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Roadlog References

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ROAD-LOG REFERENCES

Aldrich, M. J., Jr. and Laughlin, A. W., 1984, A model for the tectonic development of the southeastern Colorado Plateau boundary: Journal of Geophysical Research, v. 89, p. 10207-10218.

Aldrich, M. J., Jr., Ander, M. E. and Laughlin, A. W., 1981, Geological and geophysical signatures of the Jemez lineament: a reactivated Precambrian structure: International Basement Tectonics Association Publication no. 4, p. 77-85.

Anderson, O. J., 1987, Geology and coal resources of the Atarque Lake 1:50,000 quadrangle (NW quadrant of Fence Lake 1:100,000): New Mexico Bureau of Mines and Mineral Resources, GM-61, 2 sheets, scale 1:50,000.

Anderson, O. J., 1994, Geologic map of the Zuni Salt Lake quadrangle, Catron County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 405, 1:24,000.

Anderson, O. J., Chamberlin, R. M. and Roybal, G. H., 1987, Road log from Fence Lake, New Mexico to Springerville, Arizona: New Mexico Bureau of Mines and Mineral Resources, Bulletin 121, p. 26–30.

Armstrong, R. M. and Chamberlin, R. M., 1994, Preliminary geologic interpretation of the ARMA Baca Basin seismic reflection profile, northeastern Catron County, New Mexico: New Mexico Geological Society, Guidebook 45.

Austin, G. S. and Barker, J. M., 1993, Production and marketing of perlite of the western United States: 29th Forum on the Geology of Industrial Minerals: Division of Mines and Geology, California Department of Conservation, Long Beach, California, April 25–30, 1993, in press.

Bachman, G. O. and Mehnert, H. H., 1978, New K-Ar dates and late Pliocene to Holocene geomorphic history of the central Rio Grande region, New Mexico: Geological Society of America Bulletin, v. 89, p. 283–292.

Baldridge, W. S., Perry, F. V., Nealey, L. D., Laughlin, A. W. and Wohletz, K. H., 1989, Field guide to excursion 8A: Oligocene to Holocene magmatism and extensional tectonics, central Rio Grande rift and southeastern Colorado Plateau, New Mexico and Arizona: New Mexico Bureau of Mines and Mineral Resources, Memoir 46, p. 202–230.

Baldridge, W. S., Perry, F. V., Vaniman, D. T., Nealy, L. D., Leavy, B. D., Laughlin, A. W., Kyle, P., Bartor, Y., Steinitz, G. and Gladney, E. S., 1989, Magmatism associated with lithospheric extension; middle to late Cenozoic magmatism of the southeastern Colorado Plateau and central Rio Grande rift, New Mexico and Arizona: New Mexico Bureau of Mines and Mineral Resources, Memoir 46, p. 187.

Barker, C. E., 1989, Temperature and time in the thermal maturation of sedimentary organic matter; *in* Naeser, N. D. and McCulloh, T. H., eds., Thermal history of sedimentary basins–methods and case histories: Springer-Verlag, New York, p. 71–98.

Bikerman, M., 1972, New K-Ar ages on volcanic rocks from Catron and Grant Counties, New Mexico: Isochron/West no. 3, p. 9-12.

Black, B. A., 1964, The geology of the northern and eastern parts of the Ladron Mountains, Socorro County, New Mexico [M.S. thesis]: Albuquerque, University of New Mexico, 117 p.

Bobrow, D. J., Kyle, P. R. and Osburn, G. R., 1983, Miocene rhyolitic volcanism in the Socorro area of New Mexico: New Mexico Geological Society, Guidebook 34, p. 211–226.

Bornhorst, T. J., 1976, Volcanic geology of the Crosby Mountains and vicinity, Catron County, New Mexico [M.S. thesis]: Albuquerque, University of New Mexico, 113 p.

Bove, D. J., 1990, Preliminary geologic map of the Eagle Peak quadrangle, Catron County, New Mexico: U.S. Geological Survey, Open-file Report 90-0546, scale 1:24,000.

Bowie, M. R. and McLemore, V. T., 1987, Clay mineralogy of selected sedimentary and volcanic rocks, Socorro County, New Mexico; *in* McLemore, V. T. and Bowie, M. R., compilers, Guidebook to the Socorro area, New Mexico: New Mexico Bureau of Mines and Mineral Resources, p. 46–54.

Bradbury, J. P. 1966, Pleistocene-Recent geologic history of Zuni Salt Lake: New Mexico Geological Society, Guidebook 17, p. 119.

Broadhead, R. F., 1994, Geology and petroleum source rocks in the Hunt No. 1-16 State well: New Mexico Geological Society, Guidebook 45.

Brouillard, L. A., 1984, Geology of the northeastern Gallinas Mountains, Socorro County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 219, 172 p.

Brown, L. D., Chapin, C. E., Sanford, A. R., et al., 1980, Deep structure of the Rio Grande rift from seismic reflection profiling: Journal of Geophysical Research, v. 85, p. 4773–4800.

Bryan, K., 1926, Ground water reconnaissance in Socorro County, New Mexico: New Mexico State Engineer, 7th Biennial Report, p. 81–87.

Bucknam, R. C. and Anderson, R. E., 1979, Estimation of fault scarp ages from a scarp-height—slope-angle relationship: Geology, v. 7, p. 11-14.

Bull, W. B, 1991, Geomorphological responses to climatic change: Oxford University Press, New York, 326 p.

Campbell, F., 1989, Geology and coal resources of the Fence Lake 1:50,000 quadrangle: New Mexico Bureau of Mines and Mineral Resources, Geologic Map GM-62.

Campbell, F., and Roybal, G., 1984, Geology and coal resources of the Fence Lake quadrangle, Catron and Cibola Counties, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 207, 37 p.

Carslaw, H. S. and Jaeger, J. C., 1959, Conduction of heat in solids: Oxford University Press, New York, 510 p.

Cas, R. A. F. and Wright, J. V., 1987, Volcanic successions—modern and ancient: London, Allen and Unwin Ltd., 528 p.

Cather, S. M., 1980, Petrology, diagenesis and genetic stratigraphy of the Eocene Baca Formation, Alamo Navajo Reservation and vicinity, Socorro County, New Mexico [M.A. thesis]: Austin, The University of Texas at Austin, 243 p.

