heavy packs, huddling in tents during week-long deluges, trout fishing, dogs with backpacks, snow on tents, elaborate one-pot meals, floods, and most of all spectacular structures, isograds, and huge porphyroblasts. It wasn't Jeff's style to reveal what should be seen at a particular field-trip stop or how these rocks fit into one model or another. Instead, he led the way to the outcrop and then stood back, allowing each person to see for themselves. Only later would those seemingly unrelated stops merge into a subtle, carefully thought-out hypothesis. Memories of debating and sketching and talking and walking and laughing in the field with Jeff Grambling will forever be cherished by all of Jeff's colleagues and students.

Jeff Grambling was as successful a teacher as he was a researcher, perhaps because his research and teaching were so thoroughly integrated. He was careful, complete, and demanding in his undergraduate courses, but his graduate courses were truly inspirational. Jeff managed to incorporate the newest techniques and ideas into his courses to a remarkable degree. His problem sets involved calculations based on rocks that the class had seen, using methods they had studied in the most current literature. In the end, he created an atmosphere of ongoing research with the excitement of unknown results worked into continuously evolving class exercises. Perhaps the ultimate testament to this dynamic teaching style is that many of these exercises became abstracts, theses, or papers (Pedrick and Grambling, 1990; Daniel and others, 1990; Williams and Grambling, 1990; and many others). As an advisor, Jeff was at once demanding, frustrating, supportive, encouraging, discouraging, and most of all, successful. All of his students have had the excruciating experience of trying to gain his approval on a thesis or paper, and feeling that after the tenth draft, perhaps Jeff should have simply written it himself. He taught and demonstrated a care in writing, bordering on perfectionism, which is now used and taught by Jeff's students and their students. The feelings of inadequacy were easily balanced by feelings of warm collegiality. Jeff requested and respected the contributions of his students, and he shared his enthusiasm over new discoveries and successful experiments. Jeff's graduate program was a training ground for professional collaboration, and his students have been

successful in a wide range of pursuits from industry to academia. Three of Jeff's PhD students are now in teaching positions (Williams, Metcalf, Thompson) trying to convey the same love of science and insistence on excellence that they inherited from Jeff. Like all great teachers, Jeff's spirit will affect many generations of students.

There were no barriers between Jeff's work and family life. His students all were welcomed into his family, and his devotion to his real and "extended" family was obvious to everyone. Gail shared Jeff's love of backpacking, camping, chili, and the cultures of New Mexico. She was his field assistant of choice until their children Lara and Tyler were born, and it would have been only a few more years before Lara and Tyler would have certainly volunteered for the field effort. Perhaps because of their love of the field and the mountains, Gail, Lara and Tyler (and canine assistants Bask, Bart, and Ripley) were part of the geologic collaboration and also a refreshing relief from it. Back home, Jeff liked baseball and softball, the Albuquerque Dukes, gardening, Mexican food, and talking and talking about geology.

Jeff Grambling has had a profound effect on the lives of his students, his colleagues, his friends, and his science. We celebrate his extraordinary life in our lives. His influence will live and grow in our research and teaching and in that of our students.

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NOTE—This memorial was significantly improved by the comments and suggestions of Paul Bauer, Chris Daniel, Linc Hollister, Karl Karlstrom, Rodney Metcalf, Jane Pedrick, Sheila Seaman, Amy Thompson, and Chris White.

## Bibliography

### Papers

- Grambling, J. A., 1979, Precambrian geology of the Truchas Peaks region, north-central New Mexico, and some regional implications: *New Mexico Geological Society, Guidebook to 30th Field Conference*, pp. 135–143.
- Grambling, J. A., 1981a, Kyanite, andalusite, sillimanite, and related mineral assemblages in the Truchas Peaks region, New Mexico: *American Mineralogist*, v. 66, no. 7–8, pp. 702–722.
- Grambling, J. A., 1981b, Pressures and temperatures in Precambrian metamorphic rocks: *Earth and Planetary Science Letters*, v. 53, no. 1, pp. 63–68.
- Grambling, J. A., and Coddington, D. B., 1982, Stratigraphic and structural relationships of multiply deformed Precambrian metamorphic rocks in the Rio Mora area, New Mexico: *Geological Society of America, Bulletin*, v. 93, no. 2, pp. 127–137.

