

CURRICULUM VITAE

JON ERIC SPENCER

Present Positions:

Senior Geologist
Arizona Geological Survey
416 W. Congress St., #100
Tucson, AZ 85701
Tel.: (520) 209-4124
Fax: (520) 770-3505
E-mail: jon.spencer@azgs.az.gov

Adjunct Researcher
Dept. of Geosciences
Univ. of Arizona
Tucson, AZ 85719

Degrees: B.S., University of California, Santa Cruz, 1977, major: geology.
Ph.D., Massachusetts Institute of Technology, 1981, major: geology (emphasis on structural geology, tectonics, and isotope geochronology; thesis advisor: B.C. Burchfiel)

Research Interests: Tectonics (especially extensional), structural geology, structural controls of metallic mineral deposits, isotope geochronology, numerical simulation of geologic processes.

Membership in Professional Societies: Geological Society of America (Fellow), American Geophysical Union, Arizona Geological Society (president 2001)

Positions Held:

Senior Geologist (1999-present) and **Research Geologist** (1988-1999), Arizona Geological Survey (formerly the Arizona Bureau of Geology and Mineral Technology), research focuses primarily on field studies of structurally complex areas in the Basin and Range province of Arizona, and includes study of metallic mineral deposits.

Assistant Geologist, Arizona Bureau of Geology and Mineral Technology, University of Arizona, September 1982 to June 1988 (research focused on field and laboratory studies of structurally complex areas in the Basin and Range province of Arizona, and included study of metallic mineral deposits).

Postdoctoral Research Associate, U.S. Geological Survey, Menlo Park, California, September 1981-August 1982 (sponsor: K.A. Howard; research focused on field and isotope-geochronologic study of a structurally complex area in the eastern Mojave desert).

Physical Science Technician (1977-1980) and **Geologist** (1980-1981), U.S. Geological Survey, Menlo Park, California, (supervisor: W.R. Normark; primary duties were collection, reduction, and interpretation of marine geophysical data from the Pacific margin of California and the Baja California peninsula).

Theses and Dissertations:

Spencer, J.E., 1981, Geology and geochronology of the Avawatz Mountains, San Bernardino County, California: Unpublished Ph.D. dissertation, Massachusetts Institute of Technology, Cambridge, Massachusetts, 183 p.

Spencer, J.E., 1977, Geology of the southern Grouse Creek Mountains, Box Elder County, Utah: Unpublished B.S. thesis, University of California, Santa Cruz, California, 76 p.

JON ERIC SPENCER

PUBLICATIONS

(none listed more than once)

Books Edited

- Spencer, J.E.**, and Titley, S.R., eds., 2008, Ores and orogenesis: Circum-Pacific tectonics, geologic evolution, and ore deposits: Arizona Geological Society Digest 22, 618 p.
- Spencer, J.E.**, ed., 1993, Radon in Arizona: Arizona Geological Survey, Bulletin 199, 96 p., 2 plates, scales 1:1,000,000 and 1:32,000.
- Gehrels, G.E., and **Spencer, J.E.**, eds., 1990, Geologic excursions through the Sonoran desert region, Arizona and Sonora: Arizona Geological Survey Special Paper 7, 202 p.
- Spencer, J.E.**, and Reynolds, S.J., eds., 1989, Geology and Mineral Resources of the Buckskin and Rawhide Mountains, west-central Arizona: Arizona Geological Survey Bulletin 198, 279 pgs. and 3 plates.