Cather, S. M., 1989, Post-Laramide volcanic and tectonic transition in west-central New Mexico: New Mexico Geological Society, Guidebook 40, p. 91–97.

Cather, S. M. and Chapin, C. E., 1989, Day 2: Field guide to upper Eocene and lower Oligocene volcaniclastic rocks of the northern Mogollon-Datil volcanic field: southern Rocky Mountain region: New Mexico Bureau of Mines and Mineral Resources, Memoir 46, p. 61–68.

Cather, S. M. and Johnson, B. D., 1984, Eocene tectonics and depositional setting of west-central New Mexico and eastern Arizona: New Mexico Bureau of Mines and Mineral Resources, Circular 192, 33 p.

Cather, S. M. and McIntosh, W. C., 1994, The Plio-Pleistocene Quemado Formation of west-central New Mexico: New Mexico Geological Society, Guidebook 45.

Cather, S. M., Chamberlin, R. M. and Ratté, J. C., 1994, Tertiary stratigraphy and nomenclature for western New Mexico and eastern Arizona: New Mexico Geological Society, Guidebook 45.

Cather, S. M., McIntosh, W. C., and Chapin, C. E., 1987, Stratigraphy, age and rates of deposition of the Datil Group (Upper Eocene-lower Oligocene), west-central New Mexico: New Mexico Geology, v. 9, no. 3, p. 50–54.

Cather, S. M., Chamberlin, R. M., Chapin, C. E. and McIntosh, W. C., in press, Stratigraphic consequences of episodic extension in the Lemitar Mountains, central Rio Grande rift: Geological Society of America Special Paper 291.

Chamberlin, R. M., 1980, Cenozoic stratigraphy and structure of the Socorro Peak volcanic center, central New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 118, 532 p.

Chamberlin, R. M., 1981a, Cenozoic stratigraphy and structure of the Socorro Peak volcanic center, central New Mexico: a summary: New Mexico Geology, v. 3, p. 22–24.

Chamberlin, R. M., 1981b, Uranium potential of the Datil Mountains-Pietown area, Catron County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 138, 51 p.

Chamberlin, R. M., 1989, Criteria for the recognition of a pre-Eocene lateritic weathering profile, west-central New Mexico: New Mexico Geological Society, Guidebook 40, p. 34–35.

Chamberlin, R. M., 1991, A micro-indentation-extrusion tectonic model for the Laramide Zuni uplift, west-central New Mexico, USA: Geological Society of America Abstracts with Programs, v. 23, no. 5, p. A482.

Chamberlin, R. M., 1993, Neogene sinistral transtension along the Hickman fault zone, southeastern Colorado Plateau, New Mexico: Geological Society of America Abstracts with Programs, v. 25, no. 5, p. 19.

Chamberlin, R. M. and Anderson, O. J., 1989a, The Laramide Zuni uplift, southeastern Colorado Plateau: a microcosm of Eurasian-style indentation extrusion tectonics?: New Mexico Geological Society, Guidebook 40, p. 81–90.

Chamberlin, R. M. and Anderson, O. J., 1989b, The southern margin of the Colorado Plateau: a ragged edge bounded by Neogene domains of crustal extension: New Mexico Geological Society, Guidebook 40, p. 37-38.

Chamberlin, R. M. and Harris, J. S., 1994, Upper Eocene and Oligocene volcaniclastic sedimentary stratigraphy of the Quemado-Escondido Mountain area, Catron County, New Mexico: New Mexico Geological Society, Guidebook 45.

Chamberlin, R. M. and Osburn, G. R., 1986, Tectonic framework, character and evolution of upper crustal extensional domains in the Socorro area of the Rio Grande rift, New Mexico: Arizona Geological Society Digest, v. 16, p. 464.

Chamberlin, R. M., Barker, J. M. and Jenkins, D. A., 1994a, Economic geology of perlite production in New Mexico: Society for Mining, Metallurgy, and Exploration, Inc., Preprint No. 94–225, 24 p.

Chamberlin, R. M., Cather, S. M., Anderson, O. J. and Jones, G. E., 1994b, Reconnaissance geologic map of the Quemado 30 x 60' quadrangle, Catron County, New Mexico: New Mexico Bureau of Mines and Mineral Resources Open-file Report 406, scale, 1:100,000.

Chapin, C. E., 1971, The Rio Grande rift, Part I: Modifications and additions: New Mexico Geological Society, Guidebook 22, p. 191–201.

Chapin, C. E., 1983, An overview of Laramide wrench faulting in the southern Rocky Mountains with emphasis on petroleum exploration; *in* Lowell, J. D., ed., Rocky Mountain forelands and uplifts: Rocky Mountain Association of Geologists, p. 169–180.

Chapin, C. E., 1989, Volcanism along the Socorro accommodation zone, Rio Grande rift, New Mexico: Southern Rocky Mountain Region: New Mexico Bureau of Mines and Mineral Resources, Memoir 46, p. 46–57.

Chapin, C. E. and Cather, S. M., 1981, Eocene tectonics and sedimentation in the Colorado Plateau–Rocky Mountains area: Arizona Geological Society Digest, v. 14, p. 173–198.

Chapin, C. E. and Cather, S. M., in press, Tectonic setting of the axial basins of the northern and central Rio Grande rift: Geological Society of America Special Paper 291.

Chapin, C. E. and Lindley, J. I., 1986, Potassium metasomatism of igneous and sedimentary rocks in detachment terranes and other sedimentary basins: economic implications: Arizona Geological Society Digest, v. 16, p. 118–126.

Chapin, C. E., Chamberlin, R. M., Osburn, G. R., White, D. W. and Sanford, A. R., 1978a, Exploration framework of the Socorro geothermal area: New Mexico Geological Society, Special Publication no. 7, p. 115–129.

Chapin, C. E., Jahns, R. H., Chamberlin, R. M. and Osburn, G. R., 1978b, First day road log from Socorro to Truth or Consequences via Magdalena and Winston: New Mexico Geological Society, Special Publication no. 7, p. 1–31.

Chapin, C. E., Osburn, G. R., Hook, S. C., Massingill, G. L. and Frost, S. J., 1979, Coal, uranium, oil and gas potential of the Riley-Puerticito area, Socorro County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 103, 33 p.

