

# DR. KARL E. KARLSTROM – CURRICULUM VITAE (August 2021)

Dr. Karl E. Karlstrom is a Distinguished Professor in the Department of Earth and Planetary Sciences at the University of New Mexico. He has been at UNM since 1994. Dr. Karlstrom grew up in Flagstaff, Arizona and received his B.S. in Geology from Northern Arizona University in May 1973. He received his MS in Geology in 1977 from the University of Wyoming and Ph.D. from the University of Wyoming in May 1981. He conducted post-doctoral work at the University of New Brunswick, Canada (1981 -1982). He held professor positions at North Carolina State University (1983-1984) and Northern Arizona University (1984-1991) before coming to UNM in 1992, where he has been for the last 27 years. His research specialties are structural geology and tectonics. His current research topics span the geologic timescale and address: the formation and stabilization of continents, the supercontinent cycle, Paleoproterozoic to Cambrian Earth Systems, and neotectonics of ongoing uplift of the Colorado Plateau-Rocky Mountain region.

Research summary: Dr. Karlstrom has generated > \$5 million in external funding, with > \$3.4 million in the last 10 years. This includes continuous funding from the National Science Foundation. This CV lists ~200 published journal articles, 23 geologic maps, 87 technical reports and guidebook articles, and > 520 abstracts from professional meetings (most coauthored with students). He is an expert on: the Proterozoic assembly of North America and its position in the supercontinents of Nuna and Rodinia; the 2-billion-year geologic evolution of Grand Canyon region; and near surface hydrologic and geomorphic systems in the Colorado Plateau-Rocky Mountain region. He has worked on tectonic influences on water quality in groundwater systems in Australia, Egypt, and the American Southwest. In terms of research impact on his profession, Google Scholar lists ~13,000 citations of over 200 publications since 1979 and an H-index of 54 (54 publications have been cited at least 54 times).

Teaching summary: He teaches at all learning levels: Freshman Learning Communities (2007-2014), New Mexico Field Geology (every Fall), Structural Geology (every Spring), and the Advanced Summer Field Course. He has mentored 69 graduate students. Informal science education activities include, with his wife Laura Crossey, development of the Trail of Time Geoscience Education Exhibition at Grand Canyon which opened in 2010 and received the 2011 First Place award from National Association for Interpretation; this exhibit reaches ~6 million annual Park visitors. His teaching is entwined with his research.

Service summary and awards: Dr. Karlstrom's professional service includes local, national, and international service. His served as member of the Canadian Pan-Lithoprobe subcommittee (2000-2003), Trustee of the International Basement Tectonics Association (2005-2009), U.S. Member (one per continent) of the International Geologic Congress Rodina compilation, Australian Research Council (ARC) "expert of international standing", Founding member of the NSF Earthscope Science and Education Committee (2002-2005), Science Editor for the journal GSA Today (2000- 2003), and Science Editor for the Geological Society of America Bulletin (2005-2008). He received the 2009 Distinguished Service Award from Geological Society of America and was elected Geological Society of America Fellow in 2010. He was selected for the 2014 UNM 60th Distinguished Research Lecture, received a 2015 Career Achievement Award from the American Institute of Professional Geologists (joint with Laurie Crossey), was awarded the 2017 New Mexico Geological Society Honorary Member. He received the 2018 UNM Alumni Teaching Award. His UNM service includes numerous departmental, College, and University committees.

## EDUCATION

Post-doctoral research, University of New Brunswick, Fredericton, N.B., Feb 1981 - Aug 1982.  
University of Wyoming, Laramie, Wyoming - Ph.D. in Geology, May 1981, (8/77 – 2/81).  
University of Wyoming, Laramie, Wyoming - M.S. in Geology, July 1977; 8/75 to 7/77.  
Northern Arizona University, Flagstaff, Arizona - B.S. in Geology, May 1973; Awards: graduated Magna cum laude.

## EMPLOYMENT

Distinguished Professor, University of New Mexico, August 2018- present.  
Professor, University of New Mexico, August 1994 - 2018.  
Sabbatical: visiting professor, University of Adelaide, South Australia, Spring, 1998  
Crosby Visiting Professor, M.I.T., Cambridge, Massachusetts, Fall, 1997.

Associate Professor, University of New Mexico, Jan 1992 - Aug 1994.  
Associate Professor, Northern Arizona University, May 1987 - Dec 1991.  
Assistant Professor, Northern Arizona University, May 1984 - May 1987.  
Assistant Professor, North Carolina State University, Jul 1983 - May 1984.  
Research Associate, University of Arizona, Jan 1983 - Jul 1983.  
Research Associate, University of Wyoming, Oct 1982 - Dec 1982.  
Assistant Professor, University of New Brunswick, Oct 1981 - Mar 1982.  
Post-Doctoral Fellow, University of New Brunswick, Feb 1981 – Aug 1982.  
Research Associate, University of Wyoming, Jul 1978 - Feb 1981.  
Graduate Research Assistant, University of Wyoming, Jul 1977 - Jul 1978.

## GRANTS AND GRANT PROPOSALS

1978-1979      Uranium potential of Precambrian quartz-pebble conglomerates in southern Wyoming; Borgman: P.I.'s R.S. Houston, K.E. Karlstrom, L.T., Bendix Field Engineering Corporation contract to the University of Wyoming: \$212,062 awarded.

1980-1981      Geological support for diamond drilling of Precambrian quartz-pebble conglomerates; Borgman: P.I.'s R.S. Houston, K.E. Karlstrom, L.T., Bendix Field Engineering Corporation contract to the University of Wyoming: \$109,738 awarded.

1984      Tectonic styles in the northern Appalachians: P.I. K.E. Karlstrom, North Carolina State University Faculty Research and Professional Development Grant: \$3,500 awarded.

1984      Structural geology research in the northern Appalachians; P.I. K.E. Karlstrom: North Carolina State University Research Advisory Committee: \$2,500 awarded.

1984      Structural geology research in central Arizona; P.I. K.E. Karlstrom: Northern Arizona University Organized Research Fund: \$4,500 awarded.

1984-1986      Structural and sedimentologic studies of the Mazatzal Orogen and investigation of Proterozoic (1800-1600 m.y.) tectonic regimes in central Arizona: P.I.'s K.E. Karlstrom and L.T. Middleton: National Science Foundation: \$69,991 awarded.

1984-1986      Geometry and kinematics of thrust-related deformation in central Arizona: P.I. K.E. Karlstrom: Petroleum Research Fund: \$15,000 awarded.

1985      Microstructural studies of thrust-deformation in central Arizona: P.I. K.E. Karlstrom: Northern Arizona University Organized Research: \$23,400 awarded.

1985-1987      Collaborative research: Chronostratigraphic evolution of an Early Proterozoic orogenic belt in central Arizona - integrated U-Pb zircon geochronology and detailed structural geology: P.I.'s S.A. Bowring (Washington University, St. Louis), K.E. Karlstrom (NAU): National Science Foundation: \$113,324 awarded, \$13,324 to NAU.

1986      Project Seed, American Chemical Society: \$750 awarded to fund an economically disadvantaged high school student as a summer research assistant.

1986      Collaborative research: Thermal/tectonic evolution of continental crust in the Old Woman Mountains, southeastern California: P.I. K.E. Karlstrom (NAU): National Science Foundation: \$50,000 awarded to NAU as part of a \$311,627 grant to 10 P.I.'s at four universities and the U.S.G.S.

1986      Kinematic studies of shear zones and continental accretion in central Arizona: P.I. K.E. Karlstrom: Northern Arizona University Organized Research Fund: \$13,325 awarded.

1987      Structural studies of Proterozoic tectonic evolution of northwestern Arizona: P.I. K.E. Karlstrom: Northern Arizona University Organized Research Fund: \$23,140 awarded.

1987-1989      Collaborative research: Chronology and processes of deformation and metamorphism during Early Proterozoic (1.8-1.6 Ga) continental assembly, Arizona: P.I.'s S.A. Bowring (Washington University) and K.E. Karlstrom (NAU): \$168,000 awarded, \$55,392 to NAU.

1987-1988      Research Experiences for Undergraduates: \$4,000 awarded as a supplement to ongoing

grant entitled "Chronostratigraphic evolution..."

1988 Proterozoic tectonic assembly of continental crust in the Southwest. P.I. K.E. Karlstrom, NAU Organized Research Fund, \$7,700 awarded.

1989 Undergraduate field geology research in Arizona's Transition Zone, NSF Research Experiences for Undergraduates program, P.I. K.E. Karlstrom, \$30,000 awarded.

1989-1992 New Technologies in Geologic Mapping: NSF Instrumentation and Laboratory Equipment Program, P.I. K.E. Karlstrom, \$32,287 awarded from NSF with matching funds from NAU.

1989 Processes of granite emplacement during compressional deformation: NAU Organized Research Fund, \$10,000 award.

1989-1991 Collaborative Research: Interactions in time and space of thermal and mechanical processes during orogeny: the Old Woman Mountains, area southeastern California: National Science Foundation, \$57,674 awarded.

1990-1992 Collaborative Research: Processes of crustal assembly and growth: the Proterozoic of Arizona: National Science Foundation, \$40,831 awarded.

1990 Undergraduate Field Geology research in Northern Arizona, NSF Research Experiences for Undergraduates, P.I. K.E. Karlstrom, \$30,000 awarded.

1990-1991 Post-assembly uplift history of Proterozoic crustal blocks in central Arizona: NAU Organized Research Fund, \$6,800 awarded.

1992-1993 Evaluating the Early and Middle Proterozoic tectonic evolution of southwestern North America, P.I.'s J.A. Grambling and K.E. Karlstrom, National Science Foundation, \$154,672 awarded.

1992-1993 Research Experiences for Undergraduates Supplement to "Evaluating the Early and Middle Proterozoic tectonic evolution of southwestern North America; National Science Foundation, \$4,000 awarded.

1992-1994 Collaborative Research: Evaluating tectonic boundaries: Continuous transect of Proterozoic orogen in the Grand Canyon, P.I.'s K.E. Karlstrom and M.L. Williams (University of Massachusetts), National Science Foundation, \$99,444 awarded to UNM.

1993 Supplement: Evaluating tectonic boundaries: Continuous transect of a Proterozoic orogen in the Grand Canyon, \$10,000 awarded to purchase boats.

1993-1996 Middle Proterozoic tectonic regimes in the Southwest: Anorogeny or an orogeny: \$109,456 awarded.

1994-1996 Undergraduate Earth Sciences Research at the University of New Mexico: NSF-REU Site grant, 2-1-94 to 1-31-96, \$97,016 awarded: PI's K.E. Karlstrom and J. Geissman.

1994-1996 Paleomagnetic investigations of tectonostratigraphic terranes in northwest Mexico: further evaluation of the Mojave-Sonora megashear hypothesis (with R. Molina-Garza and J. Geissman). NSF Tectonics Program.

1995-1997	Collaborative Research: Nature of the middle crust during orogenesis: thermal, mechanical, and geodynamic properties inferred from Proterozoic rocks of the Southwest (\$96,437 awarded for 2 years, (7/1/95 to 1/31/98), NSF Tectonics panel) EAR-9508096.
1995	Workshop Grant: Lithospheric structure and evolution of cratonic western U.S., Wyoming to Mexico (\$18,000 granted for April 95 workshop - NSF CD panel)
1997-2000	Continental Dynamics proposal: Lithospheric structure and evolution of the Rocky Mountain transect of the western U.S.: an integrated geological/geophysical investigation (\$2,700,000 awarded). K.E. Karlstrom project leader 15 co- PIs at 13 institutions) \$335,000 to UNM, 10/1/97 - 9/30/2000, EAR-9614787.
1997-1999	Collaborative Research: (with M. Elrick and J.W. Geissman) An integrated study of Late Proterozoic (1.2-0.7 Ga) extensional tectonism, basin evolution, and biological evolution in the Grand Canyon, \$140,006 to UNM, EAR-9706541, 8-1-97 to 7-31-99.
1998	Supplement to Continental Dynamics Grant for additional Laramide studies, K.E. Karlstrom and E. Erslev, (\$29,999 awarded to UNM), 5/98 – 12/98, EAR-9614787-001.
1998	Supplement to Continental Dynamics Grant – for publication of results in “Rocky Mountain Geology” K.E. Karlstrom, (\$6,300 awarded).
1999-2002	Collaborative Research: Great Unconformity of the Southwestern U.S.A.: Ar-Ar K-feldspar thermochronologic and structural studies of a billion years of regional exhumation: K.E. Karlstrom and M. Heizler, \$76,866 awarded to UNM, 7-15-99 – 6-30-2002, EAR-9902955.
1999	Supplement to: Collaborative Research: An integrated study of Late Proterozoic (1.2 – 0.7 Ga) extensional tectonism, basin evolution, and biological evolution in the Grand Canyon, K.E. Karlstrom, NSF – EAR-9706541, \$10,000 awarded to UNM.
1999	Supplement to Continental Dynamics Grant for additional seismic reflection profiling in New Mexico: \$50,000 awarded for seismic reflection data acquisition, P.I. K.E. Karlstrom and Scott Smithson, NSF.
2001-2002	Collaborative Research: Contrasting styles of ca. 1.4 Ga tectonism in the southern Rockies: Evidence for a fossil rheologic transition in a deeply exhumed intracontinental orogen. \$90,242 awarded to UNM (1-1-2001 to 12-31-2002); PI K.E. Karlstrom, NSF Tectonics Program. EAR-0003500
2001-2002	Collaborative Research: Relationship between ultramafic rocks and crustal sutures in the North American Southwest, \$21,798 to UNM (1-1-2001 to 12-31-2002), PI K.E. Karlstrom, NSF Tectonics Program EAR-0003477
2001	Collaborative Research: Lithospheric structure and evolution of the Rocky Mountains-- Phase 1B: Geodynamic processes; This project is coordinated by K.E. Karlstrom and is a collaborative project with 20 PIs at 13 institutions; \$79,880 to UNM (1-1-2001 to 12-31-2001), NSF Continental Dynamics Program EAR-.
2000	Supplement to Grand Canyon Research grants: acquisition of trailers: PI K.E. Karlstrom, \$5935 awarded to UNM, NSF Instrumentation and Facilities Program.2001-2002
2001-2002	Collaborative Research: Tectonic geomorphology of the Grand Canyon region: testing a hypothesis for differential incision due to Quaternary slip on the Hurricane-Toroweap