- Grambling, J. A., 1982, Precambrian structures in Cañon del Trigo, Manzano Mountains, central New Mexico: *New Mexico Geological Society, Guidebook to 33rd Field Conference*, pp. 217–220.
- Grambling, J. A., 1983, Reversals in Fe–Mg partitioning between chloritoid and staurolite: *American Mineralogist*, v. 68, no. 3–4, pp. 373–388.
- Grambling, J. A., 1984, Coexisting paragonite and quartz in sillimanitic rocks from New Mexico: *American Mineralogist*, v. 69, no. 1–2, pp. 79–87.
- Grambling, J. A., and Williams, M. L., 1985, The effects of Fe(3+) and Mn(3+) on aluminum silicate phase relations in north-central New Mexico, U.S.A.: *Journal of Petrology*, v. 26, no. 2, pp. 324–354.
- Grambling, J. A., 1986a, Crustal thickening during Proterozoic metamorphism and deformation in New Mexico: *Geology*, v. 14, no. 2, pp. 149–152.
- Grambling, J. A., 1986b, A regional gradient in the composition of metamorphic fluids in pelitic schist, Pecos Baldy, New Mexico: *Contributions to Mineralogy and Petrology*, v. 94, no. 2, pp. 149–164.
- Grambling, J. A., Williams, M. L., and Mawer, C. K., 1988, Proterozoic tectonic assembly of New Mexico: *Geology*, v. 16, no. 8, pp. 724–727.
- Grambling, J. A., 1988, A summary of Proterozoic metamorphism in northern and central New Mexico; the regional development of 520°C, 4–Kb rocks; in Ernst, W. G. (ed.), *Metamorphism and crustal evolution of the Western United States*: Prentice Hall, Englewood Cliffs, New Jersey, Rubey Volume 7, pp. 446–465.
- Grambling, J. A., Williams, M. L., Smith, R. F., and Mawer, C. K., 1989, The role of crustal extension in the metamorphism of Proterozoic rocks in northern New Mexico; in Grambling, J. A., and Tewksbury, B. J. (eds.), *Proterozoic geology of the Southern Rocky Mountains*: Geological Society of America, Special Paper 235, pp. 87–110.
- Grambling, J. A., Williams, M. L., Mawer, C. K., and Smith, R. F., 1989, Metamorphic evolution of Proterozoic rocks in New Mexico; in Daly, J. S., Cliff, R. A., Yardley, B. W. D. (eds.), *Evolution of metamorphic belts, Proceedings of the 1987 joint meeting of the Metamorphic Studies Group and IGCP project 235*, Univ. Coll., Dublin, Ireland: Geological Society, Special Publication 43, pp. 461–467.
- Williams, M. L., and Grambling, J. A., 1990, Manganese, ferric iron, and the equilibrium between garnet and biotite: *American Mineralogist*, v. 75, no. 7–8, pp. 886–908.
- Grambling, J. A., and Dallmeyer, R. D., 1990, Proterozoic tectonic evolution of the Cimarron Mountains, north-central New Mexico: *New Mexico Geological Society, Guidebook to 41st Field Conference*, pp. 161–170.
- Mawer, C. K., Grambling, J. A., Williams, M. L., Bauer, P. W., and Robertson, J. M., 1990, The relationship of the Proterozoic Hondo Group to older rocks, southern Picuris Mountains and adjacent areas, northern New Mexico: *New Mexico Geological Society, Guidebook to 41st Field Conference*, pp. 171–177.
- Grambling, J. A., 1990, Proterozoic geology of the Rincon Range north of Guadalupita, New Mexico: *New Mexico Geological Society, Guidebook to 41st Field Conference*, pp. 207–210.
- Holdaway, M. J., Mukhopadhyay, B., Dyar, M.

- D., Dutrow, B. L., Rumble, D., III, and Grambling, J. A., 1991, A new perspective on staurolite crystal chemistry; use of stoichiometric and chemical end-members for a mole fraction model: *American Mineralogist*, v. 76, no. 11-12, pp. 1910-1919.
- Grambling, J. A., and Dallmeyer, R. D., 1993, Tectonic evolution of Proterozoic rocks in the Cimarron Mountains, northern New Mexico, USA: *Journal of Metamorphic Geology*, v. 11, no. 5, pp. 739-755.