Chronic, H., 1952, Molluscan fauna from the Permian Kaibab Formation, Walnut Canyon, Arizona: Geological Society of America Bulletin, v. 63, p. 95–166.

Cleaveland, A. M., 1941, No life for a lady: Boston, Houghton Mifflin Co., 356 p.

Clisby, K. H. and Sears, P. B., 1956, San Agustin Plains-Pleistocene climatic changes: Science, v. 124, p. 537–538.

Coffin, G. C., 1981, Geology of the northwestern Gallinas Mountains, Socorro County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 159, 214 p.

Colpitts, R. M., Jr., 1989, Permian reference section for southeastern Zuni Mountains, Cibola County, New Mexico: New Mexico Geological Society, Guidebook 40, p. 177–180.

Condit, C. D., Crumpler, L. S. and Aubele, J. C., 1989, Fourth-day field trip: Springerville volcanic field: New Mexico Bureau of Mines and Mineral Resources, Memoir 46, p. 33–38.

Crews, S. G., 1990, Structure, syntectonic sedimentation, and stratigraphy of asymmetrical non-marine basins [PhD thesis]: Laramie, University of Wyoming, 196 p.

Crews, S. G., 1994, Tectonic control of synrift sedimentation patterns, Reserve graben, southwestern New Mexico: New Mexico Geological Society, Guidebook 45.

Crumpler, L. S., Aubele, J. C. and Condit, C. D., 1994, Volcanoes and neotectonic characteristics of the Springerville volcanic field, Arizona: New Mexico Geological Society, Guidebook 45.

Dane, C. H. and Bachman, G. O., 1965, Geologic map of New Mexico: U.S. Geological Survey, scale 1:500,000.

Davis, G. H., 1978, Monocline fold pattern of the Colorado Plateau: Geological Society of America, Memoir 151, p. 215–233.

Decker, P. L., 1990, Style and mechanics of liquefaction-related deformation, lower Absaroka Volcanic Supergroup (Eocene), Wyoming: Geological Society of America, Special Paper 240, 71 p.

Dethier, D. P. and Demsey, K. A., 1984, Erosional history and soil development on Quaternary surfaces, northwest Española Basin, New Mexico: New Mexico Geological Society, Guidebook 35, p. 227-234.

Dethier, D. P., Aldrich, M. J., Jr. and Shafiqullah, M., 1986, New K-Ar ages for Miocene volcanic rocks from the northeastern Jemez Mountains and Tejana Mesa, New Mexico: Isochron/West, no. 57, p. 12–14.

Dethier, D. P., Harrington, C. D. and Aldrich, M. J., 1988, Late Cenozoic rates of erosion in the western Española Basin, New Mexico: Evidence from geological dating of erosion surfaces: Geological Society of America Bulletin, v. 100, p. 928-937.

Dick, H. W., 1965, Bat Cave: School of American Research, Monograph No. 27, Santa Fe, 114 p.

Dunbar, C. O. and Condra, G. E., 1932, Brachiopoda of the Pennsylvanian System in Nebraska: Nebraska Geological Survey, Bulletin 5, 2nd series, 377 p.

Dunbar, N. W., Chapin, C. E., Ennis, D. J. and Campbell, A. R., 1994, Trace element and mineralogical alteration associated with moderate and advanced degrees of K-metasomatism in a rift basin at Socorro, New Mexico: New Mexico Geological Society, Guidebook 45.

Eggleston, R. E. and Reiter, M., 1984, Terrestrial heat-flow estimates from petroleum bottom-hole temperature data in the Colorado Plateau and the eastern Basin and Range Province: Geological Society of America Bulletin, v. 95, p. 1027–1033.

Eggleston, T. L., Osburn, G. R. and Chapin, C. E., 1983, Third day road log from Socorro to San Antonio, Nogal Canyon, Chupadera Mountains, Luis Lopez manganese district and the MCA mine: New Mexico Geological Society, Guidebook 34, p. 61–81.

Elston, W. E., 1978, Mid-Tertiary cauldrons and their relationship to mineral resources, southwestern New Mexico: a brief review: New Mexico Geological Society, Special Publication no. 7, p. 107–113.

Elston, W. E., 1984, Mid-Tertiary ash-flow tuff cauldrons, southwestern New Mexico: Journal of Geophysical Research, v. 89, p. 8733-8750.

Elston, W. E., 1989, Overview of the Mogollon-Datil volcanic field: Southern Rocky Mountain region: New Mexico Bureau of Mines and Mineral Resources, Memoir 46, p. 43–46.

Elston, W. E. and Damon, P. E., 1970, Significance of 4 new K-Ar dates from the Mogollon Plateau volcanic province southwestern New Mexico; *in* Annual Progress Report COO-689-130, Contract AT (11-1)-689, U.S. Atomic Energy Commission: Geochronological Laboratories, University of Arizona, Tucson, AVI-1-AVI-9.

Elston, W. E., Rhodes, R. C., Coney, J. P. and Deal, E. J., 1976, Progress report on the Mogollon Plateau volcanic province, southwestern New Mexico: New Mexico Geological Society, Special Publication no. 5, p. 3-28.

Eveleth, R. W., 1983, Gustav Billing, the Kelly mine, and the great smelter at Park City, Socorro County, New Mexico: New Mexico Geological Society, Guidebook 34, p. 89–95.

Ferguson, C. A., 1991, Stratigraphic and structural studies in the Mt. Withington caldera, Grassy Lookout quadrangle, Socorro County, New Mexico: New Mexico Geology, v. 13, p. 50–54.

Fisher, R. V. and Schmincke, H.-U., 1984, Pyroclastic rocks: New York, Springer-Verlag, 472 p.

Fisher, R. V. and Smith, G. A., 1991, Volcanism, tectonics and sedimentation; *in* Sedimentation in volcanic settings: SEPM Special Publication no. 45, p. 1–5.

Fitzsimmons, J. P., 1959, Structure and geomorphology of west-central New Mexico: New Mexico Geological Society, Guidebook 10, p. 112–116.

Foreman, F., 1956, San Agustin Plains—the sediments: Science, v. 124, p. 539.

Foreman, F., Clisby, K. H. and Sears, P. B., 1959, Plio-Pleistocene sediments and climates of the San Agustin Plains, New Mexico: New Mexico Geological Society, Guidebook 10, p. 117–120.