Articles in peer-review journals

- Spencer, J.E.**, Richard, S.M., Gehrels, G.E., Gleason, J.D., and Dickinson, W.R., *in review*, Age and tectonic setting of the Mesozoic McCoy Mountains Formation in western Arizona, USA: Geological Society of America Bulletin
- Spencer, J.E.**, *in press*, Structural analysis of three extensional detachment faults with data from the 2000 Space-Shuttle Radar Topography Mission: GSA Today.
- Roskowski, J.A., Patchett, P.J., **Spencer, J.E.**, Pearthree, P.A., Dettman, D.L., Faulds, J.E., and Reynolds, A.C., *in press*, A late Miocene-early Pliocene chain of lakes fed by the Colorado River: Evidence from Sr, C, and O Isotopes of the Bouse Formation and related units between Grand Canyon and the Gulf of California: Geological Society of America Bulletin.
- Pearthree, P.A., **Spencer, J.E.**, Faulds, J.E., and House, P.K., 2008, *Comment on* "Age and evolution of the Grand Canyon revealed by U-Pb dating of water table – type speleothems": Science, v. 321, p. 1634c (online format only).
- Spencer, J.E.**, 2003, *Comment on*: Direct geologic evidence for oceanic detachment faulting: The mid-Atlantic Ridge, 15°45'N: Geology, online forum, p. e14.
- Spencer, J.E.**, 2002, Natural occurrence of arsenic in Southwest ground water: Southwest Hydrology, v. 1., n. 1, p. 14-15.
- Gross, E.L., Patchett, P.J., Dallegge, T.A., and **Spencer, J.E.**, 2001, The Colorado River system and Neogene sedimentary formations along its course: Apparent Sr isotopic connections: Journal of Geology, v. 109, p. 449-461.
- Spencer, J.E.**, 2001, Possible giant metamorphic core complex at the center of Artemis Corona, Venus: Geological Society of America Bulletin, v. 113, p. 333-345.
- Spencer, J.E.**, 2000, Possible origin and significance of extension-parallel drainages in Arizona's metamorphic core complexes: Geological Society of America Bulletin, v. 112, p. 727-735.
- Spencer, J.E.**, 1999, Geologic continuous casting below continental and deep-sea detachment faults and at the striated extrusion of Sacsayhuamán, Peru: Geology, v. 27, p. 327-330.
- Spencer, J.E.**, 1999, Discussion of The active southwest margin of the Colorado Plateau: Uplift of mantle origin (by T. Parsons, and J. McCarthy): Geological Society of America Bulletin, v. 111, p. 154-155.
- Spencer, J.E.**, and Patchett, P.J., 1997, Sr isotope evidence for a lacustrine origin for the upper Miocene to Pliocene Bouse Formation, lower Colorado River trough, and implications for timing of Colorado Plateau uplift: Geological Society of America Bulletin, v. 109, p. 767-778.
- Spencer, J.E.**, 1996, Uplift of the Colorado Plateau due to lithosphere attenuation during Laramide low-angle subduction: Journal of Geophysical Research, v. 101, p. 13,595-13,609.