## Map

- Moench, R. H., Grambling, J. A., and Robertson, J. M., 1988, Geologic map of the Pecos Wilderness, Santa Fe, San Miguel, Mora, Rio Arriba, and Taos Counties, New Mexico: U.S. Geological Survey, Miscellaneous Field Studies Map MF-1921-B, scale 1:48,000.

## Edited volumes

- Callender, J. F., Grambling, J. A., and Wells, S. G., 1982, Albuquerque Country II: New Mexico Geological Society, Guidebook to 33rd Field Conference, 370 pp.
- Grambling, J. A., and Tewksbury, B. J., 1989, Proterozoic geology of the Southern Rocky Mountains: Geological Society of America, Special Paper 235, 175 pp.

## Abstracts

- Grambling, J. A., 1978, Aluminum silicate phase relations in the Truchas Peak region, northern New Mexico: Geological Society of America, Abstracts with Programs, v. 10, no. 7, p. 411.
- Grambling, J. A., 1979, Isothermal prograde metamorphism and fluid diffusion, Truchas Peaks region, northern New Mexico: Geological Society of America, Abstracts with Programs, v. 11, no. 7, p. 435.
- Grambling, J. A., 1979, The evolution of Precambrian metamorphism: American Geophysical Union (EOS), Transactions, v. 60, no. 46, p. 934.
- Grambling, J. A., 1981, Reversals in partitioning of Fe and Mg between coexisting staurolite and chloritoid: Geological Society of America, Abstracts with Programs, v. 13, no. 7, p. 463.
- Grambling, J. A., 1981, Precambrian geology of the Rio Mora area, north-central New Mexico; refolded isoclinal folds and the nature of the Vadito-Ortega contact: Geological Society of America, Abstracts with Programs, v. 13, no. 2, p. 58.
- Maggiore, P., and Grambling, J. A., 1981, Oscillatory zoning in birefringent garnets from metacarbonate, Emory cauldron, southwestern New Mexico: Geological Society of America, Abstracts with Programs, v. 13, no. 7, p. 501.
- Grambling, J. A., 1982, Mn andalusite in kyanite-sillimanite rocks from Rio Mora, New Mexico: Geological Society of America, Abstracts with Programs, v. 14, no. 7, p. 500.
- Grambling, J. A., and Williams, M. L., 1983, Univariant equilibrium in rocks with coexisting kyanite, andalusite, and sillimanite: Geological Society of America, Abstracts with Programs, v. 15, no. 6, p. 584.
- Grambling, J. A., Williams, M. L., and Coddington, D. B., 1983, Mn and Cr-rich marker horizons in multiply deformed Proterozoic metamorphic rocks, northern New Mexico: Geological Society of America, Abstracts with Programs, v. 15, no. 5, p. 424.
- Coddington, D. B., Grambling, J. A., and Williams, M. L., 1983, Geochemistry of minor element and rare-earth-rich horizons in Precambrian metamorphic rocks of the southern Sangre De Cristo Mountains, New Mexico: Geological Society of America, Abstracts with Programs, v. 15, no. 5, p. 423.
- Williams, M. L., and Grambling, J. A., 1984, Evidence for ideal solution of Fe, Mg, and Mn in garnet from northern New Mexico: Geological Society of America, Abstracts with Programs, v. 16, no. 6, p. 695.
- Grambling, J. A., 1984, Proterozoic isobaric surfaces and tectonism in northern and central New Mexico: Geological Society of America, Abstracts with Programs, v. 16, no. 4, p. 222.
- Grambling, J. A., 1984, Regional metamorphism in central and northern New Mexico, and implications for Proterozoic tectonics: Geological Society of America, Abstracts with Programs, v. 16, no. 6, p. 522-523.
- Williams, M. L., and Grambling, J. A., 1985, The effects of manganese and ferric iron on Fe-Mg mixing in garnet and biotite: Geological Society of America, Abstracts with Programs, v. 17, no. 7, p. 751.
- Grambling, J. A., 1985, Discrepancies between predicted and observed mineral reactions in staurolite schist, Pecos Baldy, New Mexico: Geological Society of America, Abstracts with Programs, v. 17, no. 7, p. 596.
- Ward, D. B., and Grambling, J. A., 1985, Dating a Proterozoic metamorphic event using Rb-Sr geochronology; an example from northern New Mexico: Geological Society of America, Abstracts with Programs, v. 17, no. 7, p. 744.
- Grambling, J. A., and Ward, D. B., 1986, Crustal thickening during Proterozoic metamorphism and deformation in northern New Mexico, U.S.A.: in Aldrich, M. J., Jr. and Laughlin, A. W. (eds.), Proceedings of the Sixth International Conference on Basement Tectonics, Santa Fe, New Mexico, September 16-20, 1985: International Basement Tectonics Assoc., Publication no. 6, pp. 198-199.
- Grambling, J. A., and Williams, Michael L., 1986, Correlation of Proterozoic stratigraphy across northern New Mexico; in Aldrich, M. J., Jr. and Laughlin, A. W. (eds.), Proceedings of the Sixth International Conference on Basement Tectonics, Santa Fe, New Mexico, September 16-20, 1985: International Basement Tectonics Assoc., Publication no. 6, p. 199.
- Grambling, J. A., 1986, Self-infiltration during metamorphism of structurally isolated pelitic schists: Geological Society of America, Abstracts with Programs, v. 18, no. 6, p. 619.
- Grambling, J. A., and Ward, D. B., 1987, Thrusting of the Pecos greenstone belt over younger supracrustal rocks, Rio Mora area, New Mexico: Geological Society of America, Abstracts with Programs, v. 19, no. 5, pp. 278-279.
- Grambling, J. A., and Williams, M. L., 1987, Manganese and the appearance of an "extra" AFM phase in low-variance, 500°C rocks at Pecos Baldy, N.M.: Geological Society of America, Abstracts with Programs, v. 19, no. 7, p. 681.
- Williams, M. L., and Grambling, J. A., 1987, Structural and metamorphic framework for Proterozoic mineral deposits in northern New Mexico: Geological Society of America, Abstracts with Programs, v. 19, no. 7, p. 891.
- Williams, M. L., and Grambling, J. A., 1987, Mid-crustal exposure of a Proterozoic orogenic belt: Geological Society of America, Abstracts with Programs, v. 19, no. 7, pp. 890-891.