Foster, R. W., 1957, Stratigraphy of west-central New Mexico: Geology of Southwestern San Juan Basin, Four Corners Geological Society Guidebook, Second Field Conference, p. 62–72.

Foster, R. W., 1964, Stratigraphy and petroleum possibilities of Catron County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Bulletin 85, 55 p.

Futa, K. and Ratté, J. C., 1989, Petrogenetic implications of Rb-Sr and Sm-Nd isotopes related to post-caldera volcanism in the western Mogollon-Datil volcanic field, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Bulletin 131, 100 p.

Gabin, V. L. and Lesperance, L. E., 1976, New Mexico climatological data, precipitation, temperature, evaporation, and wind, monthly and annual means, 1850–1975: W. K. Summers and Associates.

Gallagher, S., 1994, Landslide repairs on US-180 between mileposts 13 and 19, near Luna, Catron County, New Mexico: New Mexico Geological Society, Guidebook 45.

Garmezy, L., 1990, Strike-slip deformation along the southeastern margin of the Colorado Plateau: Geological Society of America Abstracts with Programs, v. 22, p. A-276.

Gile, L. H., Hawley, J. W. and Grossman, R. B., 1981, Soils and geomorphology in the Basin and Range area of southern New Mexico: New Mexico Bureau of Mines and Mineral Resources, Memoir 39, 222 p.

Gile, L. H., Peterson, F. F. and Grossman, R. B., 1966, Morphological and genetic sequences of carbonate accumulation in desert soils: Soil Science, v. 101, p. 347-360.

Godson, R. H., 1981, Digital terrain map of the United States: U.S. Geological Survey, Miscellaneous Investigations Map I-1318.

Guilinger, D. R., 1982, Geology and uranium potential of the Tejana Mesa-Hubbell Draw area, Catron County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 176, 137 p.

Harris, L. G., 1984, New Mexico water rights: New Mexico Water Resources Research Institute, Las Cruces, Miscellaneous Report no. 15, 53 p.

Harrison, R. W., 1980, Geology of the northeastern Datil Mountains, Socorro and Catron Counties, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 136, 146 p.

Hawley, J. W., compiler, 1978, Guidebook to the Rio Grande rift in New Mexico and Colorado: New Mexico Bureau of Mines and Mineral Resources, Circular 163, 154 p.

Hawley, J. W., 1993, Some principles of calcisol development and soil-geomorphic relationships in southeastern New Mexico: New Mexico Geological Society, Guidebook 44, p. 4–5.

Hoffer, J. M. and Corbitt, L. L., 1989, A preliminary note on some unusual explosion-collapse craters, Quemado basalt field, Catron County, New Mexico: New Mexico Geological Society, Guidebook 40, p. 157–158.

Hook, S. C., Molenaar, C. M. and Cobban, W. A., 1983, Stratigraphy and revision of nomenclature of Upper Cenomanian to Turonian (Upper Cretaceous) rocks of west-central New Mexico: New Mexico Bureau of Mines and Mineral Resources, Circular 185, p. 7–28.

Hough, W., 1907, Antiquities of the upper Gila and Salt River valleys in Arizona and New Mexico: Smithsonian Institution, Bureau of American Ethnology, Bulletin 35, p. 70–76.

Houser, B. B., 1994, Geology of the late Cenozoic Alma Basin, New Mexico and Arizona: New Mexico Geological Society, Guidebook 45.

Hunt, J. M. and Hennet, R. J-C., 1992, Modeling petroleum generation in sedimentary basins; *in* Whelan, J. K. and Farrington, J. W., eds., Organic matter: productivity, accumulation, and preservation in recent and ancient sediments: Columbia University Press, New York, p. 20–52.

Huppert, H. E. and Sparks, R. S., 1989, Chilled margins in igneous rocks: Earth and Planetary Science Letters, v. 92, p. 397–405.

Hurt, W. R., Jr. and McKnight, D., 1949, Archaeology of the San Agustin Plains, a preliminary report: American Antiquity, v. 14, p. 172–194.

Jaeger, J. C., 1964, Thermal effects of intrusions: Reviews of Geophysics, v. 2, p. 443–466.

Jaeger, J. C., 1968, Cooling and solidification of igneous rocks; *in* Hess, H. H. and Poldervaart, A., eds., Basalts, the Poldervaart treatise on rocks of basaltic composition: John Wiley and Sons, New York, v. 2, p. 503–536.

Jenny, H., 1980, The soil resource-origin and behavior: Springer-Verlag, New York, 377 p.

Johansen, S. J., 1986, Provenance of the Mesaverde Group of west-central New Mexico [Ph.D. dissertation]: Austin, University of Texas, 309 p.

Johnson, B. D., 1978, Genetic stratigraphy and provenance of the Baca Formation, New Mexico and the Eagar Formation, Arizona [M.A. thesis]: Austin, University of Texas, 150 p.

Johnson, P. S., 1992, A paleohydrologic and paleoclimatic reconstruction for the San Agustin Basin, New Mexico, based on Oxygen-18 variation in ostracod shells {Ph.D. dissertation]: Socorro, New Mexico Institute of Technology.

Jones, D. P., 1980, Volcanic geology of the Alegres Mountain area, Catron County, New Mexico [M.S. thesis]: Albuquerque, University of New Mexico, 76 p.

Keller, G. R. and Cordell, L., 1983, Bouguer gravity map of New Mexico: National Geophysical Data Center, NOAA, Washington, D.C., scale 1:500,000.

Kelley, S. A., Chapin, C. E. and Corrigan, J., 1992, Late Mesozoic to Cenozoic cooling histories of the flanks of the northern and central Rio Grande rift, Colorado and New Mexico: New Mexico Bureau of Mines and Mineral Resources, Bulletin 145, 39 p.

Kelley, V. C., 1957, Tectonics of the San Juan Basin and surrounding area: Four Corners Geological Society, Second Field Conference Guidebook, p. 44–52.

Kopacz, M. A. Zarrow, L. and Garmezy, L., 1989, The Mogollon subvolcanic frontier play: Abstracts, Volume 2 of 3, 28th International Geological Congress, Washington, D.C., p. 2-213.

Kottlowski, F. E., 1959, Pennsylvanian rocks on the northeast edge of the Datil Plateau: New Mexico Geological Society, Guidebook 10, p. 57–62.