- Spencer, J.E.**, Richard, S.M., Reynolds, S.J., Miller, R.J., Shafiqullah, M., Grubensky, M.J., and Gilbert, W.G., 1995, Spatial and temporal relationships between mid-Tertiary magmatism and extension in southwestern Arizona: *Journal of Geophysical Research*, v. 100, p. 10,321-10,351.
- Spencer, J.E.**, 1994, A numerical assessment of slab strength during high- and low-angle subduction and implications for Laramide orogenesis: *Journal of Geophysical Research*, v. 99, p. 9227-9236.
- Hollocher, K., **Spencer, J.E.**, and Ruiz, J., 1994, Composition changes in an ash-flow cooling unit during K-metasomatism, west-central Arizona: *Economic Geology*, v. 89, p. 877-888.
- Spencer, J.E.**, and Reynolds, S.J., 1991, Tectonics of mid-Tertiary extension along a transect through west-central Arizona: *Tectonics*, v. 10, p. 1204-1221.
- Spencer, J.E.**, and Reynolds, S.J., 1990, Relationship between Mesozoic and Cenozoic tectonic features in west-central Arizona and adjacent southeastern California: *Journal of Geophysical Research*, v. 95, p. 539-555.
- Spencer, J.E.**, and Chase, C.E., 1989, Role of crustal flexure in initiation of low-angle normal faults and implications for structural evolution of the Basin and Range Province: *Journal of Geophysical Research*, v. 94, p. 1765-1775.
- Laubach, S.E., Reynolds, S.J., **Spencer, J.E.**, and Marshak, S., 1989, Progressive deformation and superposed fabrics related to Cretaceous crustal underthrusting in western Arizona, U.S.A.: *Journal of Structural Geology*, v. 11, p. 735-749.
- Reynolds, S.J., **Spencer, J.E.**, Asmerom, Y., DeWitt, E., and Laubach, S.E., 1989, Early Mesozoic uplift in west-central Arizona and southeastern California: *Geology*, v. 17, p. 207-211.
- Spencer, J.E.**, 1987, K-Ar thermochronology of a Mesozoic plutonic complex, Avawatz Mountains, southeastern California: *Isochron/West*, no. 48, p. 3-7.
- Spencer, J.E.**, and Welty, J.W., 1986, Possible controls of base- and precious-metal mineralization associated with Tertiary detachment faults in the lower Colorado River trough, Arizona and California: *Geology*, v. 14, p. 195-198.
- Reynolds, S.J., and **Spencer, J.E.**, 1985, Evidence for large-scale transport on the Bullard detachment fault, west central Arizona: *Geology*, v. 13, p. 353-356.
- Spencer, J.E.**, 1985, Miocene low-angle normal faulting and dike emplacement at Homer Mountain and surrounding areas, southeastern California and southernmost Nevada: *Geological Society of America Bulletin*, v. 96, p. 1140-1155.
- Spencer, J.E.**, 1984, Role of tectonic denudation in warping and uplift of low-angle normal faults: *Geology*, v. 12, p. 95-98.
- Wernicke, Brian, **Spencer, Jon**, and Guth, P.L., 1983, Reply to Comment on "Magnitude of crustal extension in the southern Great Basin": *Geology*, v. 11, p. 495-497.
- Wernicke, B., **Spencer, J.E.**, Burchfiel, B.C., and Guth, P.L., 1982, Magnitude of extension in the southern Great Basin: *Geology*, v. 10, p. 499-502.
- Spencer, J.E.**, and Normark, W.R., 1979, Tosco-Abreojos fault zone: A Neogene transform plate boundary within the Pacific margin of southern Baja California, Mexico: *Geology*, v. 7, p. 554-557.

Articles in books

- Spencer, J.E.**, and Titley, S.R., 2008, Introduction to the proceedings volume for the 2007 AGS Ores and Orogenesis Symposium, *in Spencer, J.E.*, and Titley, S.R., eds., *Ores and orogenesis: Circum-Pacific tectonics, geologic evolution, and ore deposits: Arizona Geological Society Digest 22*, p. 1-3.
- Spencer, J.E.**, and Ohara, Y., 2008, Magmatic and tectonic continuous casting in the circum-Pacific region, *in Spencer, J.E.*, and Titley, S.R., eds., *Ores and orogenesis: Circum-Pacific tectonics, geologic evolution, and ore deposits: Arizona Geological Society Digest 22*, p. 31-53.
- Spencer, J.E.**, 2008, Geologic and landscape evolution, *in Ffolliott, P.F.*, and Davis, O.K., eds., *Natural environments of Arizona: From deserts to mountains: University of Arizona Press*, p. 40-57.