- Grambling, J. A., Mawer, C. K., and Smith, R. F., 1988, Crustal extension as the cause of metamorphism in New Mexico: Geological Society of America, Abstracts with Programs, v. 20, no. 7, p. 99.
- Metcalf, R. V., and Grambling, J. A., 1988, Variations in the chemical potential of water between leucosomes and mesosomes in a layered anatectic migmatite: Geological Society of America, Abstracts with Programs, v. 20, no. 7, p. 161.
- Thompson, A., Grambling, J. A., and Mawer, C. K., 1989, Proterozoic tectonic assembly of southwestern North America; evidence from ductile shear zones in the Manzano Mountains, NM: Geological Society of America, Abstracts with Programs, v. 21, no. 6, p. 215.
- White, C. A., and Grambling, J. A., 1989, Nature of a major Proterozoic tectonic boundary in the Pecos Wilderness, northern New Mexico (abs.): New Mexico Geology, v. 11, no. 3, p. 64.
- Grambling, J. A., 1989, Proterozoic granulite facies metamorphism in northern New Mexico (abs.): New Mexico Geology, v. 11, no. 3, p. 64.
- Mawer, C. K., Grambling, J. A., and Vernon, R. H., 1989, Syntectonic nature of the 1.45 Ga Sandia batholith, New Mexico: Geological Society of America, Abstracts with Programs, v. 21, no. 6, p. 308.
- Grambling, J. A., and White, C. A., 1989, Fluid infiltration during metamorphism of pelites and quartzites: Geological Society of America, Abstracts with Programs, v. 21, no. 6, p. A84.
- Grambling, J. A., 1989, Internally consistent geothermometry and water barometry: Geological Society of America, Abstracts with Programs, v. 21, no. 6, p. A83-A84.
- Daniel, C. J., Thompson, A. G., and Grambling, J. A., 1990, P-T-t paths from aluminum silicate triple-point rocks of New Mexico: Geological Society of America, Abstracts with Programs, v. 22, no. 7, p. 30.
- Dallmeyer, R. D., Grambling, J. A., and Thompson, A. G., 1990, Age and character of Proterozoic polymetamorphism in New Mexico: Geological Society of America, Abstracts with Programs, v. 22, no. 7, p. 113.
- Pedrick, J. N., and Grambling, J. A., 1990, Testing the Gibbs method; calculating oxygen fugacity in metamorphic rocks: Geological Society of America, Abstracts with Programs, v. 22, no. 7, p. 124.
- Grambling, J. A., and Dallmeyer, R. D., 1990, Tectonothermal evolution of contrasting Proterozoic terranes in the Cimarron Mountains, north-central New Mexico: Geological Society of America, Abstracts with Programs, v. 22, no. 7, p. 262.
- Grambling, J. A., Thompson, A. G., and Dallmeyer, R. D., 1992, Middle Proterozoic thrusting in central New Mexico: Geological Society of America, Abstracts with Programs, v. 24, no. 7, p. 92.
- Daniel, C. G., Thompson, A. G., and Grambling, J. A., 1992, Decompressional metamorphic P-T paths from kyanite-sillimanite-andalusite-bearing rocks in north-central New Mexico: Geological Society of America, Abstracts with Programs, v. 24, no. 7, p. 264.
- Grambling, J. A., Bowring, S. A., and Dallmeyer, R. D., 1992, Middle Proterozoic cooling ages in the Cimarron Mountains, northern