	fault system: P.I.s K.E. Karlstrom and J. Pederson (Utah State University), \$74,454 to UNM (06/01/01 to 05/31/02), NSF Tectonics Program.
2001-2002	The Trail of Time: Integrating Science and Education at Grand Canyon, Arizona: PIs L. Crossey and K.E. Karlstrom, \$96,426 awarded for 12/01/01 to 11/30/02, NSF Geoscience Education Program.
2002	Acquisition of an electron microprobe: PIs A. Brearley, J. Selverstone, L. Crossey, M Spilde, K.E. Karlstrom, \$300,000 awarded to UNM, NSF Instrumentation and Facilities
2002-2004	Mesoproterozoic tectonics of inboard southwestern Laurentia: insight into assembly and configuration of Rodinia from study of sedimentary successions, NSF Tectonics Program (EAR-028463), \$114,888 (07/01/02 to 06/30/04), Southwestern USA, 0.5 months in 2003 and 2004.
2002-2003	REU supplement to Tectonic geomorphology of the Grand Canyon region: testing a hypothesis for differential incision due to Quaternary slip on the Hurricane-Toroweap fault system: support for T. Cleveland, \$4455.
2003	Supplement to Tectonic geomorphology of the Grand Canyon region: testing a hypothesis for differential incision due to Quaternary slip on the Hurricane-Toroweap fault system: support for further Ar-Ar dating: \$8,000.
2003-2005	Geoscience Education at the Grand Canyon: Integrating Science and Education Through the Trail of Time Exhibit, NSF Geoscience Education Program, \$49,997 (03/01/03 to 02/29/04), PIs L. Crossey and K. Karlstrom, 0.5 month in 2003. EAR- 0314133.
2003-2005	The Trail of Time at Grand Canyon: Planning and implementation, 09/15/03 to 08/31/04, PIs Karl Karlstrom and Laura Crossey, \$49,984, 0.5 months in 2004. ISE- 0314132-.
2003-2005	Post-doc grant: Continental Dynamics of the Rocky Mountains: structure, evolution, and geodynamics of the continental lithosphere: NSF Continental Dynamics Program, \$40,000 (07/01/-03 to 06/30/04); S. Whitmeyer.
2004-2006	Organizational structure for Rocky Mountain EarthScope: Science and education planning: NSF EarthScope Program, \$60,412 (02/01/04 to 01/31/06).
2005	Supplement to "Mesoproterozoic tectonics..." : \$35,000 for upgrading Grand Canyon research equipment: NSF Instrumentation and Facilities Program.
2005-2007	Collaborative Research: CO <sub>2</sub> springs and travertines of the southwestern U.S.: Hydrologic pathways linking tectonism and water quality: NSF Hydrologic Sciences Program (01/01/2006-12/31/2007), L. Crossey, K. Karlstrom, T. Fischer, and A. Springer, \$149,795 to UNM. , EAR- 0538304
2006-2010:	Collaborative Research: The Trail of Time: A Geoscience Exhibition at Grand Canyon National Park: \$1,834,740 to UNM (06/01/2006 to 05/31/2010); NSF Informal Science Education Program: Karl Karlstrom, Laura Crossey, Steve Semken (ASU). ISE-0610393
2007-2010	Collaborative Research: CREST: Colorado Rockies Experiment and Seismic Transects; \$299,457 to UNM (01/01/2007-12/31/2010); NSF Continental Dynamics Program EAR-0607808, Ken Dueker, Rick Aster, Eric Kirby, L. Crossey, and others.

2007-2009	Collaborative Research: Dating sedimentary sequences: In situ U/Th-Pb microprobe dating of early diagenetic monazite in Neoproterozoic black shales: NSF Sedimentary Geology and Paleobiology Program, 105,920 to UNM (1/01/07 to 12/31/08); Laura Crossey, John Bloch, Karl Karlstrom, Mike Williams., EAR-
2007-2010	Collaborative Research: Testing models for incision and neotectonics of the Grand Canyon region: field studies, Ar-Ar dating of Neogene basalts, and detrital zircon and monazite analysis of quartzite cobbles: NSF Tectonics Program, \$159,964 to UNM (7/15/07 to 6/30/10); Karl Karlstrom and Laura Crossey EAR- 0711546
2009-2011	"Continental Smokers"-- evaluating mantle-to-surface hydrologic connections, CO <sub>2</sub> flux, geomicrobiology, and water quality in continental rifts. NSF Hydrological Sciences Program, L.J. Crossey, K.E. Karlstrom, and others, 01-2009 to 12-2011, 300,000 to UNM, EAR- 0838575
2010	Supplement to: The Trail of Time: A Geoscience Exhibition at Grand Canyon National Park: \$200,000 to UNM (06/01/2006 to 05/31/2010); NSF Informal Science Education Program: Karl Karlstrom, Laura Crossey
2010-2011	Workshop grant for the opening of the Trail of Time: A Geoscience Exhibition at Grand Canyon National Park: \$49,560 to UNM; NSF GeoScience Education Program: Karl Karlstrom, Laura Crossey EAR 1028432
2010- 2012	US Egypt Cooperative Research: Comparisons between New Mexico and Egyptian travertines and tufas, NSF OISE, \$46,560 10/01/2010-9/30/2012, PIs KarlKarlstrom, Laura Crossey. 1004276
2011-2014	Collaborative Research: Testing Hypotheses for Neotectonic Mantle-Driven Surface Uplift of the Colorado Plateau Region: \$341,810.00 awarded to UNM, PIs Karl Karlstrom, Laura Crossey; 8/1/11 to 7/31/14, EAR- 1119629 and 1242028 supl.
2013-2016	NSF-NM EPsCOR— NSF- NM EPsCOR - Track 2R4, Energize New Mexico; Geothermal Energy in New Mexico PI L.J. Crossey and co-PI <u>K.E. Karlstrom</u> 7/1/2013- 6/30/2018; \$772,198 awarded to EPS
2012-2015	Collaborative Research: Resolving the nature and extent of Archean (and other pre-1.8 Ga) crustal components in southwestern Laurentia using Hf and U-Pb analysis of zircon and baddeleyite. NSF Tectonics EAR-1145247- \$201,030 to UNM, 06/01/12-05/31/15 .
2014-2016	Collaborative Research: The age of Grand Canyon: applying new tests to resolve the 150-year-old debate: NSF Tectonics, \$154,081 to UNM 05/2014 to 04/2016 (with Dave Shuster, Berkeley) EAR-1348007.
2016-2019	Collaborative Research: Reconstructing the Origins of the Colorado River: An integrative Study of the Miocene-Pliocene Bouse Formation Source of Support: UNM PI is Laura Crossey; Karlstrom is UNM co-PI; NSF Sedimentary Geology and Paleobiology Total Award Amount: \$194,176 to UNM, 07/01/2016 to 6/30/2019, EAR- 1545986.
2016-2019	Collaborative Research: Helium-isotope systematics along seismic profiles in Tibet to study geometry of Indian and Tibetan lithosphere beneath the Lhasa and Qiangtang terranes, Lead PI is Simon Klemperer (Stanford), UNM PI is Laura Crossey; Karlstrom is UNM co-PI; \$83,464 for UNM, July 15, 2016-June 30, 2019. EAR-1627930.

2020-2023      Collaborative Research: Constraining the tempo and dynamics of Cambrian Earth systems in western Laurentias, Lead PI Mark Schmitz (Boise State University), UNM PI is Karl Karlstrom, Laura Crossey is UNM co-PI; \$262,998 for UNM, June 1, 2020-May 31, 2023; EAR- 1955078

## INVITED PAPERS, TALKS, AND MEETINGS

1983      Invited to participate as co-author of the Decade for North American Geology (DNAG) volume on the Precambrian of North America (Wyoming Province Chapter).

1984      Invited to participate in a GSA Penrose Conference on "Melanges of the Appalachians, in Newfoundland."

1984      Invited to read a paper at the Ogden Tweto Memorial Symposium on "Precambrian rocks of the Southwest", GSA meeting, May, 1984, Durango, Colorado.

1985      Invited to attend a conference on "Heat and detachment in crustal extension on continents and planets, October, 1985, Sedona, Arizona.

1985      Co-sponsor (with Clay Conway of the USGS and Lee Silver of Cal Tech) of a workshop entitled "Early Proterozoic Geology of Arizona", October, 1985, at the USGS, Flagstaff, Arizona.

1986      Coordinator and convener of a symposium and field trip on "Early Proterozoic orogenic history in the Southwest", Spring GSA Rocky Mountain Section Meeting, May, 1986, Flagstaff, Arizona.

1987      Convener of a symposium and field trip on "Early Proterozoic continental assembly of southwestern North America", GSA Annual Meeting, Fall, 1987, Phoenix, Arizona.

1987      Invited to attend Penrose Conference on Cordilleran Metamorphic core Complexes, September, 1987, Elko, Nevada.

1987      Steering Committee member: CACTIS - California to Arizona Crustal Transect -Interim Synthesis - Meeting, May 1988.

1988      Convener of a symposium on Pre-Cenozoic crustal evolution of the eastern Mojave Desert: Cordilleran Section Meeting, Las Vegas, Nevada.

1988      Invited to be a panel member for "Workshop on the search for unconventional ore deposits in Arizona", co-hosted by the USGS, Arizona Geological Survey, and U.A. Geosciences Dept.

1988      Invited to attend a Penrose Conference on "Criteria for establishing the relative timing of pluton emplacement and deformation.

1989      Leader of field trip for GSA Cordilleran Section Meeting, Tucson, AZ.

1991      Leader of Arizona Geological Society Fieldtrip - Proterozoic Geology and Ore Deposits of Arizona.

1992      Convener of symposium for Spring AGU (Montreal) entitled Early and Middle Proterozoic evolution of Laurentia - Baltica.

1994      Leader of POMP (Proterozoic orogenesis and metallogenesis project) fieldtrip to northern New Mexico, 55 participants.

1994 Attended Southern Sierra Nevadas Continental Dynamics workshop, Mammoth Lakes, CA.

1994 Invited speaker for 1994 Illiad workshop of the Iris Consortium, Taos New Mexico.

1994 Invited to join IGCP project 376 Pre-Pangea analysis of Middle Proterozoic and Paleozoic interaction of Laurentia and Gondwona.

1995 Organized Continental Dynamics Workshop: Lithospheric Evolution of the western U.S., Albuquerque, New Mexico, April 1995.

1996 Invited speaker - GSA symposium on "Tectonic Development of Southern Rocky Mountains.

1996 Theme session coordinator - GSA - Middle Crustal Processes.

1998 Co-convener and invited speaker of GSA National meeting Pardee Symposium entitled: Tectonic Evolution of Precambrian North America: I. A Synthesis of Recent Results.

1999 Keynote speaker for GAC-MAC meeting on "Precambrian Terrane Boundaries", Sudbury Ontario.

1999 Co-convener and invited speaker for GSA National meeting theme session: Origin of orogenic plateaus: Interactions of plate convergence, mantle processes, and surficial processes in continental tectonics: Denver, Colorado.

1999 Co-convener and invited speaker for GSA National meeting theme session. Cenozoic tectonics of the southern Rocky Mountains in Colorado and New Mexico: Connections with global processes: Denver, Colorado.

1999 Co-convener of special session: Lithospheric structure and evolution of the Rocky Mountain region: AGU Fall meeting, San Francisco.

2000 1999 Invited speaker for special session: Characterization of small-scale crustal heterogeneity: AGU Fall meeting, San Francisco.

2000 Convener of Theme Session: Proterozoic evolution of western Laurentia: Continental Accretion to breakup of Rodinia, GSA National Meeting, Reno NV; delivered opening talk.

2000 Convener of Theme Session: Lithospheric Structure and Evolution of the Rocky Mountains: AGU Fall meeting, San Francisco.

2001 GSA Rocky Mountain Section meeting in Albuquerque: session chair for 1) Paleoproterozoic tectonics of the southwestern United States; 2) Mesoproterozoic tectonics of the southwestern United States; 3) Meso to Neoproterozoic of the western U.S.: Record of supercontinent assembly and breakup, and a snowball Earth?; 4) Continental lithosphere of the Rocky Mountain region-from Proterozoic accretion to present structure.

2002 GSA National Meeting, Denver Colorado, Convener of two theme sessions: on Rocky Mountains, field trip leader for Colorado shear zones fieldtrip.

2003 Seattle GSA, convener of Rodinia session for IGCP 440

2003 Durango GSA—symposium convener and fieldtrip leader

2004 Invited speaker for two sessions at the IGC meeting, Florence, Italy

2004 Keynote speaker for PanLithoprobe final conference

2005 Meeting coordinator and invited speaker for EarthScope National meeting, Santa Ana Pueblo

2005 Invited speaker EarthScope in the Northern Rockies Workshop, Bozeman

2004 Invited speaker for Supercontinents and Earth Evolution workshop, Perth Australia

2005 Invited speaker for topical session on accretionary orogens—GSA national meeting

2005 Invited speaker Northern Arizona University seminar series

2005 Invited speaker Arizona State University seminar series

2006 Invited speaker for mini-symposium at Syracuse University on Precambrian of Laurentia

2006 Gunnison GSA—topical session convener and fieldtrip leader

2006 Aspen workshop convener (CREST and LANL as sponsors)

2006 Convener for Trail of Time workshop—South Rim, Grand Canyon

2006 Invited speaker for topical session on Continental Dynamics Program —20 years later—GSA

2007 Invited speaker for 3 GSA Topical Sessions:

2007 Fieldtrip leader and Technical session coordinator for UNESCO IGCP Symposium on Paleoproterozoic supercontinents and global evolution: Ores and Orogenesis, a symposium honoring the career of William R. Dickinson, Tucson Arizona: Arizona Geological Society, p 24.