- Spencer, J.E.,** Pearthree, P.A., Roskowski, J.A., and Patchett, P.J., 2008, Extent and age of the Bouse Formation as indicated by strontium isotopes and tephrochronology in Blythe basin, *in* Reynolds, R.E., ed., Trough to trough: The Colorado River and the Salton Sea (The 2008 Desert Symposium Field Guide and Proceedings): California State University (Fullerton) Desert Studies Consortium and LSA Associates, Inc., p. 69-71.
- Spencer, J.E.,** Smith, G.R., and Dowling, T.E., 2008, Middle to late Cenozoic geology, hydrography, and fish evolution in the American Southwest, *in* Reheis, M.C., Hershler, R., and Miller, D.M., eds., Late Cenozoic drainage history of the southwestern Great Basin and lower Colorado River region: geologic and biotic perspectives: Geological Society of America Special Paper 439, p. 279-299; doi: 10.1130/2008.2439(12).
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- Spencer, J.E.,** Peters, L., McIntosh, W.C., and Patchett, P.J., 2001, $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology of the Hualapai Limestone and Bouse Formation and implications for the age of the lower Colorado River, *in* Young, R.A., and Spamer, E.E., eds., The Colorado River: Origin and evolution: Grand Canyon, Arizona, Grand Canyon Association Monograph 12, p. 89-91.
- Spencer, J.E.,** and Pearthree, 2001, Headward erosion versus closed-basin spillover as alternative causes of Neogene capture of the ancestral Colorado River by the Gulf of California, *in* Young, R.A., and Spamer, E.E., eds., The Colorado River: Origin and evolution: Grand Canyon, Arizona, Grand Canyon Association Monograph 12, p. 215-219.
- Patchett, P.J., and **Spencer, J.E.,** 2001, Application of Sr isotopes to the hydrology of the Colorado River system waters and potentially related Neogene sedimentary formations, *in* Young, R.A., and Spamer, E.E., eds., The Colorado River: Origin and evolution: Grand Canyon, Arizona, Grand Canyon Association Monograph 12, p. 167-171.
- Damon, P.E., and **Spencer, J.E.,** 2001, K-Ar geochronologic survey of the Hopi Buttes volcanic field, *in* Young, R.A., and Spamer, E.E., eds., The Colorado River: Origin and evolution: Grand Canyon, Arizona, Grand Canyon Association Monograph 12, p. 53-56.
- Spencer, J.E.,** Richard, S.M., and Ferguson, C.F., 2001, Cenozoic structure and evolution of the boundary between the Basin and Range and Transition Zone provinces in Arizona, *in* Erskine, M.C., Faulds, J.E., Bartley, J.M., and Rowley, P.D., eds., The geologic transition, High Plateaus to Great Basin - A Symposium and Field Guide: Utah Geological Association Publication no. 30, p. 273-289.
- Wernicke, Brian, and **Spencer, Jon,** 1999, Retrospective on “Low-angle (denudation) faults, hinterland of the Sevier orogenic belt, eastern Nevada and western Utah” by Richard Lee Armstrong, *in* Moores, E.M., Sloan, D.L., and Stout, D.L., eds, Classic Cordilleran concepts: A view from California: Boulder, Colorado, Geological Society of America Special Paper 338, p. 357-362.
- Reynolds, S.J., **Spencer, J.E.,** Laubach, S.E., Peacock, S.S., Richard, S.M., and Cunningham, W.D., 1996, Geologic setting of mineral deposits of the Granite Wash Mountains, La Paz County, west-central Arizona, *in* Rehrig, W.A., ed., Tertiary extension and mineral deposits, southwestern U.S.: Society of Exploration Geologists Guidebook Series, v. 25, p. 141-155.
- Spencer, J.E.,** 1993, Stratigraphy of the Avawatz Formation, southern Death Valley region, southeastern California, *in* Sherrod, D.R., and Nielson, J.E., eds., Tertiary stratigraphy of the highly extended terranes, California, Arizona, and Nevada: U.S. Geological Survey Bulletin 2053, p. 19-20.
- Spencer, J.E.,** and Reynolds, S.J., 1993, Stratigraphy of middle Tertiary rocks in the central and eastern Buckskin Mountains, west-central Arizona, *in* Sherrod, D. R., and Nielson, J.E., eds., Tertiary stratigraphy of the highly extended terranes, California, Arizona, and Nevada: U.S. Geological Survey Bulletin 2053, p. 149-150.
- Spencer, J.E.,** 1990, Late Cenozoic extensional and compressional tectonism in the southern and western Avawatz Mountains, southeastern California, *in* Wernicke, B.P., ed., Basin and Range extensional tectonics near the latitude of Las Vegas, Nevada: Geological Society of America Memoir 176, p. 317-333.