## New Mexico Geological Society

### 1995 Fall Field Conference: Santa Fe Announcement and call for papers

The New Mexico Geological Society will convene in Santa Fe on September 27, 1995 for its annual three-day fall field conference. Santa Fe is in a dramatic and diverse geologic setting, in the borderland between the Rio Grande rift and the southern Sangre de Cristo Mountains. The conference will focus on the Proterozoic to present tectonic development of basins and highlands and their complex margins. Other topics will include mineral resources related to Tertiary volcanism, the environmental geology of the Santa Fe area, geophysical investigations of the Española Basin, Precambrian geology of the Sangre de Cristo and Sandia Mountains, Tertiary basin stratigraphy, Quaternary history of the Rio Chama and Rio Grande, paleontology, sedimentology, geologic hazards such as seismicity and collapsible soils, and industrial rock and mineral resources. The trip will not explore the geology of the Jemez Moun-

tains, as that will be the focus of the 1996 trip.

Day 1 will tour northward from Santa Fe into the southern Española Basin, along US-84 through Tesuque and Española to Abiquiú. Highlights will include the structure of the southern Española Basin, mountain-front neotectonics, geophysical investigations along the western rift margin, Santa Fe Group stratigraphy and paleontology, the Abiquiú Formation type section, Quaternary history of the lower Rio Chama, and environmental geology.

Day 2 will skirt the southern end of the Sangre de Cristo Mountains along I-25 to Las Vegas. Highlights will include the southern Picuris-Pecos fault, Early Proterozoic mylonites and plutons of the southern Sangre de Cristo Mountains, Glorieta Mesa, Laramide structures, the Mesozoic section in the Las Vegas sub-basin, and environmental problems along the Pecos River.

Day 3 focuses on the transition

zone between the Española Basin and the Albuquerque Basin, south of Santa Fe. Highlights will include Tertiary stratigraphy and gold mineralization in the Ortiz Mountains, deformation and sedimentation associated with Tertiary intrusions, early rift sedimentation, the northern Tijeras fault zone, the turquoise mines of Cerrillos, and structures of the Hagan Basin. We also plan to visit the studio of famed Native American sculptor Allan Houser.

The guidebook editors are now soliciting papers and minipapers for the field conference guidebook. Guidebooks generally cover a wide range of topics in earth science and cultural history. Guidebook papers will be due in **February 1995**. If you plan to contribute, or know of some work that should be included, please contact Paul Bauer, NM Bureau of Mines and Mineral Resources, Socorro, NM 87801; phone (505) 835-5106; fax (505) 835-6333; email: [bauer@jupiter.nmt.edu](mailto:bauer@jupiter.nmt.edu).

New Mexico; U-Pb and  $^{40}\text{Ar}/^{39}\text{Ar}$  constraints: Geological Society of America, Abstracts with Programs, v. 24, no. 7, p. 92.

White, C. A., Grambling, J. A., and Yapp, C. J., 1992, Mineralogic, petrologic and stable-isotopic evidence for fluid infiltration during metamorphism of pelitic schist and quartzite, Rio Mora, New Mexico: Geological Society of America, Abstracts with Programs, v. 24, no. 7, p. 250.

Andronikos, C. L., Daniel, C. G., and Grambling, J. A., 1993, Decompressional metamorphism from the contact aureole of the middle Proterozoic Sandia Granite, central New Mexico: Geological Society of America, Abstracts with Programs, v. 25, no. 6, p. A48.