2008 6-25: NSF Informal Science Education PI Summit in Washington DC

2008 9-17: Presented EarthScope Science Café at Aztec NM

2009 Invited to give joint departmental seminar (with Laura Crossey) at U. of Oklahoma (Oct. 29).

2009 Invited to give joint departmental seminar (with Laura Crossey) at U. of Montana (Feb. 24).

2010 Invited to give joint departmental seminar (with Laura Crossey) at Cal. Berkeley (Feb. 4), NSF Geoprisms workshop (Nov. 5), University of Nebraska (Nov. 19), and New Mexico Tech (Dec. 9).

2010 Member of Nominating Committee for EarthScope Science Committee (2010-present)

2010 Member of USArray Advisory Committee (USAAC) (2010- present)

2010 Coordinated Grand Opening of the Trail of Time at South Rim of Grand Canyon and workshop entitled: “Advances in Geoscience Education in the National Parks”

2011 Invited to give keynote talk for 11<sup>th</sup> Australasian Environmental Isotope Conference and 4<sup>th</sup> Australasian Hydrogeology Research Conference, Cairns, Australia,

2012 Technical Program Chairman, Rocky Mountain Section, Geological Society of America, May, 2012, Fieldtrip leader, T9. Cenozoic Landscape Evolution in the Rocky Mountains and Colorado Plateau: Interplay between Mantle Buoyancy and Surface Processes

2012 Guest speaker for: "North Rim of Grand Canyon National Park's 1st Annual Geology Festival July 20, 2012

2012-2014 Invited speaker for annual Colorado River Guides Association Guides Training Seminar and river trip (GTS)

2013 Organized and convened a 2-day special theme session at the National GSA in Denver on the Evolution of the Colorado River system and age of Grand Canyon and co-led a pre-meeting fieldtrip

2014 Speaker at New Mexico Museum of Natural History: Age of Grand Canyon (March 27)

2014 Collegiate Peaks Forum: Debate with Rebecca Flowers on Age of Grand Canyon (April 11)

2014 Keynote speaker for the joint meeting of the American Institute of Professional geologists and the Arizona Hydrological Society: IPG/AHS National Conference: Water & Rocks - the Foundations of Life, September 13-16, 2014, Prescott, Arizona

2014 Invited to give Departmental seminar at Stanford University: "How old is the Grand Canyon?" October 7, 2014

2014 Invited to give the October 16, 2014 Sigma Xi Science & Society Distinguished Public Talk: "How Old is The Grand Canyon: Resolution of a 140-Year-Long Debate"

2015 University of Delaware October 29, 2015 seminar series (joint with Laura Crossey)

2015 University of Nevada, Reno, Discover Science Series lecture, Nov 19, 2015

2016 Colorado State University Department seminar Feb 11

2016 Consortium of Chemistry Teachers keynote talk for National Meeting Nov 4-5

2016 3 invited talks at 2016 GSA National Meeting in Denver (see abstracts)

2017 University of Calgary Galagher Symposium invited public lecture

2017 NM Museum of Natural History docent lecture, Novemeber 2017

2019 Grand Canyon Historical Society Meeting:

2019 Mapping Grand Canyon meeting at ASU

2019 Grand Canyon Geology and Geoscience Education Public Symposium 2019

2019 GSA Thompson Field Forum I- Age and Carving of Grand Canyon: Towards a resolution of 140 years of debate

2019 Geological Society of America National Meeting in Phoenix, Pardee session P2: Grand Ideas, Grand Events: Geoscience Research, Geoscience Education, and Human Connections to Grand Canyon at its Six Millionth, 150th, and 100th Anniversaries

2019 Theme session T1. Grand Canyon, Colorado Plateau, and Rocky Mountain Debates and Their Global Reverberations, 150 Years after Powell.

2022 2 Invited talks at GSA Denver, convened a theme session, and had 14 coauthored abstracts  
2 invited talks at IUGS 60<sup>th</sup> anniversary meeting in Zumaia Spain

## **PROFESSIONAL SERVICE AND HONORS**

- Member of Editorial Board for GEOLOGY magazine, 1-88 to 1-91
- Vice President for field trips, Arizona Geological Society, 1991
- Panelist for National Science Foundation Instrumentation and Laboratory Improvement Program, Jan. 1990.
- Member of Editorial Board for PRECAMBRIAN RESEARCH, 1-90 to present
- Panelist for NSF-ILI Program, Jan. 1991
- Panelist for the NSF Post-doctoral Program. Earth Science, January, 1992
- Panelist for the NSF Tectonics Program, Earth Science Division, 1992-1995
- Panelist for NSF Continental Dynamics Program, 1993-1996
- Member New Mexico Geologic Mapping Advisory Board, 1995-present
- Crosby visiting Professor at M.I.T. for Fall, 1997
- Steering Committee and workshop coordinator for U.S. Array (1999- 2002)
- Science editor for GSA Today, January 2000-2003
- Panelist for NSF special panel to evaluate IRIS proposal (2000)
- Member Pan-Lithoprobe subcommittee (2000-2003)
- Member Earthscope Science and Education Committee (2002 – 2005)
- Compiler of southern Laurentia map for IGCP 440- Rodinia map project
- Australian Research Council (ARC) “expert of international standing”
- Science editor for GSA Bulletin, July 2004- December 2008
- Co-organizer of first EarthScope National meeting, March 29-32, 2005, Santa Ana Pueblo
- Trustee of the International Basement Tectonics Association, 2005 to 2009
- Distinguished Service Award from Geological Society of America (October, 2009)
- Fellow of the Geological Society of America, 2010- present
- Recipient of the 2011 National Association for Interpretation Media Awards Competition—Ist place award for Wayside Exhibits: Grand Canyon’s Trail of Time Geoscience Exhibition

- Member of Nominating Committee for EarthScope Science Committee (2010-2013)
- Member of EarthScope USArray Advisory Committee (USAAC) (2010- 2014)
- Member of GSA Penrose metal nominating committee (2011-2014)
- Guest Associate Editor for Geosphere Themed Issue: CRevolution 2: Origin and Evolution of the Colorado River System (papers reviewed 2012-2015)
- Recipient of the 2015 Award of Outstanding Achievement from the American Institute of Professional Geologists
- Selected as the 60<sup>th</sup> Annual Research Lecture honoree, one of the highest honors UNM bestows on its faculty members in recognition of research/creative activity of exceptional merit.
- Volume Editor and Fieldtrip leader for 2016 NMGS Fall Field Conference in Belen NM
- Guest Associate Editor: Geosphere CRevolution 2: Origin and Evolution of the Colorado River System II themed issue (about 33 papers reviewed and accepted as of 09/2017).
- Volume Editor and Fieldtrip leader for 2017 NMGS Fall Field Conference in Ouray CO

**REFEREED PUBLICATIONS (\*= graduate student coauthor; \*\*= undergraduate student coauthor)**

1. Karlstrom, K.E., and Houston, R.S., 1977b, Stratigraphy of Phantom Lake Metamorphic Suite and Deep Lake Group and a review of the Precambrian tectonic history of the Medicine Bow Mountains: Contributions to Geology, v. 17, no. 2, p. 111-134.
2. Houston, R.S., Lanthier, L.R., Karlstrom, K.E., and Sylvester, G.G., 1981, Early Proterozoic diamictite in southern Wyoming, in Hambrey, M.J. and Harland, W.B. (eds.), Earth's pre-Pleistocene glacial record: Cambridge University Press, New York, p. 795-799.
3. Karlstrom, K.E., 1982, Stratigraphic problems in the Hamilton Sound area of northeastern Newfoundland, in Current Research Part B, Geological Survey Canada Paper 82-1B, p. 49-59.
4. Karlstrom, K.E., Van Der Pluijm, B.A., and Williams, P.F., 1982, Structural interpretation of the eastern Notre Dame Bay area, Newfoundland: regional Post-Middle Silurian thrusting and asymmetrical folding: Canadian Journal of Earth Sciences, v. 19, p. 2325-2341.
5. Karlstrom, K.E., 1983, Reinterpretation of Newfoundland gravity data and arguments for an allochthonous Dunnage Zone: Geology, v. 11, p. 263-266.
6. Karlstrom, K.E., Flurkey, A.J., and Houston, R.S., 1983, Stratigraphy and depositional setting of Proterozoic metasedimentary rocks in southeastern Wyoming: record of an Early Proterozoic Atlantic-type cratonic margin: Geological Society of America Bulletin, v. 97, p. 1257-1294.
7. Karlstrom, K.E., Van Der Pluijm, B.A., and Williams, P.F., 1983, Structural interpretation of the eastern Notre Dame Bay area, Newfoundland: regional Post-Middle Silurian thrusting and asymmetrical folding - reply: Canadian Journal of Earth Sciences, v. 20, p. 1353-1354.
8. Karlstrom, K.E., and Houston, R.S., 1984, The Cheyenne Belt: analysis of a Proterozoic suture in southern Wyoming: Precambrian Research, v. 25, p. 415-446.
9. Karlstrom, K.E., Van Der Pluijm, B.A., and Williams, P.F., 1983, Sedimentology of Upper Ordovician-Silurian sequences on New World Island, Newfoundland: separate fault-controlled basins - discussion: Canadian Journal of Earth Sciences, v. 20, p. 1757-1758.
10. Karlstrom, K.E., 1984, Reinterpretation of Newfoundland gravity data and arguments for an allochthonous Dunnage Zone - reply: Geology, v. 1, p. 61.
11. Johnson, R., Karlstrom, K.E., Houston, R.S., and Smithson, S.B., 1984, Gravity profiles across a Proterozoic suture: the Cheyenne Belt in southeastern Wyoming: Journal of Geodynamics, v. 1, p. 445-472.
12. Karlstrom, K.E., 1985, Structural reconnaissance of South Sansom Island, northeastern Newfoundland: Current Research, Part B, Geological Survey of Canada Paper 85-1B, p. 95-101.
13. Van Der Pluijm, B.A., Karlstrom, K.E., and Williams, P.F., 1987, Fossil evidence for fault-derived stratigraphic repetition in the northeastern Newfoundland Appalachians: Canadian Journal of Earth Sciences, v. 24, p. 2337-2350.
14. Karlstrom, K.E., Bowring, S.A., and Conway, C.M., 1987, Early Proterozoic two-province boundary in central Arizona: Geological Society of America Bulletin, v. 99, p. 529-538.

15. Karlstrom, K.E., and Morgan, P., 1988, Research in undergraduate education: Changing direction in geology training during low enrollments: *Geotimes*, v. 33, p. 8-10.
16. Karlstrom, K.E., and Bowring, S.A., 1988, Early Proterozoic assembly of tectonostratigraphic terranes in southwestern North America: *Journal of Geology*, v. 96, p. 561-576.
17. Karlstrom, K.E., 1989, Early recumbent folding during Proterozoic orogeny in central Arizona: in Grambling, J.A. and Tewksbury, B.J., eds., *Proterozoic geology of the southern Rocky Mountains*: Geological Society of America Special Paper, 235, p. 155-171.
18. Houston, R.S., Duebendorfer, E.M., Karlstrom, K.E., and Premo, W.R., 1989, Petrology and structure of the Cheyenne Belt and Proterozoic rocks of southern Wyoming: in Grambling, J.A. and Tewksbury, B.J., eds., *Proterozoic geology of the southern Rocky Mountains*: Geological Society of America Special Paper, 235, p. 1-12.
19. Karlstrom, K.E., 1989, Towards a syntectonic paradigm for granites: *EOS*, v.70, p. 762-770.
20. Bowring, S.A., and Karlstrom, K.E., 1990, Growth, stabilization, and reactivation of Proterozoic lithosphere in the southwestern United States: *Geology*, v. 18, no. 12, p. 1203-1206.
21. Fletcher,\* J.M., and Karlstrom, K.E., 1990, Late Cretaceous ductile deformation, metamorphism, and plutonism in the Piute Mountains, eastern Mojave Desert: *Journal of Geophysical Research*, v. 95, p. 487-500.
22. Karlstrom, K.E., 1991, Proterozoic geology and ore deposits of Arizona: *Arizona Geological Society Digest* 19, 332 p. (This book includes 10 articles co-authored by K.E. Karlstrom, as listed below 24-33.
23. Karlstrom, K.E., and Bowring, S.A., 1991, Styles and timing of Early Proterozoic deformation in Arizona: Constraints on tectonic models, in Karlstrom, K.E. ed., *Proterozoic geology and ore deposits of Arizona*: *Arizona Geological Society Digest* 19, p. 1-10.
24. Cox, R., Karlstrom, K.E., and Cullers, R., 1991, Rare earth element chemistry of Proterozoic argillites, central Arizona: Constraints on stratigraphy, in Karlstrom, K.E., ed., *Early Proterozoic geology and ore deposits of Arizona*: *Arizona Geological Society Digest* 19, p. 57-66.
25. Albin,\* A.A., and Karlstrom, K.E., 1991, Orthogonal Proterozoic fabrics in northwestern Arizona: multiple orogenic events or progressive deformation during continental assembly, in Karlstrom, K.E. ed., *Proterozoic geology and ore deposits of Arizona*: *Arizona Geological Society Digest* 19, p. 67-84.
26. Darrach,\* M., Karlstrom, K.E., Williams, M.L., and Argenbright, D., 1991, Progressive deformation in the Early Proterozoic Shylock Shear Zone, central Arizona, in Karlstrom, K.E., ed., *Early Proterozoic Geology and ore deposits of Arizona*, p. 97-116.
27. Leighty,\* R.S., Best, D., and Karlstrom, K.E., 1991, Gravity and magnetic evidence for a Proterozoic crustal boundary along the southern Shylock fault zone, central Arizona, in Karlstrom, K.E. ed., *Proterozoic geology and ore deposits of Arizona*: *Arizona Geological Society Digest* 19, p. 135-152.
28. Gillentine,\*\* J., Karlstrom, K.E., Parnell, R.A., JR., and Puls, D., 1991, Constraints on temperatures of Proterozoic metamorphism in low grade rocks of central Arizona, in Karlstrom, K.E. ed., *Proterozoic geology and ore deposits of Arizona*: *Arizona Geological Society Digest* 19, p. 165-180.