Kottlowski, F. E., 1960, Summary of Pennsylvanian sections in southwestern New Mexico and southeastern Arizona: New Mexico Bureau of Mines and Mineral Resources, Bulletin 66, 187 p.

Kues, B. S. and Lucas, S. G., 1989, Stratigraphy and paleontology of a San Andres Formation (Permian, Leonardian) outlier, Zuni Indian Reservation, New Mexico: New Mexico Geological Society, Guidebook 40, p. 167–176.

Lachenbruch, A. H., Sass, J. H., Munroe, R. J. and Moses, T. H., Jr., 1976, Geothermal setting and simple heat conduction models for the Long Valley caldera: Journal of Geophysical Research, v. 81, p. 769–784.

Laughlin, A. W., Aldrich, M. J. and Vaniman, D. T., 1983, Tectonic implications of mid Tertiary dikes in west-central New Mexico: Geology, v. 11, p. 45–48.

Laughlin, A. W., Damon, P. E. and Shafiqullah, M., 1980, New K-Ar dates from the Springerville volcanic field, central Jemez zone, Apache County, Arizona: Isochron/West, no. 29: 3–4.

Laughlin, A. W., Brookins, D. G., Damon, P. E. and Shafiqullah, M., 1979, Late Cenozoic volcanism of the central Jemez zone, Arizona-New Mexico: Isochron/West, no. 25, p. 5–8.

Leinau, P. J., 1988, Direct-use developments in the United States: Oregon Institute of Technology Geo-heat center, Quarterly Bulletin, v. 11, p. 1–4.

Leopold, A., 1966, A Sand county almanac: Oxford University Press, 295 p.

Lipman, P. W., 1984, The roots of ash flow calderas in western North America: windows into the tops of granitic batholiths: Journal of Geophysical Research, v. 89, p. 8801–8841.

Lipman, P. W., 1992, Magmatism in the Cordilleran United States; progress and problems; *in* Burchfiel, B. C., Lipman, P. W. and Zoback, M. L., eds., The Cordilleran Orogen: conterminous U.S.: Geological Society of America, The Geology of North America, v. G-3, p. 481–514.

Lopez, D. A., 1975, Geology of the Datil area, Catron County, New Mexico [M.S. thesis]: Albuquerque, University of New Mexico, 72 p.

Lopez, D. A. and Bornhorst, T. J., 1979, Geologic map of the Datil area, Catron County, New Mexico: U.S. Geological Survey, Miscellaneous Geologic Investigations Map I-1098, scale 1:50,000.

Love, D. W., 1989, Bidahochi Formation: an interpretive summary: New Mexico Geological Society, Guidebook 40, p. 273–280.

Lucas, S. G. and Anderson, O. J., 1994, Miocene Proboscidean from the Fence Lake Formation, Catron County, New Mexico: New Mexico Geological Society, Guidebook 45.

Lucas, S. G. and Hayden, S. N., 1989, Triassic stratigraphy west-central New Mexico: New Mexico Geological Society, Guidebook 40, p. 191-211.

Luna Ward—The Church of Jesus Christ of Latter-day Saints, 1983, Do You Remember Luna? 100 Years of Pioneer History: Albuquerque, New Mexico, Adobe Press, 301 p.

Machette, M. N., 1982, Quaternary and Pliocene faults in the La Jencia and southern part of the Albuquerque-Belen basins, New Mexico: evidence of fault history from fault scarp morphology and Quaternary geology: New Mexico Geological Society, Guidebook 33, p. 161–169.

Machette, M. N., 1986, History of Quaternary offset and paleoseismicity along the La Jencia fault, central Rio Grande rift, New Mexico: Seismological Society of America Bulletin, v. 76, p. 259-272.

Machette, M. N., 1988, Quaternary movement along the La Jencia fault, central New Mexico: U.S. Geological Survey, Professional Paper 1440, 82 p.

Machette, M. N. and McGimsey, R. G., 1982, Quaternary and Pliocene faults in the Socorro and western part of the Fort Sumner 1° x 2° quadrangles, New Mexico: U.S. Geological Survey, Miscellaneous Field Studies Map MF-1465A.

Mack, G. H., Nightengale, A. L., Seager, W. R. and Clemons, R. E., 1994, The Oligocene Goodsight-Cedar Hills half graben near Las Cruces and its implications to the evolution of the Mogollon-Datil volcanic field and to the southern Rio Grande rift: New Mexico Geological Society, Guidebook 45.

Markgraf, V., Bradbury, J. P., Forester, R. M., Singh, G. and Sternberg, R. S., 1984, San Agustin Plains, New Mexico: age and paleoenvironmental potential reassessed: Quaternary Research, v. 22, p. 336–343.

Markgraf, V., Bradbury, J. P., Forester, R. M., McCoy, W., Singh, G. and Sternberg, R., 1983, Paleoenvironmental reassessment of the 1.6-million-year-old record from San Agustin basin, New Mexico: New Mexico Geological Society, Guidebook 34, p. 291-297.

Martin, P. S., 1959, Digging into history: Chicago Natural History Museum, 157 p.

Marvin, R. F., Naeser, C. W., Bikerman, M., Mehnert, H. H. and Ratté, J. C., 1987, Isotopic ages of post-Paleocene igneous rocks within and bordering the Clifton 1° x 2° quadrangle, Arizona–New Mexico: New Mexico Bureau of Mines and Mineral Resources, Bulletin 118, 63 p.

Massingill, G. L., 1979, Geology of the Riley-Puerticito area, southeast margin of the Colorado Plateau, Socorro County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 107, 316 p.

Maxwell, C. H., 1976, Stratigraphy and structure of the Acoma region, New Mexico: New Mexico Geological Society, Special Publication no. 6, p. 95–101.

McDonald, E. V. and Busacca, A. J., 1990, Interaction between aggrading geomorphic surfaces and the formation of a late Pleistocene paleosol in the Palouse loess of eastern Washington state: Geomorphology, v. 3, p. 449–470.

McGrath, D. G. and Hawley, J. W., 1987, Geomorphic evolution and soil geomorphic relationships in the Socorro area, central New Mexico; *in* McLemore, V. T. and Bowie, M. R., compilers, Guidebook to the Socorro area, New Mexico: New Mexico Bureau of Mines and Mineral Resources, p. 55–67.