- Spencer, J.E.**, and Reynolds, S.J., 1989, Middle Tertiary tectonics of Arizona and the Southwest, *in* Jenney, J.P., and Reynolds, S.J., eds., *Geologic evolution of Arizona: Arizona Geological Society Digest*, v. 17., p. 539-574.
- Spencer, J.E.**, and Welty, J.W., 1989, Mid-Tertiary ore-deposits in Arizona, *in* Jenney, J.P., and Reynolds, S.J., eds., *Geologic evolution of Arizona: Arizona Geological Society Digest*, v. 17., p. 585-607.
- Spencer, J.E.**, and Normark, W.R., 1989, Neogene plate tectonic evolution of the Baja California Sur continental margin and the southern Gulf of California, Mexico, *in* Winterer, E.L., and others, eds., *The Eastern Pacific Ocean and Hawaii: Geological Society of America, The Geology of North American*, v. N, p. 489-497.
- Normark, W.R., **Spencer, J.E.**, and Ingle, J.C., Jr., 1987, Geology and Neogene history of the Pacific continental margin of Baja California Sur, Mexico, *in* *Geology and resource potential of the continental margin of western North America and adjacent ocean basins -- Beaufort Sea to Baja California: Circum-Pacific Council for Energy and Mineral Resources, Earth Science Series*, v. 6, p. 449-472.
- Reynolds, S.J., **Spencer, J.E.**, and DeWitt, E., 1987, Stratigraphy and geochronology of Triassic and Jurassic rocks in west-central Arizona, *in* Dickinson, W.R., and Klute, M., eds., *Arizona Geological Society Digest* 18, p. 65-80.
- Laubach, S.E., Reynolds, S.J., and **Spencer, J.E.**, 1987, Mesozoic stratigraphy of the Granite Wash Mountains, west-central Arizona, *in* Dickinson, W.R., and Klute, M., eds., *Arizona Geological Society Digest* 18, p. 91-100.
- Richard, S.M., Reynolds, S.J., and **Spencer, J.E.**, 1987, Mesozoic stratigraphy of the Little Harquahala and Harquahala Mountains, west-central Arizona, *in* Dickinson, W.R., and Klute, M., eds., *Arizona Geological Society Digest* 18, p. 101-119.
- Spencer, J.E.**, and Reynolds, S.J., 1986, Some aspects of the Middle Tertiary tectonics of Arizona and southeastern California, *in* Beatty, B., and Wilkinson, P., eds., *Frontiers in the geology and ore deposits of Arizona and the Southwest: Arizona Geological Society Digest*, v. 16, p. 102-107.
- Reynolds, S.J., **Spencer, J.E.**, Richard, S.M., and Laubach, S.E., 1986, Mesozoic structures of west-central Arizona, *in* Beatty, B., and Wilkinson, P., eds., *Frontiers in the geology and ore deposits of Arizona and the Southwest: Arizona Geological Society Digest*, v. 16, p. 35-51.
- Spencer, J.E.**, and Reynolds, S.J., 1986, Field-trip guide to selected parts of the Harquahala, Granite Wash, and Buckskin Mountains, west-central Arizona, *in* Beatty, B., and Wilkinson, P., eds., *Frontiers in the geology and ore deposits of Arizona and the Southwest: Arizona Geological Society Digest*, v. 16, p. 382-389.
- Spencer, J.E.**, 1985, Possible role of crustal flexure in initial detachment of extensional allochthons, *in* *Papers presented to the conference on heat and detachment in crustal extension on continents and planets: Houston, Texas, Lunar and Planetary Institute*, p. 142-144.
- Reynolds, S.J., and **Spencer, J.E.**, 1985, Cenozoic extension and magmatism in Arizona, *in* *Papers presented to the conference on heat and detachment in crustal extension on continents and planets: Houston, Texas, Lunar and Planetary Institute*, p. 128-131.
- Spencer, J.E.**, 1982, Origin of folds of Tertiary low-angle fault surfaces, southeastern California and western Arizona, *in* Frost, E.G., and Martin, D.L., eds., *Mesozoic-Cenozoic tectonic evolution of the Colorado River region, California, Arizona, and Nevada: San Diego, Cordilleran Publishers*, p. 123-134.
- Spencer, J.E.**, and Turner, R.D., 1982, Dike swarms and low-angle faults, Homer Mountain and the northwestern Sacramento Mountains, southeastern California, *in* Frost, E.G., and Martin, D.L., eds., *Mesozoic-Cenozoic tectonic evolution of the Colorado River region, California, Arizona, and Nevada: San Diego, Cordilleran Publishers*, p. 97-108.