18. Doe,\* M., and Karlstrom, K.E., 1991, Structural geology of an Early Proterozoic foreland thrust belt, Mazatzal Mountains, Arizona, in Karlstrom, K.E. ed., Proterozoic geology and ore deposits of Arizona: Arizona Geological Society Digest 19, p. 181-192.
19. Wessels,\* R.L., and Karlstrom, K.E., 1991, Re-evaluation of the Slate Creek shear zone: crustal shortening by tectonic wedging, in Karlstrom, K.E. ed., Proterozoic geology and ore deposits of Arizona: Arizona Geological Society Digest 19, p. 193-210.
20. Sherlock,\* S.M., and Karlstrom, K.E., 1991, Structure and stratigraphy of Early Proterozoic rocks, Breadpan Mountain area, northern Sierra Ancha, Arizona, in Karlstrom, K.E. ed., Proterozoic geology and ore deposits of Arizona: Arizona Geological Society Digest 19, p. 211-224.
32. Labrenz,\* M.E., and Karlstrom, K.E., 1991, Timing of the Mazatzal orogeny: Constraints from the Young Granite, Pleasant Valley, Arizona, in Karlstrom, K.E. and DeWitt, E., eds., Proterozoic geology and ore deposits of Arizona: Arizona Geological Society Digest 19, p. 225-236.
33. Bergh, S.G., and Karlstrom, K.E., 1992, The Proterozoic Chaparral fault zone of central Arizona; deformation partitioning and escape block tectonics during arc accretion: Geological Society of America Bulletin: v. 104, p. 329-345.
34. Houston, R.S., Karlstrom, K.E., Graff, P.J., and Flurkey, A.J., 1992, New stratigraphic subdivisions and redefinition of subdivisions of Late Archean and Early Proterozoic metasedimentary and metavolcanic rocks of the Sierra Padre and Medicine Bow Mountains, Wyoming: U.S. Geological Survey Professional Paper 1520, 50 p.
35. Karlstrom, K.E., Miller, C.F., Kingsbury,\*\* J.A., and Wooden, J.L., 1993, Pluton emplacement along an active ductile thrust zone, Piute Mountains, southeastern California: Interaction between deformational and solidification processes: Geol., Society of America Bulletin, v. 105, p. 213-230.
36. Karlstrom, K.E., and Bowring, S.A., 1993, Proterozoic orogenic history in Arizona, in Van Schmus, W.R., Bickford, M.E., Anderson, J.L., Bender, E.E., Anderson, R.R., Bauer, P.W., Robertson, J.M., Bowring, S.A., Condie, K.C., Denison, R.E., Gilbert, M.C., Grambling, J.A., Mawer, C.K., Shearer, C.K., Hinze, W.J., Karlstrom, K.E., Kisvarsanyi, E.B., Lidiak, E.G., Reed, J.C., Jr., Sims, P.K., Tweto, O., Silver, L.T., Treves, S.B., Williams, M.L., Wooden, J.L., Transcontinental Proterozoic provinces, in Reed, J.C., Jr., Bickford, M.E., Houston, R.S., Link, P.K., Rankin, D.W., Sims, P.K., and Van Schmus, W.R., eds., Precambrian: Conterminous U.S.: Boulder, Colorado, Geological Society of America, The Geology of North America, v. C-2, p.
37. Karlstrom, K.E., and Daniel,\* C.G., 1993, Restoration of Laramide right lateral strike slip in northern New Mexico using Proterozoic piercing points: tectonic implications from the Proterozoic to the Cenozoic: Geology, v. 21, no. 12, p. 1139-1142.
38. Houston, R.S., Erslev, E.A., Frost, C.D., Karlstrom, K.E., Page, N.J., Zientek, M.L., Reed, J.C., Jr., Snyder, G.L., Worl, R.G., Bryant, B., Reynolds, M.W., and Peterman, Z.E., 1993, The Wyoming province, in Reed, J.C., Jr., Bickford, M.E., Houston, R.S., Link, P.K., Rankin, D.W., Sims, P.K., and Van Schmus, W.R., eds., Precambrian: Conterminous U.S.: Boulder, Colorado, Geological Society of America, The Geology of North America, v. C-2, p. 121-170.
39. Bauer, P.W., Karlstrom, K.E., Bowring, S.A., Smith,\*\* A., and Goodwin, L., 1993, Proterozoic plutonism and regional deformation: New constraints from the southern Manzano Mountains, central New Mexico: New Mexico Geology, v. 15, no. 3, p. 49-55.
40. Rothstein,\* D.A., Karlstrom, K.E., Hoisch, T.D., and Morrison, J., 1994, Synkinematic contact metasomatism: implications for the timing of pluton emplacement and regional deformation in the

Scanlon shear zone, south-eastern California, *Journal of Metamorphic Geology*, v. 12, p. 709-721.

41. Hook, S.J., Karlstrom, K.E., Miller, C., and McCaffrey, K., 1994, Mapping the Piute Mountains, CA., with thermal infrared multispectral scanner (TIMS) data: *Journal of Geophysical Research*, v. 99, p. 15605-15622.
42. Nyman, M.W., Karlstrom, K.E., Kirby,\* E., and Graubard, C., 1994, 1.4 Contractional orogeny in western North America: Evidence from ca. 1.4 Ga plutons: *Geology*, v. 22, p. 901-904.
43. Karlstrom, K.E., and Daniel,\* C.G., 1994, Restoration of Laramide right-lateral strike slip in northern New Mexico by using Proterozoic piercing points: Tectonic implications from the Proterozoic to the Cenozoic: Reply, *Geology*, v. 22, p. 863-864.
44. Karlstrom, K.E., and Williams, M.L., 1995, The case for simultaneous deformation, metamorphism, and plutonism: an example from Proterozoic rocks in central Arizona: *Journal of Structural Geology*, v. 17, p. 59-81.
45. Kirby,\* E., Karlstrom, K.E., and Andronicus,\* C., 1995, Tectonic setting of the Sandia pluton: an orogenic 1.4 Ga granite in New Mexico: *Tectonics*, v. 14, p. 185-201.
46. Ilg,\* Brad, Karlstrom, K.E., Hawkins, D., and Williams, M.L. 1996, Tectonic evolution of paleoproterozoic rocks in Grand Canyon, Insights into middle crustal processes: *Geological Society of America Bulletin*, v. 108, p. 1149-1166.
47. Hawkins, D.P., Bowring, S.A., Ilg, B.R., Karlstrom, K.E., and Williams, M.L., 1996, U-Pb geochronologic constraints on Proterozoic crustal evolution: *Geological Society of America Bulletin*, v. 108, p. 1167-1181.
48. Gonzales,\* D.A., Karlstrom, K.E., and Siek, G., 1996, Syn-contractional crustal anatexis and deformation during emplacement of the 1435 Ma Electra Lake gabbro, Needle Mountains, Colorado: *Journal of Geology*: v. 104, p. 215-223.
49. Thompson,\* A.G., Grambling, J.A., Karlstrom, K.E., and Dallmeyer, B.D., 1996, Thermal evolution of Proterozoic middle crust during and following 1.4 Ga pluton emplacement, Manzano Mountains, New Mexico: Pluton-enhanced 4 kb metamorphism, rapid decompression, and retrograde history: *Journal of Geology*, v. 104, p. 583-598.
50. Heizler, M.T., Ralser, S., and Karlstrom, K.E., 1997, Late Proterozoic (Greenville ?) deformation in central New Mexico determined from single-crystal muscovite  $^{40}\text{Ar}/^{39}\text{Ar}$  age spectra: *Precambrian Research*, v. 84, p. 1-15.
51. Williams, M.L., and Karlstrom, K.E., 1997, Looping P-T paths and high-T, low-P middle crust metamorphism: Proterozoic evolution of the southwestern United States: *Geology*, v. 105, p. 205-223.
52. Karlstrom, K.E., Dallmeyer, D., and Grambling, J.A., 1997,  $^{40}\text{Ar}/^{39}\text{Ar}$  evidence for 1.4 Ga regional metamorphism in New Mexico: Implications for thermal evolution of the lithosphere in Southwestern U.S.A: *Journal of Geology*, v. 105, p. 205-223.
53. Nyman, M.W., and Karlstrom, K.E., 1997, Pluton Emplacement processes and tectonic setting of the 1.42 Ga signal batholith, SW USA: important role of crustal anisotropy during regional shortening: *Precambrian Research*, v. 82, p. 237-263.

54. Pedrick,\* J.M., Karlstrom, K.E., and Bowring, S.A., 1998, Reconciliation of conflicting models for Proterozoic rocks of northern New Mexico: *Journal of Metamorphic Geology*, v. 16, p. 687-707.
55. Karlstrom, K.E., and Williams, M.L., 1998, Heterogeneity of the middle crust: implications for strength of continental lithosphere: *Geology*, v. 26, p.815-818
56. Karlstrom, K.E., 1998, Introduction to special issues: Lithospheric structure and evolution of the Rocky Mountains: *Rocky Mountain Geology*, v. 33, no.2, p. 157-160.
57. Karlstrom, K.E., and Humphreys, G., 1998, Influence of Proterozoic accretionary boundaries in the tectonic evolution of western North America: Interaction of cratonic grain and mantle modification events: *Rocky Mountain Geology*, v. 33, no.2, p. 161-179.
58. Read\*, A., Karlstrom, K.E., Grambling, J.A., Bowring, S.A., Heizler, M., and Daniel\*, C., 1999, A mid-crustal cross section from the Rincon Range, northern New Mexico: Evidence for 1.68 Ga pluton-influenced tectonism and 1.4 Ga regional metamorphism: *Rocky Mountain Geology*, v. 34, no. 1, p. 67-91.
59. Shaw\*, C.A., and Karlstrom, K.E., 1999, The Yavapai-Mazatzal crustal boundary in the southern Rocky Mountains: *Rocky Mountain Geology*, v. 34, no.1, p. 37-52.
60. Williams, M.L., Karlstrom, K.E., Lanzirotti, A., Read\*, A.S., Bishop, J.L., Lombardie, C.E. Pedrick\*, J.N., and Wingstead, M.B., 1999, New Mexico middle crustal cross sections: 1.65 Ga macroscopic geometry, 1.4 Ga thermal structure and continued problems in understanding crustal evolution: *Rocky Mountain Geology*, v. 34, no.1, p. 53-66.
61. Karlstrom, K.E., 1999, Introduction to special issues: Nature of tectonic boundaries in the lithosphere of the Rocky Mountains: *Rocky Mountain Geology*, v. 34, no. 1, p. 1-4.
62. McCaffrey, K.J.W., Miller, C.F., Karlstrom, K.E., and Simpson, C., 1999, Synmagmatic deformation patterns in the Old Woman Mountains, SE California: *Journal of Structural Geology*, v. 21, p. 335-349.
63. Karlstrom, K.E., Harlan, S.S., Williams, M.L., McLlland, J., Geissman, J.W., and Ahall, K.I., 1999, Refining Rodinia: Geologic evidence for the Australia – Western U.S. connection for the Proterozoic: *GSA Today*, v. 9, no. 10, p. 1-7.
64. Meltzer, A., Rudnick, R., Zeitler, P., Levander, A., Humphreys, G., Karlstrom, K.E., Ekstiööm, G., Carlson, R., Dixon, T., Gunis, M., Shearer, P., and Van Der Hilst, R., 1999, US Array Initiative: *GSA Today* v. 9, no. 11, p. 8-10.
65. Keller, G.R., Karlstrom, K.E., and Farmer, G.L., 1999, Tectonic Evolution in the Rocky Mountain Region: 4-D imaging of the continental lithosphere: *EOS*, v. 80, p. 493-498.
66. Ilg\*, B.R., Karlstrom, K.E., and Williams, M.L., 2000, Porphyroblast inclusion trail geometries in the Grand Canyon: Evidence for rotation and non-rotation? *Journal of Structural Geology*, v. 22, p. 231-243.
67. Marshak, S., Karlstrom, K.E., and Timmons,\* M.J., 2000, Inversion of Proterozoic extensional faults: An explanation for the patterns of Laramide and Ancestral Rockies intracratonic deformation, U.S.A.: *Geology*, v. 28, p. 735-738
68. Cather, S.M., and Karlstrom, K.E., 2000, Implications of Jurassic, Cretaceous, and Proterozoic piercing lines for Laramide oblique-slip faulting in New Mexico and rotation of the Colorado

Plateau: Reply: Geological Society of America Bulletin, v. 112, p. 783-788.