McIntosh, W. C. and Cather, S. M., 1994, $^{40}Ar/^{39}Ar$ geochronology of basaltic rocks and constraints on Late Cenozoic stratigraphy and landscape development in the Red Hill-Quemado area, New Mexico: New Mexico Geological Society, Guidebook 45.

McIntosh, W. C. and Chamberlin, R. M., 1994, $^{40}Ar/^{39}Ar$ geochronology of middle to late Cenozoic ignimbrites, mafic lavas, and volcaniclastic rocks in the Quemado-Datil region, New Mexico: New Mexico Geological Society, Guidebook 45.

McIntosh, W. C., Kedzie, L. L. and Sutter, J. F., 1991, Paleomagnetism and $^{40}Ar/^{39}Ar$ ages of ignimbrites, Mogollon-Datil volcanic field, southwest New Mexico: New Mexico Bureau of Mines and Mineral Resources, Bulletin 135, 99 p.

McIntosh, W. C., Chapin, C. E., Ratté, J. C. and Sutter, J. F., 1992, Time-stratigraphic framework for the Eocene-Oligocene Mogollon-Datil volcanic field, southwest New Mexico: Geological Society of America Bulletin, v. 104, p. 851-871.

McIntosh, W. C., Geissman, J. W., Chapin, C. E., Kunk, M. J. and Henry, C. D., 1992, Calibration of the latest Eocene-Oligocene geomagnetic polarity time scale using $^{40}Ar/^{39}Ar$ dated ignimbrites: Geology, v. 20, p. 459–463.

McLellan, M., Haschke, L., Robinson, L., Carter, M. D. and Medlin, A., 1983, Middle Turonian and younger rocks, northern Salt Lake coal field, Cibola and Catron Counties, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Circular 185, p. 41–46.

McLellan, M., Robinson, L., Haschke, L., Carter, M. D. and Medlin, A., 1982, Fence Lake Formation (Tertiary), west-central New Mexico: New Mexico Geology, v. 3, p. 53–55.

McLemore, V. T., 1994, Volcanic-epithermal deposits in the Mogollon-Datil volcanic field, west-central New Mexico: New Mexico Geological Society, Guidebook 45.

Menges, C. M. and Perthree, P. A., 1989, Late Cenozoic tectonism in Arizona and its impact on regional landscape evolution: Arizona Geological Society Digest, v. 17, p. 649-680.

Menges, C. M., Kawaguchi, G. H., Ritter, J. B., McFadden, L. D. and Lozinsky, R. P., 1984, Rates and amounts of Quaternary faulting on the VLA fault scarp, northeastern San Agustin Plains: New Mexico Geology, v. 6, p. 85.

Minier, J., 1987, A geothermal study in west-central New Mexico [Ph.D. dissertation]: Socorro, New Mexico Institute of Mining and Technology, 112 p.

Minier, J. and Reiter, M., 1989, Coal maturation and geothermal history, west-central New Mexico: New Mexico Geological Society, Guidebook 40, p. 127–133.

Minier, J. and Reiter, M., 1991, Heat flow on the southern Colorado Plateau: Tectonophysics, v. 200, p. 51–66.

Minier, J., Reiter, M., Shafiqullah, M. and Damon, P. E., 1988, Geothermal studies in the Quemado area, New Mexico: Geothermics, v. 17, p. 735–755.

Morgan, T. L., 1980, Uranium hydrogeochemical survey of well waters from an area around Pie Town, Catron County, west-central New Mexico, including concentrations of twenty-three additional elements: Los Alamos LA-8017-MS, 23 p.

Morgan, P. and Gosnold, W. D., 1989, Heat flow and thermal regimes in the continental United States: Geological Society of America, Memoir 172, p. 493–522.

Murphy, M. O., 1971, Bytownite bonanza: Lapidary Journal, v. 25, p. 170-178.

Myers, R. G., 1992, Geohydrology and potential hydrologic effects of surface coal mining of the San Agustin coal area and adjacent area, Catron and Cibola Counties, New Mexico: U.S. Geological Survey, Water-Resources Investigations Report 92-4004, 52 p.

Neal, J. T., 1965, Giant desiccation polygons of Great Basin playas: Air Force Cambridge Research Laboratories, Environmental Research Papers no. 123, 30 p.

Neal, J. T. and Motts, W. S., 1975, Recent geomorphic changes in playas of western United States; *in* Neal, J. T., ed., Playas and dried lakes—occurrence and development: Dowden, Hutchinson, and Ross, p. 327–342.

New Mexico Geological Society, 1982, New Mexico Highway Geologic Map: scale 1:1,000,000.

Newell, N. D. and Boyd, D. W., 1975, Parallel evolution in early trigoniacean bivalves: Bulletin of the American Museum of Natural History, v. 154, p. 55–162.

Osburn, G. R. and Chapin, C. E., 1983a, Nomenclature for Cenozoic rocks of the northeast Mogollon-Datil volcanic field, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Stratigraphic Chart 1.

Osburn, G. R. and Chapin, C. E., 1983b, Ash-flow tuffs and cauldrons in the northeast Mogollon-Datil volcanic field: a summary: New Mexico Geological Society, Guidebook 34, p. 197–204.

Osburn, G. R., Laroche, T. M. and Weber, R. H., 1993, Geology of Lion Mountain and northern Arrowhead Well quadrangles, Socorro County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Geologic Map 68, 11 p.

Palmer, A. R., compiler, 1983, Decade of North American geology 1983 time scale: Geology, v. 11, p. 503–504.

Pearce, T. M., ed., 1965, New Mexico place names—a geographical dictionary: The University of New Mexico Press, 187 p.

Phillips, F. M., Campbell, A. R., Kruger, C., Johnson, P. S., Roberts, R. and Keyes, E., 1992, A reconstruction of the response of the water balance in western United States lake basins to climate change: New Mexico Water Resources Research Instiute, Technical Completion Report (Volume 1) on Project Nos. 11345662 and 1423687, WRRI Report No. 269, 167 p.

Pierce, H. W., 1985, Arizona's backbone: the transition zone: Arizona Bureau of Geology and Mineral Technology, Field Notes, v. 15, p. 1–6.

Potochnik, A. R., 1989, Depositional style and tectonic implications of the Mogollon Rim Formation (Eocene), east-central Arizona: New Mexico Geological Society, Guidebook 40, p. 107–118.