Detailed geologic maps

- Ferguson, C.A., Johnson, B.J., Pearthree, P.A., **Spencer, J.E.**, Shipman, T.C., and Cook, J.P., *in prep.*, Geologic map of the Helvetia 7 ½' Quadrangle, Pima County, Arizona: Arizona Geological Survey Digital Geologic Map DGM-77, scale 1:24,000.
- Spencer, J.E.**, Youberg, A., Ferguson, C.A., and Shipman, T.C., *in prep.*, Geologic map of the Spring Water Canyon 7 ½' Quadrangle Pima County, Arizona: Arizona Geological Survey Digital Geologic Map DGM-79, scale 1:24,000.
- Gootee, B.F., Ferguson, C.A., **Spencer, J.E.**, and Cook, J.P., *in prep.*, Geologic map of the Chino Valley North 7 ½' Quadrangle, Yavapai County, Arizona: Arizona Geological Survey Digital Geologic Map DGM-80, scale 1:24,000.
- Pearthree, P.A., Ferguson, C.A., and **Spencer, J.E.**, *in prep.*, Geologic map of the Dolan Spring 7 ½' Quadrangle, Mohave County, Arizona: Arizona Geological Survey Digital Geologic Map DGM-81, scale 1:24,000.
- Young, J.J., **Spencer, J.E.**, MacFarlane, B.J., and Richard, S.M., 2009, Geologic map of the Lookout Mountain 7 ½' Quadrangle, Pinal County, Arizona: Arizona Geological Survey Digital Geologic Map DGM-66, scale 1:24,000.
- Spencer, J.E.**, Gootee, B.F., Richard, S.M., and Cook, J.P., 2009, Geologic map of the Mammoth 7 ½' Quadrangle, Pinal County, Arizona: Arizona Geological Survey Digital Geologic Map DGM-67, scale 1:24,000.
- Gootee, B.F., **Spencer, J.E.**, Ferguson, C.A., Richard, S.M., Cook, J.P., and MacFarlane, B.J., 2009, Geologic map of the Clark Ranch 7 ½' Quadrangle and the west half of the Rhodes Peak 7 ½' Quadrangle, Pinal and Graham Counties, Arizona: Arizona Geological Survey Digital Geologic Map DGM-68, scale 1:24,000.
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- Ferguson, C.A., Johnson, B.J., Pearthree, P.A., and **Spencer, J.E.**, 2009, Geologic map of the Grasshopper Junction 7 ½' Quadrangle, Mohave County, Arizona: Arizona Geological Survey Digital Geologic Map DGM-70, scale 1:24,000.
- Cook, J.P., and **Spencer, J.E.**, 2008, Geologic map of the Redington 7 ½' Quadrangle, Cochise, Graham, and Pima Counties, Arizona: Arizona Geological Survey Digital Geologic Map DGM-60, scale 1:24,000.
- Spencer, J.E.**, Richard, S.M., Cook, J.P., Dickinson, W.R., Lingrey, S.H., and Guynn, J.H., 2008, Geologic map of the Soza Canyon 7 ½' Quadrangle, Cochise and Pima Counties, Arizona: Arizona Geological Survey Digital Geologic Map DGM-61, scale 1:24,000.
- Spencer, J.E.**, Cook, J.P., Lingrey, S.H., Richard, S.M., Ferguson, C.A., and Guynn, J.H., 2008, Geologic map of the Wildhorse Mountain 7 ½' Quadrangle, Cochise County, Arizona: Arizona Geological Survey Digital Geologic Map DGM-62, scale 1:24,000.