69. Karlstrom, K.E., Bowring, S.A., Dehler\*, C.M., Knoll, A.H., Porter, S., Sharp, Z., Des Marais, D., Weil, A., Geissman, J.W., Elrick, M., Timmons, M.J., Keefe, K., and Crossey, L., 2000, Chuar Group of the Grand Canyon: Record of breakup of Rodinia, associated change in the global carbon cycle, and ecosystem expansion by 740 Ma: *Geology*, v. 28, p. 619-622.
70. Timmons\*, M.J., Karlstrom, K.E., Dehler\*, C.M., Geissman, J.W., AND Heizler, M.T., 2001, Proterozoic multistage (~1.1 and ~0.8 Ga) extension in the Grand Canyon Supergroup and establishment of northwest and north-south tectonic grains in the southwestern United States: *Geological Society of America Bulletin*, v. 113, no. 2, p 163-180.
71. Karlstrom, K.E., Harlan, S.S., William, M.L., McLelland, J., Geissman, J.W., and Ahall, K-I., 2001, Long-lived (1.8-0.8 Ga) Cordilleran – type orogen in southern Laurentia, its extensions to Australia and Baltica, and implications for refining Rodinia: *Precambrian Research*, v. 111, p. 5-30.
72. Shaw\* C. A., Karlstrom, K.E., Williams, M.L., Jercinovik, M.J., and McCoy\* A., 2001, Electron microprobe monazite dating of ca. 1710-1630 Ma and ca. 1380 Ma deformation in the Homestake shear zone, Colorado: Origin and evolution of a persistent intracontinental tectonic zone: *Geology*, v. 29, p. 739-742.
73. Dehler\*, C.M., Elrick, M., Karlstrom, K.E., Smith, G.A., Crossey. L.J., and Timmons\*, M.J., 2001, Neoproterozoic Chuar Group (~800-742 Ma), Grand Canyon: a record of cyclic marine deposition during global cooling and supercontinent rifting, *Sedimentary Geology* v. 141-142, p. 465-499.
74. Karlstrom, K.E., and the CD-ROM working Group (Continental Dynamics of the Rocky Mountains), 2002, Structure and Evolution of the lithosphere beneath the Rocky Mountains: Initial results from the CD-ROM Experiment: *GSA Today*, v. 12, no. 3, p. 4-10.
75. Pederson, J., Karlstrom, K.E., McIntosh, W.C., and Sharp, W., 2002, Geomorphic implications of new absolute ages and associated incision and fault-slip rates in Grand Canyon: *Geology*, v. 30, no. 8, p. 739-742.
76. Tyson\*, A.R., Morozova, E.A., Karlstrom, K.E., Chamberlain, K.R., Smithson, S.G., Dueker, K.G., and Foster, C.T., 2002, Proterozoic Farwell Mountain-Lester Mountain suture zone, northern Colorado: Subduction flip and progressive assembly of arcs: *Geology*, v. 30, no. 10, p. 943-946.
77. Karlstrom, K.E., Ilg\*, B.R., Williams, M.L., Hawkins, D.P., Bowring, S.A., and Seaman, S.J., 2003, Paleoproterozoic rocks of the Granite Gorges, in Beus, S.S. and Morales, M., eds., *Grand Canyon Geology*: Oxford University Press, second edition, p.9-38.
78. Timmons\*, M.J., Karlstrom, K.E., and Sears, J.W., 2003, Geologic structure of the Grand Canyon Supergroup, in Beus, S.S., and Morales, M., eds., *Grand Canyon Geology*: Oxford University Press, second edition, p. 76-89.
79. Pederson, J., Karlstrom, K.E., Sharp, W., and McIntosh, W., 2003, Differential Incision of the Grand Canyon related to Quaternary faulting - Constraints from U-Series and Ar/Ar dating: Comment and Reply: *Geology*, online forum, [www.gsajournals.org](http://www.gsajournals.org), p. e16-e17.
80. Strickland\*\*, D., Heizler, M.T., Silverstone, J., and Karlstrom, K.E., 2003, Proterozoic evolution of the Zuni Mountains, western New Mexico: Relationship to the Jemez lineament and implications for a complex cooling history: *New Mexico Geological Society Guidebook* 54, p. 109-118.

81. Newell\*, D.L., Koning, D., Karlstrom, K.E., Crossey, L.J., and Dillon\*\*, M., 2004, Plio-Pleistocene incision history of the Rio Ojo Caliente, northern Espanola Basin, and an overview of the Rio Grande system in northern New Mexico: New Mexico Geological Society Guidebook 55: Geology of the Taos region: p. 121-134.
82. Kelley, S.A., Chapin, C.E., and Karlstrom, K.E., 2001, Laramide cooling histories of the Grand Canyon, Arizona, and the Front Range, Colorado, determined from apatite fission-track thermochronology, *in* Young, R.A., and Spamer, E.E., eds., The Colorado River: Origin and evolution: Grand Canyon, Arizona, Grand Canyon Association Monograph 12, p.
83. Pederson, J., and Karlstrom, K.E., 2001, Relating differential incision of Grand Canyon to slip along the Hurricane-Toroweap fault system, *in* Young, R.A., and Spamer, E.E., eds., The Colorado River: Origin and evolution: Grand Canyon, Arizona, Grand Canyon Association Monograph 12, p. 159.166.
84. Karlstrom, K.E., Amato, J.M., Williams, M.L., Heizler, M., Shaw\*, C.A., Read\*, A.S., and Bauer, P., 2004, Proterozoic tectonic evolution of the New Mexico region, *in* Mack, G.H. and Giles, K.A., eds., The Geology of New Mexico: A Geologic History: New Mexico Geological Society Special Publication 11, p. 1-34.
85. Magnani, M.B., Miller, K.M., Levander, A., Karlstrom, K.E., 2004, The Yavapai-Mazatzal boundary: A long-lived tectonic element in the lithosphere of southwestern North America: Geological Society of America Bulletin v. 116, p. 1137-1142.
86. Dehler\*, C.M., Elrick, M.E., Bloch, J.D., Crossey, L.J., Karlstrom, K.E., and Des Marais, D.J., 2005,  $\delta^{13}$  composition of organic carbon and dolomites, lithostratigraphy, and mudrock petrology of the Neoproterozoic Chuar Group (~770-742 Ma), Grand Canyon: Implications for pre-742 Ma climate change: Geological Society of America Bulletin, v. 117, p. 32-45.
87. Timmons\*, J.M., Karlstrom, K.E., Heizler, M., Bowring, S.A., and Crossey, L.C., 2005, Tectonic inferences from the 1254- ~1100 Ma Unkar Group and Nankoweap Formation, Grand Canyon: Intracratonic deformation and basin formation during protracted Grenville orogenesis: GSA Bulletin v. 117, p. 1573-1595.
88. Newell\*, D.N., Crossey, L.J., Karlstrom, K.E., Fischer, T. P., and Hilton, D.R., 2005, Continental-scale links between the mantle and groundwater systems of the western United States: Evidence from travertine springs and regional He isotope data: GSA Today, v. 15, no. 12, p. 4-10.
89. Hook, S.J., Dmochowski, J.E., Howard, K.A., Rowan, L.C., Karlstrom, K.E., and Stock, J.M., 2005, Mapping variations in weight percent silica measured from multispectral thermal infrared imagery: Examples from the Hiller Mountains, Nevada, USA and Tres Virgenes- La Reforma, Baja California: Remote Sensing of the Environment, p. 273-289.
90. Karlstrom, K.E. and Keller, G.R., editors, 2005, The Rocky Mountain Region -- An Evolving Lithosphere: Tectonics, Geochemistry, and Geophysics: American Geophysical Union Geophysical Monograph 154, 441 p.
91. Karlstrom, K.E. and Keller, G.R., editors, 2005, Introduction to: The Rocky Mountain Region -- An Evolving Lithosphere: Tectonics, Geochemistry, and Geophysics: American Geophysical Union Geophysical Monograph 154, p. 1-5.
92. Jessup\*, M.J., Karlstrom, K.E., Connelly, J., Williams, M.L., Livaccari, R., Tyson\*, A., and

Rogers\*\*, S.A., 2005, Complex Proterozoic crustal assembly of southwestern North America in an arcuate subduction system: The Black Canyon of the Gunnison, southwestern Colorado, *in* Karlstrom, K.E. and Keller, G.R., editors, The Rocky Mountain Region -- An Evolving Lithosphere: Tectonics, Geochemistry, and Geophysics: American Geophysical Union Geophysical Monograph 154, p. 21-38.

93. McCoy\*, A., Karlstrom, K.E., Williams, M.L., and Shaw\*, C.A., 2005, Proterozoic ancestry of the Colorado mineral belt: 1.4 Ga shear zone system in central Colorado, *in* Karlstrom, K.E. and Keller, G.R., editors, The Rocky Mountain Region -- An Evolving Lithosphere: Tectonics, Geochemistry, and Geophysics: American Geophysical Union Geophysical Monograph 154, p. 71-90.

94. Shaw\*, C.A., Karlstrom, K.E., and Heizler, M.T., 2005, Mid-crustal temperatures during ca. 1.4 Ga metamorphism in the southwestern United States: A regional synthesis of  $^{40}\text{Ar}/^{39}\text{Ar}$  data *in* Karlstrom, K.E. and Keller, G.R., editors, The Rocky Mountain Region -- An Evolving Lithosphere: Tectonics, Geochemistry, and Geophysics: American Geophysical Union Geophysical Monograph 154, p. 163-184.

95. Morozova, E., Wan\*, X., Chamberlain, K., Smithson, S., Johnson, R., and Karlstrom, K.E., 2005, Inter-wedging nature of the Cheyenne belt - Archean-Proterozoic suture from seismic reflection data *in* Karlstrom, K.E. and Keller, G.R., editors, The Rocky Mountain Region -- An Evolving Lithosphere: Tectonics, Geochemistry, and Geophysics: American Geophysical Union Geophysical Monograph 154, p. 217-226.

96. Magnani, M.B., Levander, A., Miller, K.M., Eshete\*, T., Karlstrom, K.E., 2005, Seismic investigations target the Yavapai-Mazatzal Transition Zone and the Jemez Lineament, *in* Karlstrom, K.E. and Keller, G.R., editors, The Rocky Mountain Region -- An Evolving Lithosphere: Tectonics, Geochemistry, and Geophysics: American Geophysical Union Geophysical Monograph 154, p. 227-238.

97. Magnani, B., Levander, A.R., Erslev, E.A., Bolay-Koenig\*, N., and Karlstrom, K.E., 2005, Listric thrust faulting in the Laramide from north-central New Mexico guided by Precambrian basement anisotropies *in* Karlstrom, K.E. and Keller, G.R., editors, The Rocky Mountain Region -- An Evolving Lithosphere: Tectonics, Geochemistry, and Geophysics: American Geophysical Union Geophysical Monograph 154, p. 239-252.

98. Keller, G.R., Karlstrom, K.E., Williams, M.L., Miller, K.C., Andronicos, C., Levander, A., Snelson, C., and Prodehl, C., 2005, The dynamic nature of the continental crust-mantle boundary: Crustal evolution in the Southern Rocky Mountain region as an example, *in* Karlstrom, K.E. and Keller, G.R., editors, The Rocky Mountain Region -- An Evolving Lithosphere: Tectonics, Geochemistry, and Geophysics: American Geophysical Union Geophysical Monograph 154, p. 403-420.

99. Karlstrom, K.E., Whitmeyer, S.J., Dueker, K., Williams, M.L., Levander, A., Humphreys, G., Keller, G.R., and the CD-ROM Working Group, 2005, Synthesis of results from the CD-ROM experiment: 4-D image of the lithosphere beneath the Rocky Mountains and implications for understanding the evolution of continental lithosphere, *in* Karlstrom, K.E. and Keller, G.R., editors, The Rocky Mountain Region -- An Evolving Lithosphere: Tectonics, Geochemistry, and Geophysics: American Geophysical Union Geophysical Monograph, 154, p. 421-441.

100. Karlstrom, K.E., and Williams, M.L., 2006, Nature of the middle crust - Heterogeneity of structure and process due to pluton-enhanced tectonism: an example from Proterozoic rocks of the North American Southwest, *in* Brown, M., and Rushmore, T., eds., Evolution and

Differentiation of the Continental Crust: Cambridge University Press, p. 268-295.

101. Levander, A., Lenardic, A., and Karlstrom, K.E., 2006, Structure of the continental crust, in Brown, M., and Rushmore, T., eds., Evolution and differentiation of the continental crust: Cambridge University Press: p. 21-66.
102. Anders\*, M.A., Pederson, J.L., Rittenhour, T.M., Sharp, W.D., Gosse, J.C., Karlstrom, K.E., Crossey, L.J., Goble, R.J., Stockli, L., and Yang, G., 2006, Pleistocene geomorphology and geochronology of eastern Grand Canyon: Linkages of landscape components during climate changes: *Quaternary Science Reviews* v. 24, p. 2428-2448.
103. Pederson, J.L., Anders\*, M.D., Rittenhour, T.M., Goble, R.J., Sharp, W.D., Gosse, J.C., Karlstrom, K.E., Crossey, L.J., and Finkel, R.C., 2006, Using fill terraces to understand incision rates and evolution of the Colorado River in eastern Grand Canyon, Arizona, *Journal of Geophysical Research - Earth Surface*, v. 111: F02003 doi:10.1029/2004JF000201.
104. Jessup\*, M.J., Karlstrom, K.E., Williams, M.L., Connelly, J.N., Heizler, M.T., Jones\*, J.V., 2006, Three Proterozoic orogenic episodes and an intervening exhumation event in the Black Canyon of the Gunnison region, Colorado, *Journal of Geology*, v. 114, p. 555-576.
105. Crossey, L.J., Fischer, T.P., Patchett, P.J., Karlstrom, K.E., Hilton, D.R., Newell, D.L., Huntoon, P., Reynolds, A.C., and de Leeuw, G.A.M., 2006, Dissected hydrologic system at the Grand Canyon: interaction between deeply derived fluids and plateau aquifer waters in modern springs and travertine: *Geology*, v. 34, p.25-28.
106. Bloch, J.D., Timmons\*, J.M., Gehrels, G.E., Karlstrom, K.E., and Crossey, L.J., 2006, The Petrology of Mesoproterozoic Unkar Group shales and detrital zircon geochronology of interbedded sandstones, Grand Canyon Supergroup: Grenvillian influence on sedimentation of inboard Rodinia: *Journal of Sedimentary Research*, v. 76, DOI 10.2110/jsr.2006.107.
107. Crowley, J.L., Schmitz, M.D., Bowring, S.A., Williams, M.L., and Karlstrom, K.E., 2006, U-Pb and Hf isotopic analysis of zircon in lower crustal xenoliths from the Navajo volcanic field: 1.4 Ga mafic magmatism and metamorphism beneath the Colorado Plateau: Contributions to Mineralogy and Petrology, DOI-10.1007/a00410-006-0061-z.
108. Cather, S.M., Karlstrom, K.E., Grauch, V.J.S., Heizler, M., and Timmons, J.M., 2006, A palinspastic reconstruction of Proterozoic basement-related aeromagnetic features in north-central New Mexico: Implications for Mesoproterozoic to late Cenozoic tectonism: *Geosphere*, v. 2, DOI 10.1130/GES00045.1. p. 229-323.
109. Dumond\*, G., Mahan, K., Williams, M.W., and Karlstrom, K.E., 2007, Metamorphism in middle continental crust, Upper Granite Gorge, Grand Canyon, Arizona: implications for segmented crustal architecture, processes at 25-km-deep levels, and unroofing of orogens: *Geological Society of America Bulletin*, v. 119: p. 202 – 22.
110. Whitmeyer\*, S., and Karlstrom, K.E., 2007, Tectonic model for the Proterozoic growth of North America: *Geosphere*, v. 3, no. 4, p. 220-259.
111. Karlstrom, K.E., Crow\*, R., McIntosh, W., Peters, L., Pederson, J., Raucci, J., Crossey, L.J., Umhoefer, P., Dunbar, N., 2007,  $^{40}\text{Ar}/^{39}\text{Ar}$  and field studies of Quaternary basalts in Grand Canyon and model for carving Grand Canyon: quantifying the interaction of river incision and normal faulting across the western edge of the Colorado Plateau: *Geological Society of America Bulletin*, v. 119, p. 1283-1312.