Potter, L. D., 1957, Phytosociological study of San Agustin Plains, New Mexico: Ecological Monographs, v. 27, p. 113–136.

Powers, W. E., 1939, Basin and shore features of the extinct lake San Agustin, New Mexico: Journal of Geomorphology, v. 2, p. 345–356.

Powers, W. E., 1941, Volcanic rocks of the western San Agustin Plains district, New Mexico: Journal of Geology, v. 49, p. 207–217.

Rannels, J. E. and McLarty, L., 1990, Geothermal power generation in the United States: 1985 through 1989: Geothermal Resources Council, Transactions, v. 14, part 1, p. 293–305.

Ratté, J. C., 1980, Geologic map of the Saliz Pass quadrangle, Catron County, New Mexico: U.S. Geological Survey, Miscellaneous Field Investigations Map MF-1203, scale 1:24,000.

Ratté, J. C., 1989a, Geologic map of the Bull Basin quadrangle, Catron County, New Mexico: U.S. Geological Survey, Geologic Quadrangle Map GQ-1651, scale 1:24,000.

Ratté, J. C., 1989b, Days 3 and 4: selected volcanic features of the western Mogollon-Datil volcanic field: New Mexico Bureau of Mines and Mineral Resources, Memoir 46, p. 68-91.

Ratté, J. C., 1992, Preliminary geologic map of the Tularosa Canyon quadrangle, Catron County, New Mexico: U.S. Geological Survey, Open-file Report 92-187, scale 1:24,000.

Ratté, J. C. and Futa, K., 1989, Petrogenetic implications of Rb-Sr and Sm-Nd isotopes related to post-caldera volcanism in the western Mogollon-Datil volcanic field, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Bulletin 131, p. 100.

Ratté, J. C., Bove, D. J. and McIntosh, W. C., 1994, Geologic map of the Milligan Mountain quadrangle, Catron County, New Mexico: U.S. Geological Survey, Geologic Quadrangle Map GQ-1736, scale 1:24,000.

Ratté, J. C., McIntosh, W. C. and Houser, H.B., 1991, Geologic map of the Horse Mountain West quadrangle, Catron County, New Mexico: U.S. Geological Survey, Geologic Quadrangle Map GQ-1685, scale 1:24,000.

Ratté, J. C., Landis, E. R., Gaskill, D. L. and Raabe, R. G., 1969, Mineral resources of the Blue Range Primitive Area, Greenlee County, Arizona, and Catron County, New Mexico: U.S. Geological Survey, Bulletin 1261-E, p. E1-E91, with geologic map, scale 1:62,500.

Ratté, J. C., Modreski, P. J., McIntosh, W. C. and Chamberlin, R. M., 1994, The Horse Springs dacite: an enigmatic pyroclastic deposit at the edge of the Plains of San Agustin: New Mexico Geological Society, Guidebook 45.

Rauzi, S. L., 1994a, Geothermal test hints at oil potential in eastern Arizona volcanic field: Oil and Gas Journal, Jan. 3, 1994, p. 52–54.

Rauzi, S. L., 1994b, Implications of live oil shows in eastern Arizona geothermal test: Arizona Geological Survey, Open-file Report 94-1, 16 p.

Reiter, M. and Clarkson, G., 1983, A note of terrestrial heat flow in the Colorado Plateau: Geophysical Research Letters, v. 10, p. 929–932.

Reiter, M. and Shearer, C., 1979, Terrestrial heat flow in eastern Arizona: a first report: Journal of Geophysical Research, v. 84, p. 6115–6120.

Rhodes, R. C. and Smith, E. I., 1976, Stratigraphy and structure of the northwestern part of the Mogollon Plateau volcanic province, Catron County, New Mexico: New Mexico Geological Society, Special Publication no. 5, p. 57-62, geologic map scale ~1:100,000.

Ritter, J. B., Kawaguchi, G. H., Menges, C. M., McFadden, L. D. and Lozinsky, R. P., 1984, A preliminary soils chronosequence for the San Agustin Plains, west-central New Mexico: New Mexico Geology, v. 6, p. 86.

Roberts, D. G., Adams, D. C. and Keller, G. R., 1994, Crustal structure of west-central New Mexico: a preliminary seismic interpretation: New Mexico Geological Society, Guidebook 45.

Robinson, B. R., 1981, Geology of the D-Cross Mountain quadrangle, Socorro and Catron Counties, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 147, 225 p.

Rodgers, K. W., 1994, Salt River Project's proposed Fence Lake mine, Catron County, New Mexico: New Mexico Geological Society, Guidebook 45.

Roy, R. F., Beck, A. E. and Touloukian, Y. S., 1981, Thermophysical properties of rocks; *in* Touloukian, Y. S., Judd, W. R. and Roy, R. F., eds., Physical properties of rocks and minerals: McGraw-Hill CINDAS Data Series on Material Properties, v. II-2, chapter 12, p. 409–502.

Sanford, A. R., 1978, Characteristics of Rio Grande rift in vicinity of Socorro, New Mexico, from geophysical studies: New Mexico Bureau of Mines and Mineral Resources, Circular 163, p. 116–119.

Sanford, A. R., Mott, R. P., Jr., Shuleski, P. J., Rinehart, E. J., Carvella, F. J., Ward, R. M. and Wallace, T. C., 1977, Geophysical evidence for a magma body in the crust in the vicinity of Socorro, New Mexico: American Geophysical Union, Geophysical Monograph 20, p. 385–403.

Sass, J. H., Stone, C. and Bills, D. J., 1982, Shallow subsurface temperatures and some estimates of heat flow from the Colorado Plateau of northeastern Arizona: U.S. Geological Survey, Open-file Report 82-994, 112 p.

Simoneit, B. R. T., 1983, Organic matter maturation and petroleum genesis: geothermal versus hydrothermal: Geothermal Resources Council, Special Report 13, p. 215–241.

Sirrine, G. K., 1956, Geology of the Springerville-St. Johns area, Apache County, Arizona [Ph.D. thesis]: Austin, The University of Texas at Austin, 247 p.

Smith, E. I., 1976, Structure and petrology of the John Kerr Peak dome complex southwestern New Mexico: New Mexico Geological Society, Special Publication no. 5, p. 71-78.