- Ferguson, C.A., Haddad, D.E., Johnson, B.J., Guynn, J.H., **Spencer, J.E.**, and Reddy, D.L., 2008, Geologic map of the east half of the Black Canyon City 7 ½' Quadrangle and the west half of the Squaw Creek Mesa 7 ½' Quadrangle, Maricopa and Yavapai Counties, Arizona: Arizona Geological Survey Digital Geologic Map DGM-64, scale 1:24,000.
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- Shipman, T.C., Richard, S.M., and **Spencer, J.E.**, 2006, Geologic map of the Fortuna 7 ½' Quadrangle, Yuma County, Arizona: Arizona Geological Survey Digital Geologic Map DGM-55, layout scale 1:24,000, with 13 p. text.
- Youberg, A., **Spencer, J.E.**, and Richard, S.M., 2006, Geologic map of the Galleta Flat East 7 ½' Quadrangle, Cochise County, Arizona: Arizona Geological Survey Digital Geologic Map 56, layout scale 1:24,000, with 7 p. text.
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- Spencer, J.E.**, Leighty, R.S., Conway, C.M., Ferguson, C.A., and Richard, S.M., 2004, Compilation geologic map of the Reno Pass area, central Mazatzal Mountains, Maricopa and Gila Counties, Arizona: Arizona Geological Survey Open-File Report 04-03, scale 1:24,000, with 18 p. text.
- Ferguson, C.A., **Spencer, J.E.**, Pearthree, P.A., Youberg, A., and Field, J.J., 2004, Geologic map of the Wagner Wash Well 7 ½' Quadrangle, Maricopa County, Arizona: Arizona Geological Survey Digital Geologic Map 38 (DGM-38), scale 1:24,000, with 7 p. text.
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- Youberg, A., **Spencer, J.E.**, and Ferguson, C.A., 2004, Geologic map of the Star Well 7 ½' Quadrangle, Maricopa County, Arizona: Arizona Geological Survey Digital Geologic Map 42 (DGM-42), scale 1:24,000.
- Richard, S.M., **Spencer, J.E.**, Youberg, A., and Ferguson, C.A., 2004, Geologic map of the Rincon Valley area, Pima County, Arizona: Arizona Geological Survey Digital Geologic Map 44 (DGM-44), scale 1:24,000.
- Spencer, J.E.**, and Pearthree, P.A., 2004, Geologic map of the Oro Valley 7 ½' Quadrangle, Pima County, Arizona: Arizona Geological Survey Digital Geologic Map 21, version 2.0, scale 1:24,000.
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- Spencer, J.E.**, Ferguson, C.A., Richard, S.M., and Youberg, A., 2003, Geologic map of the Esperanza Mill 7 ½' Quadrangle, Pima County, Arizona: Arizona Geological Survey Digital Geologic Map DGM-33, scale 1:24,000.
- Ferguson, C.A., Gilbert, W.G., Orr, T.R., **Spencer, J.E.**, Richard, S.M., and Pearthree, P.A., 1999, Geologic map of the Samaniego Hills, Pinal and Pima Counties, southern Arizona: Arizona Geological Survey Open-File Report 99-17, 1 plate, scale 1:24,000, with 15 p. text.
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