112. Karlstrom, K.E., and Murphy, B., 2007, From the Science Editors: Geological Society of America Bulletin, v. 119, p. 259.

113. Karlstrom, K.E., Whitmeyer\*, S.J., Williams, M.L., Bowring, S.A., and Jessup\*, M.J., 2007, Does the arc-accretion model adequately explain the Paleoproterozoic evolution of southern Laurentia: An expanded interpretation—Comment: *Geology*, DOI 10.1130/G23971C.1.

114. Aslan, A., Karlstrom, K., Hood, W., Cole, R., Oesleby, T., Betton, C., Sandoval\*, M.M., Darkling, A., Kelley, S., Hudson, A., Kaproth, B., Schoepfer, S., Benage, M., and Landman, R., 2007, River incision histories of the Black Canyon of the Gunnison and Unaweep Canyon: Interplay between late Cenozoic tectonism, climate change, and drainage integration in the western Rocky Mountains: Geological Society of America Field Guide 10: Roaming the Rocky Mountains and Environs: Geological Fieldtrips, p. 175-202, ISBN: 978-0-8137-0010-6

115. Li, Z.X., Bogdanova, S.V., Collins, A.S., Davidson, A., De Waele, B., Ernst, R.E., Fitzsimons, I.C.W., Fuck, R.A., Gladkochub, D.P., Jacobs, J., Karlstrom, K.E., Lu, S., Natapov, L.M., Pease, V., Pisarevsky, S.A., Thrane, K., Vernikovsky, V., 2008, Assembly, configuration, and break-up history of Rodinia: a synthesis, *Precambrian Research*, v. 160, p. 179-210.

116. Crow\*, R., Karlstrom, K.E., McIntosh, W., Peters, L., Dunbar, N., 2008, History of Quaternary volcanism and lava dams in western Grand Canyon based on LIDAR analysis,  $^{49}\text{Ar}/^{39}\text{Ar}$  dating, and field studies: Implications for flow stratigraphy, timing of volcanic events, and lava dams: *Geosphere*, v. 4, no. 1, doi 10.1130/geo00133.1, Feb 2008, issue.

117. Karlstrom, K., Semken, S., Crossey, L., Perry, D., Gyllenhaal, E. D., Dodick, J., Williams, M., Hellmich-Bryan, J., Crow\*, R., Bueno Watts, N., & Ault, C., 2008, Informal geoscience education on a grand scale: the Trail of Time exhibition at Grand Canyon. *Journal of Geoscience Education*, v. 56, no. 4, p. 354-361.

118. Karlstrom, K.E., Crow\*, R., Crossey, L.J., Coblenz, D., and van Wijk, J., 2008, Model for tectonically driven incision of the less than 6 Ma Grand Canyon: *Geology*, v. 36, no. 11, p. 835-838, 36, doi: 10.1130/G25032A.1, with Data Repository 2008218.

119. Jones, J.V. III, Connelly, J.N., Karlstrom, K.E., and Williams, M.L., and Doe\*, M.F., 2009, Age, provenance, and tectonic setting of Paleoproterozoic quartzite successions in the southwestern United States: *Geological Society of America Bulletin*, v. 121, p. 247-264.

120. Crossey, L.J., Karlstrom, K.E., Springer, A., Newell\*, D., Hilton, D., and Fischer, T., 2009, Degassing of mantle-derived  $\text{CO}_2$  and  $^3\text{He}$  from springs in the southern Colorado Plateau region—flux rates, neotectonics connections, and implications for understanding the groundwater system: *Geological Society of America Bulletin*, v. 121; no. 7/8; p. 1034–1053; doi: 10.1130/B26394.1

121. Williams, M. L., Karlstrom, K., Dumond\*, G., and Mahan, K. H., 2009, Perspectives on the architecture of continental crust from integrated field studies of exposed isobaric sections, in Miller, R., and Snee, A., eds., *Crustal cross-sections from the western North America Cordillera and elsewhere: Implications for tectonic and petrologic processes*: Boulder, Geological Society of America Special Paper 456, p. 1-23, doi:10.1130/2009.2456(08).

122. Darling\*, A., Karlstrom, K., Aslan, A., Cole, R., Bettonb, C., and Wan, E., 2009, Quaternary Incision Rates and Drainage Evolution of the Uncompahgre and Gunnison Rivers , as calibrated by Lava Creek B Ash: *Rocky Mountain Geology*, v. 44, p, 71-83.

123. Z.X. Li <sup>a,\*</sup>, S.V. Bogdanova , A.S. Collins<sup>c</sup>, A. Davidson , B. De Waele , R.E. Ernst, D.A.D. Evans I.C.W. Fitzsimons, R.A. Fuck , D.P. Gladkochub , J. Jacobs<sup>k</sup>, K.E. Karlstrom , S. Lu, L.M. Natapov , V. Pease , S.A. Pisarevsky, K. Thrane , V. Vernikovsky, 2009, How not to assemble a Precambrian supercontinent – Reply to comment by J.D.A. Piper on “Assembly, configuration, and break-up history of Rodinia: A synthesis” by Li, Z.X., Bogdanova, S.V., Collins, A.S., Davidson, A., De Waele, B., Ernst, R.E., Fitzsimons, I.C.W., Fuck, R.A., Gladkochub, D.P., Jacobs, J., Karlstrom, K.E., Lu, S., Natapov, L.M., Pease, V., Pisarevsky, S.A., Thrane, K., Vernikovsky, V.: Precambrian Research v. 160 (1-2), p. 179-210.

124. Quigley\*, M.C., Karlstrom, K.E., Kelley, S., and Heizler, M., 2010, Timing and mechanisms of basement uplift and exhumation in the Colorado Plateau–Basin and Range transition zone, Virgin Mountain anticline, Nevada-Arizona, *in* Umhoefer, P.J., Beard, L.S., and Lamb, M.A., eds., Miocene Tectonics of the Lake Mead Region, Central Basin and Range: Geological Society of America Special Paper 463, p. 311–329, doi: 10.1130/2010.2463(14).

125. Karlstrom, K.E., Heizler, M., and Quigley, M.C., 2010, Structure and  $^{40}\text{Ar}/^{39}\text{Ar}$  K-feldspar thermal history of the Gold Butte block: Reevaluation of the tilted crustal section model, *in* Umhoefer, P.J., Beard, L.S., and Lamb, M.A., eds., Miocene Tectonics of the Lake Mead Region, Central Basin and Range: Geological Society of America Special Paper 463, p. 331–352, doi: 10.1130/2010.2463(15).

126. Shufeldt\*, O.P., Karlstrom, K.E., Gehrels, G.E., and Howard, K., 2010, Archean detrital zircons in the Proterozoic Vishnu Schist of the Grand Canyon, Arizona: Implications for crustal architecture and Nuna reconstructions: Geology, v. 38, p. 1099 - 1102.

127. Crow\*, R., Karlstrom, K., Asmerom, Y., Schamndt, B., Polyak, V., and DuFrane, S.A., 2011, Shrinking of the Colorado Plateau via lithospheric mantle erosion: Evidence from Nd and Sr isotopes and geochronology of Neogene basalts, Geology, v. 39, p. 27-30.

128. Crow\*, R., Karlstrom, K.E., Crossey, L.J., Semken, S., Perry, D., Williams, M., and Bryan, J., 2011, It's about time: Innovations in geoscience education at Grand Canyon: Legacy, v. 22, p. 26-27.

129. Levander A., Schmandt, B., Miller, M.S., Liu, K., Karlstrom, K.E., Crow\*, R.S., and Humphreys, E.D., 2011, Regional Colorado Plateau Uplift by Delamination and Thermo-Chemical Downwelling of North American Lithosphere: Nature, v. 472, p. 461–465.

130. Banerjee, A., Person, M., Hofstra, A., Sweetkind, D., Cohen, D., Sabin, A., Unruh, J., Zivovoski, G., Gable, C.W., Crossey, L., and Karlstrom, K., 2011, Deep Permeable Fault-Controlled Helium Transport and Limited Mantle Flux in Two Extensional Geothermal Systems in the Great Basin, USA: Geology, v. 39, no. 3, p. 195-198.

131. Griffin, W.L., Begg, G.C., Dunn, D., O'Reilly, S.Y., Natapov, L.M., and Karlstrom, K., 2011, Archean lithospheric mantle beneath Arkansas: Continental growth by microcontinent accretion: Geological Society of America Bulletin, v. 123 p 1763-1775, 10.1130/B30253.1

133. Coblenz, D., C. G. Chase, K. E. Karlstrom, and J. van Wijk (2011), Topography, the geoid, and compensation mechanisms for the southern Rocky Mountains, Geochemistry, Geophysics, and Geosystems, v. 12, no. 4, Q04002, doi:10.1029/2010GC003459, 18 p.

134. Coblenz, D., and K. E. Karlstrom, 2011, Tectonic geomorphometrics of the Western U.S.: Speculations on the surface expression of upper mantle processes, Geochemistry, Geophysics, and

135. Gehrels, G.E., Blakey, R., Karlstrom, K.E. Timmons\*, J.M., Kelley, S., Dickinson, B., and Pecha, M., 2011, Detrital zircon U-Pb geochronology of Paleozoic strata in the Grand Canyon, Arizona: *Lithosphere*, doi: 10.1130/L121.1, v.3, p. 183-200.

136. Doe\*, M.F., Jones, J.V., III, Karlstrom, K.E., Thrane, K., Frei, D., Gehrels, G., and Pecha, M., 2012, Basin formation near the end of the 1.6-1.45 Ga tectonic gap in southern Laurentia: Mesoproterozoic Hess Canyon Group of Arizona and implications for 1.5 Ga supercontinent configurations: *Lithosphere*, v. 4, no. 1, p. 77-88.

137. Karlstrom, K.E., Coblenz, D., Dueker, K., Ouimet, W., Kirby, E., Van Wijk, J., Schmandt\*, B., Kelley, S., Lazear, G., Crossey, L.J., Crow\*, R., Aslan, A., Darling\*, A., Aster, R., MacCarthy\*, J., Hansen\*, S.M., Stachnik\*, J., Stockli, D.F., Hoffman\*, M., McKeon\*, R., Feldman\*, J., Heizler, M., Donahue\*, M.S., and the CREST working group, 2011, Surface response to mantle convection beneath the Colorado Rocky Mountains and Colorado Plateau: *Lithosphere*, v. 4 p. 3-22.

138. Darling\*, A., Karlstrom, K.E., Granger, D., Aslan, A., Kirby, E., Ouimet, W., Lazear, G., Coblenz, D., and Cole, R., 2012, New incision rates along the Colorado River system based on cosmogenic burial dating of terraces: implications for regional controls on differential incision: *Geosphere*, October 2012; v. 8; no. 5; p. 1020-1041.

139. Karlstrom, K.E., Beard, L.S., House, Kyle, Young, R.A., Aslan, A., Billingsley, G., Pederson, J., 2012, Introduction: CRevolution 2: Origin and Evolution of the Colorado River System II: *Geosphere*, v. 8, no. 6, p. 1020-1041.

141. Timmons\*, J.M., and Karlstrom, K.E., eds., 2012, Grand Canyon Geology: 2 Billion Years of Earth History: Geological Society of America Special Paper 489, 156 p.

142. Karlstrom, K.E., Crossey, L.C., Hilton, D.R., and Barry, P.H., 2013, Active mantle degassing above the Aspen Anomaly of Colorado: Mantle to surface interconnections and implications for neotectonics of the Rocky Mountains: *Geology*, v. 41, no. 4, p. 495-498, doi:10.1130/G34007.1.

143. Lee\* J.P. , Stockli, D.F., Kelley, S.A., Pederson, J.L., Karlstrom, K.E., Ehlers, T.A., 2013, New Thermochronometric Constraints on the Tertiary Landscape Evolution of Central and Eastern Grand Canyon, Arizona: *Geosphere*, v.9, no.2, p. 216-228, doi:10.1130/GES00842.1.

144. Nereson\*, A., Stroud, J., Karlstrom, K.E., Heizler, M., McIntosh, W., 2013, Dynamic topography of the western Great Plains: Geomorphic and 40Ar/39Ar evidence for mantle-driven uplift associated with the Jemez lineament of NE New Mexico and SE Colorado: *Geosphere*, v.9, p. 521-545, doi:10.1130/GE500837.1.

145. Williams\*, A.J., Crossey, L.J., Karlstrom, K.E., Newell, D., Person, M., and Woolsey\*, E., 2013, Hydrogeochemistry of the Middle Rio Grande aquifer system – fluid mixing and salinization of the Rio Grande due to fault inputs: *Chemical Geology*, v. 351, p. 281-298.

146. Lazear, G., Karlstrom, K.E., Aslan, A., and Kelley, S., 2013, Denudation and flexural isostatic response of the Colorado Plateau and southern Rocky Mountain region since 10 Ma: *Geosphere*, v.9, no.4, p. 792-814, doi:10.1130/GEO00836.1.