Smith, E. I., Aldrich, M. J., Jr., Deal, E. G. and Rhodes, R. C., 1976, Fission-track ages of Tertiary volcanic and plutonic rocks, Mogollon plateau, southwestern New Mexico: New Mexico Geological Society, Special Publication no. 5, p. 117-118.

Smith, G. A., 1991, Facies sequences and geometries in continental volcaniclastic sediments; Sedimentation in volcanic settings: SEPM, Special Publication no. 45, p. 109–121.

Smith, T., 1983, Pie Town: A trip back: Impact, Albuquerque Journal Magazine, p. 4–8 (18 January).

Snyder, D. O., 1971, Stratigraphic analysis of the Baca Formation, west-central New Mexico [Ph.D. thesis]: Albuquerque, University of New Mexico, 158 p.

Spence, W. and Gross, R. S., 1990, A tomographic glimpse of the upper mantle source of magmas of the Jemez lineament, New Mexico: Journal of Geophysical Research, v. 95, p. 10,829–10,850.

Spencer, R. S., 1967, Pennsylvanian Spiriferacea and Sprifernacea of Kansas: University of Kansas Paleontological Contributions, Paper 14, 35 p.

Stearns, C. E., 1962, Geology of the north half of the Pelona quadrangle, Catron County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Bulletin 78, 46 p., with map, scale 1:63,360.

Stewart, J. H., 1980, Regional tilt patterns of later Cenozoic basin-range fault blocks, western United States: Geological Society of America Bulletin, v. 91, p. 460–464.

Stone, C., 1980, Springerville geothermal project—geology, geochemistry, geophysics—final report: Arizona Bureau of Geology and Mineral Technology, Open-file Report 8-4, 23 p.

Sutherland, P. K. and Harlow, F. H., 1973, Pennsylvanian brachiopods and biostratigraphy in southern Sangre de Cristo Mountains, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Memoir 27, 173 p.

Taylor, J. R., 1982, An introduction to error analysis: Mill Valley, California, University Science Books, 270 p.

Tester, J. W. and Herzog, H. J., 1990, Economic predictions for heat mining: a review and analysis of hot dry rock (HDR) geothermal energy technology: Massachusetts Institute of Technology Energy Laboratory, Report MIT-EL 90-001, 180 p.

Tester, J. W., Brown, D. W. and Potter, R. M., 1989, Hot dry rock geothermal energy—a new energy agenda for the 21st century: Los Alamos National Laboratory, Report LA-11-11514-MS, 30 p.

Wallace, R. E., 1977, Profiles and ages of young fault scarps, north-central Nevada: Geological Society of America Bulletin, v. 88, p. 857-868.

Waples, D. W., 1980, Time and temperature in petroleum formation: application of Lopatin's method to petroleum exploration: American Association of Petroleum Geologists Bulletin, v. 64, p. 916–926.

Weber, R. H., 1963, Geologic features of the Socorro perlite deposit: New Mexico Geological Society, Guidebook 14, p. 144–145.

Weber, R. H., 1980, Geology of the Ake Site; *in* Beckett, P. H., ed., The Ake Site—collection and excavation of LA 13423, Catron County, New Mexico: New Mexico State University, Department of Sociology and Anthropology, Cultural Resources Management Division, Report 357, p. 221–238.

Weber, R. H., 1982, Quaternary geology of the Plains of San Agustin: New Mexico Journal of Science, v. 22, p. 77.

Weber, R. H., 1994, Pluvial lakes of the Plains of San Agustin: New Mexico Geological Society, Guidebook 45.

Weber, R. H. and Willard, M. E., 1959, Reconnaissance geologic map of the Reserve 30 minute quadrangle: New Mexico Bureau of Mines and Mineral Resources, Geologic Map 12, scale 1:126,720.

Wengerd, S. A., 1959, Regional geology as related to the petroleum potential of the Lucero region, west-central New Mexico: New Mexico Geological Society, Guidebook 10, p. 121–134.

Wernicke, Brian, 1992, Cenozoic extensional tectonics of the U.S. Cordillera; *in* Burchfiel, B. C., Lipman, P. W. and Zoback, M. L., eds., The Cordilleran orogen: conterminous U.S.: Geological Society of America, The Geology of North America, v. G-3, p. 553–581.

Wernicke, B. and Axen, G. J., 1988, On the role of isostacy in the evolution of normal fault systems: Geology, v. 16, p. 848–851.

Wilkinson, W. H., Jr., 1976, Geology of the Tres Montosas-Cat Mountain area, Socorro County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Report 39, 169 p.

Willard, M. E., 1959, Tertiary stratigraphy of northern Catron County, New Mexico: New Mexico Geological Society, Guidebook 10, p. 92–99.

Willard, M. E. and Stearns, C. E., 1971, Reconnaissance geologic map of the Pelona thirty-minute quadrangle: New Mexico Bureau of Mines and Mineral Resources, Geologic Map 23, scale 1:126,720.

Wills, W. H., 1988, Early prehistoric agriculture in the American Southwest: School of American Research Press, Santa Fe.

Wills, W. H., Ford, R. I. and Speth, J. D., 1984, Preliminary report of the University of Michigan investigations at Bat Cave (LA 4935): Manuscript on file at the Bureau of Land Management, Socorro, New Mexico.

Winchester, D. E., 1920, Geology of the Alamosa Creek Valley, Socorro County, New Mexico: U.S. Geological Survey, Bulletin 716A, 15 p.

Winters, S. S., 1963, Supai Formation (Permian) of eastern Arizona: Geological Society of America, Memoir 89, 99 p.

Witcher, J. C., Hahman, W. R. and Swanberg, C. A., 1994, Alpine 1/Federal—Subsurface stratigraphy of the eastern White Mountains, Apache County, Arizona: New Mexico Geological Society, Guidebook 45.

Wrucke, C. T., 1961, Paleozoic and Cenozoic rocks in the Alpine-Nutrioso area, Apache County, Arizona: U.S. Geological Survey, Bulletin 1121-H, p. H1-H26.

Yancey, T. E., 1978, Brachiopods and molluscs of the Lower Permian Arcturus Group, Nevada and Utah, Part I: brachiopods, scaphopods, rostroconchs and bivalves: Bulletin of American Paleontology, v. 74, no. 303, p. 257–363.