#### Miscellaneous

##### (Road logs, minipapers, etc.)

Grambling, J. A., Hawley, J. W., and Love, D. W., 1982, Road-log segment I-D; Rio Grande Estates to Cañon del Trigo via Hubbell Bench: New Mexico Geological Society, Guidebook to 33rd Field Conference, pp. 30-36.

Grambling, J. A., 1984, The Precambrian rocks near Pilar [minipaper]: New Mexico Geological Society, Guidebook to 35th Field Conference, pp. 305-306.

Grambling, J. A., 1990, Proterozoic metamorphic rocks near Comanche Point, New Mexico [minipaper]: New Mexico Geological Society, Guidebook to 41st Field Conference, pp. 20-22.

Bauer, P. W., Pillmore, C. L., Mawer, C. K., Hayden S., Lucas, S. G., Meyer, J., Czamanske, G. K., Grambling, J. A., Walker, J., Barker, J. M., Cather, S. M., and Young, J. N., 1990, First-day road log, from Red River

to Questa, Costilla, Valle Vida, Cimarron, and Philmont: New Mexico Geological Society, Guidebook to 41st Field Conference, pp. 1-5.

Bauer, P. W., Pillmore, C. L., Mawer, C. K., Colpitts, R. M., Jr., Hayden, S., Lucas, S. G., Grambling, J. A., Saye, J. A., III, Barker, J. M., 1990, Second-day road log, from Philmont to Cimarron, Eagle Nest, Elizabethtown, and Angel Fire: New Mexico Geological Society, Guidebook to 41st Field Conference, pp. 45-49.

Thompson, A. G., Grambling, J. A., and Dallmeyer, R. D., 1991, Proterozoic tectonic history of the Manzano Mountains, central New Mexico; in Julian, B., and Zidek, J. (eds.), Field guide to geologic excursions in New Mexico and adjacent areas of Texas and Colorado: New Mexico Bureau of Mines and Mineral Resources, Bulletin 137, pp. 71-77.

#### Graduate-student theses and dissertations

Maggiore, Peter, 1981, Deformation and metamorphism on the floor of a major ash-flow tuff cauldron, the Emory Cauldron, Grant and Sierra Counties: MS thesis, Albuquerque, University of New Mexico, 133 pp.

Codding, David, 1983, Precambrian geology of the Rio Mora area, New Mexico: MS thesis, Albuquerque, University of New Mexico, 128 pp.

Trumbull, Robert B., 1984, The petrology of flecked gneisses in the northern Wet Mountains, Fremont County, Colorado: MS thesis, Albuquerque, University of New Mexico, 93 pp.

Weber, Jo Ann T., 1985, Oscillatory compositional zoning in grossular-andradite garnet: MS thesis, Albuquerque, University of New Mexico, 106 pp.

Plummer, David A., 1986, The petrology and structure of Proterozoic rocks northeast of Salida, Colorado: MS thesis, Albuquerque, University of New Mexico, 88 pp.

Brothers, Sara C., 1987, Theoretical phase relations in the assemblage: rutile, ilmenite (hematite), aluminum silicate, quartz (RISQ); implications for geothermometry and oxygen barometry: MS thesis, Albuquerque, University of New Mexico, 77 pp.

Williams, Michael L., 1987, Stratigraphic, structural and metamorphic relationships in Proterozoic rocks from northern New Mexico: PhD dissertation, Albuquerque, University of New Mexico, 138 pp.

Smith, Roger F., 1988, Structural and metamorphic evolution of Proterozoic rocks in the northern Taos Range, Taos County, New Mexico: MS thesis, Albuquerque, University of New Mexico, 176 pp.

Metcalf, Rodney V., 1990, Petrogenesis of Proterozoic migmatites and associated plutonic rocks in the central Santa Fe Range, New Mexico: PhD dissertation, Albuquerque, University of New Mexico, 194 pp.

Daniel, Christopher G., 1992, Metamorphic P-T paths from kyanite-sillimanite-andalusite rocks of north-central New Mexico: MS thesis, Albuquerque, University of New Mexico, 69 pp.

Shastri, Laurel L., 1993, Proterozoic geology of the Los Pinos Mountains, central New Mexico: timing of plutonism, deformation, and metamorphism: MS thesis, Albuquerque, University of New Mexico, 82 pp. □