147. Karlstrom, K.E., Darling\*, A., Crow, R., Lazear, G., Aslan, A., Granger, D., Kirby, E., Crossey, L., and Whipple, K., 2013, Colorado River chronostratigraphy at Lee's Ferry, Arizona, and the

148. Doe\*, M.F., Jones, J.V. III, Karlstrom, K.E., Dixon\*\*, B., Gehrels, G., and Pecham M., 2013, Using detrital zircon ages and Hf isotopes to identify 1.48 1 -1.45 Ga sedimentary basins and fingerprint sources of exotic 1.6-1.5 Ga grains in southwestern Laurentia: Precambrian Research, v. 231, p. 409-421: <http://dx.doi.org/10.1016/j.precamres.2013.03.002>.

149. Karlstrom, K.E., Lee, J., Kelley, S., Crow\*, R., Young, R., Lucchitta, I., Beard, S., Dorsey, R., Ricketts, J., Dickinson, W., and Crossey, L., 2013, Comment on: "Apatite  $^{4}\text{He}/^{3}\text{He}$  and (U-Th)/He evidence for an ancient Grand Canyon: Science: v. 340, no. 6129 p. 143, DOI: 10.1126/science.1233982

150. Donahue\*, M.S., Karlstrom, K.E., Aslan, A., Darling, A., Granger, D., Wan, E., Dickinson, R., and Kirby, E., 2013, Quaternary bedrock incision of the ~ 1 Ma Black Canyon of the Gunnison, Colorado, associated with knickpoint transience and mantle-driven uplift: Geosphere, v.9, p. 815-826.

151. Hansen, S. M., K. G. Dueker, J. C. Stachnik, R. C. Aster, and K. E. Karlstrom (2013), A rootless Rockies— Support and lithospheric structure of the Colorado Rocky mountains Inferred from CREST and TA seismic data, Geochemistry, Geophysics, Geosystems: v.14, no. 8, p. 2670–2695, doi:10.1002/ggge.20143.

152. Love, A.J., Shand, P., Karlstrom, K.E., Crossey, L.J., Rousseau-Gueutin, P., Priestley, S., 2013, Geochemistry and Travertine Dating Provide New Insights into the Hydrogeology of the Great Artesian Basin, South Australia: Procedia Earth and Planetary Science, v. 7, p. 521-524.

153. Wolaver, B.D., Crossey, L.J., Karlstrom, K.E., Banner, J.L., Cardenas, M.B., Ojeda, C.G., Sharp, J.M., 2013, Identifying origins of and pathways for spring waters in a semiarid basin using He, Sr, and C isotopes: Cuatrocienegas Basin, Mexico: Geosphere 9 (1), 113-125

154. Schmandt, B., Aster, R., Dirk Scherler, D., Tsai., V., and Karlstrom, K., 2013, Multiple fluvial processes detected by riverside seismic and infrasound monitoring of a controlled flood in the Grand Canyon: Geophysical Research Letters, v. 40 (18) p. 4858-4863.

155. Colman\*, D.R., Garcia\*, J.R., Crossey, L.J., Karlstrom, K.E., Jackson-Weaver, O, Takacs-Vesbach, T., 2014, An analysis of geothermal and carbonic springs in the western United States sustained by deep fluid inputs: Geobiology v. 12 (1), p. 83-98.

156. Karlstrom, K.E., Lee, J., Kelley, S., Crow, R., Crossey, L.J., Young, R., Lazear, G., Beard, L.S., and Ricketts, J., Fox, M., Shuster D., 2014, Formation of the Grand Canyon 5 to 6 million years ago through integration of older palaeocanyons: Nature Geoscience, v. 7, p. 239- 244, with Supplementary materials.

157. Mahon\*, R.C., Dehler, C.M, Link, P.K., Karlstrom, K.E., and Gehrels, G.E., 2014, Geochronologic and stratigraphic constraints on the Mesoproterozoic and Neoproterozoic Pahrump Group, Death Valley, California: A record of the assembly, stability, and breakup of Rodinia: Geological Society of America Bulletin: v. 126, no 5-6, p. 652-664, doi: 10.1130/B30956.1 with data repository 2014108.

158. Ricketts\*, J., Karlstrom, K.E., Crossey, L.J., and Prievisch\*, A., 2014, Persistent Quaternary extension in the Rio Grande rift at elevated strain rates: Interaction between magmatism, fluid-enhanced paleoseismicity, and travertine deposition documented in central New Mexico: Lithosphere, v. 6, p. 3-16, doi:10.1130/L278.1

159. Aslan, A., Hood, W.C., Karlstrom, K.E., Kirby, E., Granger, D.E., Kelley, S., Crow, R., Donahue, M.S., Polyak, V., and Asmerom, Y., 2014, Abandonment of Unaweep Canyon (1.4–0.8 Ma), western Colorado: Effects of stream capture and anomalously rapid Pleistocene river incision: *Geosphere*, v. 10, no. 3, p. 428-446, doi:10.1130/GES00986.1.

160. Crow\*, R., Karlstrom, K.E., Darling, A., Crossey, L.J., Polyak, V., Granger, D., Asmerom, Y., and Schmandt, B. 2014, Steady incision of Grand Canyon at the million year timeframe: a case for mantle-driven differential uplift: *Earth and Planetary Science Letters*, v. 397, p. 159–173.

161. MacCarthy\*, J.K., Aster, R.C., Dueker, K., Hansen, S., Borchers, B., Karlstrom, K.E., 2014, Seismic Tomography of the Colorado Rocky Mountains Upper Mantle from CREST: Lithosphere-Asthenosphere Interactions and Mantle Support of Topography: *Earth and Planetary Science Letters* v. 119, p. 107-119.

162. Mahon\*, R.C., M.S.; Dehler, C.M., Link, P.K., Karlstrom, K.E., Gehrels, G.E., 2014, Detrital zircon provenance and paleogeography of the Pahrump Group and overlying strata, Death Valley, California: *Precambrian Research*, v. 251, p. 102-117.

163. Rosenberg\*, R., Kirby, E., Aslan, A., Karlstrom, K., Heizler, M., and Ouimet, W., 2014, Late Miocene erosion and evolution of topography along the western slope of the Colorado Rockies: *Geosphere*, v. 14, no. 10, p. no. 4, doi:10.1130/GES00989.1

164. Priesisch\*, A., Crossey, L.J., Karlstrom, K.E., Polyak, V.J., Asmerom, Y., Nereson, A., and Ricketts, J.W., 2014, U-series geochronology of large-volume Quaternary travertine deposits of the southeastern Colorado Plateau: Evaluating episodicity and tectonic and paleohydrologic controls: *Geosphere* v. 10, no. 2, doi:10.1130/GES00946.1.

165. Dickinson, W.R., Karlstrom, K.E., Grove, M.J., Hanson, A.D., Gehrels, G.E., Pecha, M., Cather, S., Crossey, L.J., Kimbrough, D.L., and Muntean, T.W., 2014, Detrital-zircon U-Pb evidence precludes paleo-Colorado River sediment in the exposed Muddy Creek Formation of the Virgin River depression: *Geosphere*, v. 10, p. 1123-1138, doi:10.1130/GES01097.1.

166. Howald, T., Person, M., Campbell, A., Lueth, V., Hofstra, A., Sweetkind, D., Gabel, C., Banerjee, A., Luijendijk, E., Crossey, L., Karlstrom, K., Kelley, S., and Phillips, F., 2014, Evidence for Long-Time Scale (> 103 years) Changes in Hydrothermal Activity Induced by Seismic Events: *Geofluids*, doi: 10.1111/gfl.12113.

167. Bickford, M.E., Van Schmus, W.R., Karlstrom, K.E., and others, 2015, Mid-Continent Mesoproterozoic Granite-Rhyolite Provinces revisited: evidence from new SHRIMP U-Pb ages, zircon saturation temperatures, and Hf isotopic compositions: in preparation for Roberts et al., 'The structural, metamorphic and magmatic evolution of Mesoproterozoic orogens': *Precambrian Research* special issue, v. 65, p. 286-312, doi.org/10.1016/j.precamres.2014.11.024.

168. Crossey, L.C., Karlstrom, K.E., Dorsey, R., Pearce, J., Wan, E., Beard, L.S., Asmerom, Y., Polyak, V., Crow, R.S., Cohen, A., Bright, J., Huth, 2015, The importance of groundwater in propagating downward integration of the 6-5 Ma Colorado River System: Geochemistry of springs, travertines and lacustrine carbonates of the Grand Canyon region over the past 12 million years: *Geosphere*, v. 11, no. 3, p. 660-682.

169. Ricketts\*, J.W., Karlstrom, K.E., and Kelley, S.A., 2015, Embryonic core complexes in narrow continental rifts: The importance of low-angle normal faults in the Rio Grande rift of central New Mexico: *Geosphere*, v. p. doi:10.1130/GES01109.1.

170. Holland\*, M.E.Karlstrom1, K.E., Doe, M.F., Gehrels, G.E., Pecha, M., Shufeldt, O.P., Begg, G., Griffin, W.L., Belousova, E., 2015, An imbricate midcrustal suture zone: the Mojave-Yavapai Province boundary in Grand Canyon, Arizona: *Geological Society of America Bulletin*, v. 127 no. 9-10 p. 1391-1410, doi: 10.1130/B31232.1; 15 figures; 1 table; Data Repository item 2015158.

171. Crow\*, R.S., Karlstrom, K.E., McIntosh, W., Peters, L., Crossey, L., and Eyster\*, A., 2015, A new model for Quaternary lava dams in Grand Can-yon based on 40Ar/39Ar dating, basalt geochemistry, and field mapping: *Geosphere*, v. 11, no. 5, p. 1-38, doi:10.1130/GES01128.1.

172. Seixas\*, G., Resor, P., Pearce, J.L., Karlstrom, K., and Crossey, L., 2015, Constraints on the evolution of vertical deformation and Colorado River incision near eastern Lake Mead, AZ, provided by quantitative structural mapping of the Hualapai Limestone: *Geosphere* v. 11, p. 31-49, doi:10.1130/GES01096.1.

173. Channer\*\*, M.A., Ricketts\*, J.W., Zimmerer, M., Heizler, M., and Karlstrom, K.E., 2015, Surface uplift above the Jemez mantle anomaly in the past 4 Ma based on 40Ar/39Ar dated paleoprofiles of the Rio San Jose, New Mexico, USA: *Geosphere*, v.11, no. 5, p. 1384-1400.doi:10.1130/GES01145.

174. Crossey, L.J., Karlstrom, K.E., Schmandt, B., Crow\*, R., Coleman\*, D., Cron\*, B., Takacs-Vesbach, T.D., Dahm, C., Northup, D.E., Hilton, D.R., Ricketts\*, J.R., Lowry, A.R., 2016, Continental smokers couple mantle degassing and unique microbiology within continents: *Earth and Planetary Science Letters*, v. 435, p. 22-30, <http://dx.doi.org/10.1016/j.epsl.2015.11.039>.

175. Mako\*, C.A., Williams, M.L., Karlstrom, K.E., Doe\*, M.F., Powicki, D., Holland\*, M.E., Gehrels, G., and Pecha, M., 2015, Polyphase Proterozoic deformation in the Four Peaks area, central Arizona, and relevance for the Mazatzal orogeny: *Geosphere*, v. 11, no. 6, doi10.1130/GES01196.1.

176. Schmandt, B., Lin, Fan-Chi, Karlstrom, K.E., 2015, Distinct crustal isostasy trends east and west of the Rocky Mountain Front: *Geophysical Research Letters*, v. 42, p. 10,290–10,298.

177. Crow, R., Karlstrom, K.E., Crossey, L., Young, R., Ort, M.H., Asmerom, Y., Polyak, V., 2015, Rates of river incision and scarp retreat in eastern and central Grand Canyon over the past half million years: Evidence for passage of a transient knickzone: *COMMENT*, *Geosphere* v. 11, no. 6, p. 2130-2131.

178. Ricketts\*, J.W., Kelley, S.A., Karlstrom, K.E., Schmandt, B., Donahue, M.S., and van Wijk, J., 2016, Synchronous opening of the Rio Grande rift ~20-10 Ma supported by apatite (U-Th)/He and fission-track thermochronology, and evaluation of possible driving mechanisms: *Geological Society of America Bulletin*, v. 128, p. 397-424.

179. Hereford, R., Beard, L.S., Dickinson, W.R., Karlstrom, K.E., Amarosa, L., and House, P.K., 2016, The Miocene White Mesa-Crooked Ridge Paleovalley—Its Age, Origin, and Relation to the Ancestral Pre-Canyon Cutting Colorado River System, Northeast Arizona: *Geosphere* CRevolution volume, v. 12, no. 3, p. 768-789, doi:10.1130/GES01124.1.

180. Mohammed\*, A. M., Krishnamurthy, R.V., Kehew, A.E., Crossey, L.J., and Karlstrom, K.E., 2016, Factors affecting the stable isotopes ratios in groundwater impacted by intense agricultural practices: A case study from the Nile Valley of Egypt: *Science of the Total Environment*, v. 573, p. 707-715.

181. Karlstrom, K.E., Crossey, L.J., Embid\*, E., Crow\*, R., Heizler, M., Hereford, R., Beard, L.S., Ricketts\*, J.W., Cather, S., Kelley, S., 2017, Cenozoic incision history of the Little Colorado River: its role in carving Grand Canyon and onset of rapid incision in the last ~2 Ma in the Colorado River System: *Geosphere* CRevolution volume, v. 13, no. 1, p. 49-81 doi:10.1130/GES01304.1.

182. Dehler, C., Gehrels, G., Porter, S., Heizler, M., Karlstrom, K.E., Cox, G., Crossey, L.C., and Timmons, J.M., 2017, Synthesis of the 780–740 Ma Chuar, Uinta Mountain, and Pahrump groups (ChUMP), western USA: Implications for Laurentia-wide cratonic marine basins: *Geological Society of America Bulletin*, v. 129, p. 607-624, doi: 10.1130/B31532.1.

183. Mulder\*, J. A., Karlstrom, K. E., Fletcher\*, K., Heizler, M. T., Timmons, J. M., Crossey, L. J., Gehrels, G. E., and Pecha, M., 2017, The syn-orogenic sedimentary record of the Grenville Orogeny in southwest Laurentia: *Precambrian Research*, v. 294, p. 33–52.

184. Winn\*, C. Karlstrom, K.E., Shuster, D.K., Kelley, S., and Fox, M., 2017, 6 Ma Age of carving Westernmost Grand Canyon: Reconciling geologic data with combined AFT, (U-Th)/He, and  $^4\text{He}/^3\text{He}$  thermochronologic data: *Earth and Planetary Science Letters*, v. 474, p. 257-271.

185. Fox, M., Tripathy-Langa, A., Shuster, D.L., Winn\*, C., Karlstrom, K.E., and Kelley, S., 2017, Westernmost Grand Canyon incision: Testing thermochronometric resolution: *Earth and Planetary Science Letters*, v. 474, p. 248-256.

186. Repasch\*, M., Karlstrom, K.E., and Heizler, M., 2017, Birth and evolution of the Rio Grande fluvial system in the last 8 Ma: Progressive downward integration and interplay between tectonics, volcanism, climate, and river evolution: *Earth-Science Reviews*, v. 168, p. 113–164.

187. Hrncir\*, J.A., Karlstrom, K.E., and Dahl, P., 2017, Wyoming on the Run-Toward final Paleoproterozoic assembly of Laurentia: COMMENT, *Geology*, doi:10.1130/G38826C.1

188. Aslan, A., Boraas-Connors, M., Sprinkel, D., Becker, T.P., Lynds, R., Karlstrom, K.E., and Heizler, M., 2018, Cenozoic collapse of the eastern Uinta Mountains and drainage evolution of the Uinta Mountains region: *Geosphere*, v. 13, no. 6, p. 1–26, doi:10.1130/GES01523.1.

189. Rooney, A.D., Austermann, J., Smith, E.F., Yang, L., Selby, D., Dehler, C.M., Schmitz, M.D., Karlstrom, K.E., and Macdonald, F.A., 2018, Coupled Re-Os and U-Pb geochronology of the Tonian Chuar Group, Grand Canyon: *Geological Society of America Bulletin*, v. 129, p. 1085-1098.

190. Priestley\*, S. C., Karlstrom, K. E., Love, A. J., Crossey, L. J., Polyak, V., Asmerom, Y., Keppel, M., Habermehl, M. A., 2018, Paleodischarge record of the Great Artesian Basin of Australia using Uranium series dating of raveline deposits: Implications for palaeohydrogeology and palaeoclimate: *Palaeogeography, Palaeoclimatology, Palaeoecology*, v. 490, p. 163–177.

191. Pecha, M.E., Gehrels, G.E., Karlstrom, K.E., Dickinson, W.R., Donahue, M.S., Gonzales, D.A., and Blum, M.D., 2018, Provenance of Cretaceous through Eocene strata of the Four Corners region: Insights from detrital zircons in the San Juan Basin, New Mexico and Colorado: *Geosphere*, v. 14, no. 2, p. 1–27, doi:10.1130/GES01485.1.

192. Holland\*, M.E., Karlstrom, K.E., Gehrels, G., Shufeldt, O.P., Begg, G., Griffin, W., and Belousova, E., 2018, The Paleoproterozoic Vishnu basin in southwestern Laurentia: Implications for supercontinent reconstructions, crustal growth, and the origin of the Mojave crustal province:

193. Karlstrom, K.E., Hagadorn, J., Gehrels, G.G., Mathews, W., Schmitz, M., Madronich, L., Mulder, J., Pecha, M., Geisler, D., and Crossey, L.J., 2018, Cambrian Sauk transgression in the Grand Canyon region redefined by detrital zircons: *Nature Geoscience*, v. 11, p. 438-443.
194. Lamb, M.A., Beard, L.S., Dragos, M., Hanson, A.D., Hickson, T.A., Sitton, M., Umhoefer, P.J., Karlstrom, K.E., Dunbar, N., and McIntosh, W., 2018, Provenance and paleogeography of the 25–17 Ma Rainbow Gardens Formation: Evidence for tectonic activity at ca. 19 Ma and internal drainage rather than throughgoing paleorivers on the southwestern Colorado Plateau: *Geosphere* v. 14, p. , , <https://doi.org/10.1130/GES01127.1>.
195. Mulder, J.A., Karlstrom, K.E., Halpin, J.A., Spencer, C.J., Berry, R.F., Merdith, A.S., Gehrels, G.E., Pecha, M., McDonald, B., 2018, Rodinian devil in disguise: Correlation of 1.25–1.10 Ga strata between Tasmania and Grand Canyon refines Rodinia: *Geology*, v. 46, p. 991-994.
196. Crow, R., Karlstrom, K.E., Crossey, L.J., Polyak, V., Asmerom, Y., McIntosh, W., 2018, Carving Grand Canyon's inner gorge: a test of steady incision versus rapid knickzone migration: *Geosphere*: v. 14, no. 5, p. 2140-2156.
197. McGibbon, C., Crossey, L.C., Karlstrom, K.E. and Grulke, T., 2018, Carbonic springs as distal manifestations of geothermal systems, highlighting the importance of fault pathways and hydrochemical mixing: Example from the Jemez Mountains, New Mexico: *Applied Geochemistry*, v. 98, p. 45-57.
198. Eyster, A.E., Weiss, B.P., Karlstrom, K.E., Kremers, J.K., Macdonald, F.A., 2019, Paleomagnetism of the Chuar Group and evaluation of the 780-720 Ma apparent polar wander path of Laurentia with implications for the makeup and breakup of Rodinia: *Geological Society of America Bulletin*, <https://doi.org/10.1130/B32012.1>.
199. Walk, C.J., Karlstrom, K.E., Crow, R.S., and Heizler, M.T., 2019, Birth and evolution of the Virgin River fluvial system: ~1 km of post-5 Ma uplift of the western Colorado Plateau: *Geosphere*, v. 15, no. X, p. 1–24, <https://doi.org/10.1130/GES02019.1>
200. Blomgren, V., Crossey, L.J., Karlstrom, K.E., and Fischer, T., 2019, Hot spring hydrochemistry on opposite sides of the Rio Grande rift in northern New Mexico and a geochemical connection between Valles Caldera and Ojo Caliente: *Journal of Volcanology and Geothermal Research*, in press.
201. Crow, R., Howard K., Beard, S., Pearthe, P. A., House, P. K., Karlstrom, K.E., Peters, L., McIntosh W., Cassidy, C., Felger, T., and Block, D., 2019, Insights into post-Miocene uplift of the western margin of the Colorado Plateau from the stratigraphic record of the lower Colorado River: *Geosphere*, v. 15, no. 6, p. 1826-1845, <https://doi.org/10.1130/GES02020.1>.
202. Karlstrom, K., Crossey, L., Huntoon, P., Billingsley, G., Timmons, M., Crow, R., 2019, One Hundred and Sixty Years of Grand Canyon Geological Mapping: *Journal of Arizona History*, v. 60, n. 4, p. 655-674.
203. Keppel, M.N., Karlstrom, K.E., Crossey, L., Love, A.J., and Priestley, S., 2019, Evidence for intra-plate seismicity from spring-carbonate mound springs in the Kati Thanda–Lake Eyre region, South Australia: implications for groundwater discharge from the Great Artesian Basin: *Hydrogeology Journal*, <https://doi.org/10.1007/s10040-019-02049-1>

204. Karlstrom, K.E., and Crossey, L.J., 2019, Classic Rock Tours 3. Grand Canyon Geology, One hundred and Fifty Years after John Wesley Powell: A geology guide for visiting the south Rim of Grand Canyon National Park: Geoscience Canada, v. 46, p. 163-193, <https://doi.org/10.12789/geocanj.2019.46.153>,

205. Karlstrom, K.E., and Crossey, L., 2019, The Grand Canyon Trail of Time Companion: Geology essentials for your canyon adventure: Albuquerque, NM, Trail of Time Press, 142 p.

206. Karlstrom, K.E., Crossey, L.J., Huntoon, P., Billingsley, G. Timmons, J.M., Crow R., 2019, One Hundred and Sixty Years of Grand Canyon Geological Mapping: Journal of Arizona History, Volume 60, Number 4, Winter 2019, pp. 655-674.

207. Aslan, A., Karlstrom, K.E., Kirby, E., Heizler, M.T., Granger, D.E., Feathers, J.F., Hanson, P.R., Mahan, S.A., 2019, Resolving time-space histories of Late Cenozoic bedrock incision along the Upper Colorado River, USA: Geomorphology, v. 347, <https://doi.org/10.1016/j.geomorph.2019.106855>.

208. Wolaver, B.D., Priestley, S.C., Crossey, L.J., Karlstrom, K.E., Love, A.J., 2019, Elucidating sources to aridland Dalhousie Springs in the Great Artesian Basin (Australia) to inform conservation: Hydrogeology Journal, <https://doi.org/10.1007/s10040-019-02072-2>

209. Karlstrom, K.E., Mohr, M.T., Schmitz, M.D., Sundberg F.A., Rowland, S.M., Blakey, R., Foster, J.R., Crossey, L.J., Dehler, C.M., and Hagadorn, J.W., 2020, Redefining the Tonto Group of Grand Canyon and recalibrating the Cambrian time scale: Geology, v. 48, p. 425-430, <https://doi.org/10.1130/G46755.1>.

210. Sundberg, F.A., Karlstrom, K.E., Geyer, G., Foster, J.R., Hagadorn, J.W., Mohr, M.t., Schmitz, M.D., Dehler, C.M., and Crossey, L.J., 2020, Asynchronous trilobite extinctions at the early to middle Cambrian transition: Geology, v. 48, p. <https://doi.org/10.1130/G46913.1>.

211. Karlstrom, K.E., Crossey, L.J., Humphreys, E., Shuster, D., Whipple, K., and Crow, R. 2020, Age and Carving of Grand Canyon: Toward a Resolution of 150 Years of Debate: GSA Today, v. 30, n. 2, <https://doi.org/10.1130/GSAT-TFF-GC.1>.

212. Karlstrom, K.E., and Crossey, L.J., 2020, Depicting Grand Canyon's Rock Layers: 150 years of Visualizing and Interpreting Geology, in, Quartermo, Richard, editor, Celebrating 100 Years of Grand Canyon National Park: A Gathering of Grand Canyon Historians: Ideas, Arguments, and First-Person Accounts, Symposium Proceedings of the Grand Canyon Historical Society, Grand Canyon, Arizona: Grand Canyon Conservancy, 2020, v. 5, chapter 31.

213. Thacker, J.O., Karlstrom, K.E., Crossey, L.J., Crow, R., Beard, L.S., Dorsey, R.J., 2017, Hypothesis for post-Bouse distributed deformation of the Lower Colorado River corridor: ECSZ Does It, Revisiting the Eastern California shear zone, Robert E. Reynolds, editor, p. 158- 164.

214, Frus, R.J., Crossey, L.J., Dahm, C.N., Karlstrom, K.E., Crowley, L., 2020, Influence of Desert Springs on Habitat of Endangered Zuni Bluehead Sucker (*Catostomus discobolus yarrowi*): Environmental & Engineering Geoscience, Vol. XXVI, No. 2, pp. 1-17

215. Karlstrom, K.E., Jacobson, C.A., Sundell, K.E., Eyster, A., Blakey, R., Ingersoll, R.V., Mulder, J.A., Young, R.A., Beard, L.S., Holland, M.E., Shuster, D.L., Winn, C., and Crossey, L.J., 2020, Evaluating the Shinumo-Sespe drainage connection: Arguments against the “old” (70–17 Ma) Grand Canyon models for Colorado Plateau drainage evolution: Geosphere, v. 16, <https://doi.org/10.1130/GES02265.1>

216. Thacker, J.O., Karlstrom, K.E., Crossey, L.J., Crow, R.S., Cassidy, C.E., Beard, L.S., Singleton, J.S., Strickland, E.D., Seymour, N.M., and Wyatt, M.R., 2020, Post-12 Ma deformation in the lower Colorado River corridor, southwestern USA: Implications for diffuse transtension and the Bouse Formation: *Geosphere*, v. 16, no. 1, p. 111–135, <https://doi.org/10.1130/GES02104.1>.

217. Wolaver, B.D., Priestley, S.C., Crossey, L.J., Karlstrom, K.E. and Love, A.J., 2020. Elucidating sources to aridland Dalhousie Springs in the Great Artesian Basin (Australia) to inform conservation. *Hydrogeology Journal*, 28(1), p.279-296.

218. Priestley, S.C., Karlstrom, K.E., Love, A.J., Crossey, L.J., Polyak, V.J., Asmerom, Y., Meredith, K.T., Crow, R., Keppel, M.N. and Habermehl, M.A., 2020. Reply to Comment on" Uranium series dating of Great Artesian Basin travertine deposits: Implications for palaeohydrogeology and palaeoclimate" by Uysal et al. (2019). *Palaeogeography Palaeoclimatology Palaeoecology*, 537, p.109421.

219. Keppel, M.N., Karlstrom, K., Crossey, L. et al., 2020, Evidence for intra-plate seismicity from spring-carbonate mound springs in the Kati Thanda–Lake Eyre region, South Australia: implications for groundwater discharge from the Great Artesian Basin. *Hydrogeol J* 28, 297–311 (2020). <https://doi.org.libproxy.unm.edu/10.1007/s10040-019-02049-1>

220. Holland\*, M.E., Grambling\*\*, T.A., Karlstrom, K.E., Jones, J.V. III, Nagotko\*\* K.N., and Daniel, C.G., 2020, Geochronologic and Hf-isotope framework of Proterozoic rocks from central New Mexico, USA: Formation of the Mazatzal crustal province in an extended continental margin arc: *Precambrian Research*, v. 347, <https://doi.org/10.1016/j.precamres.2020.105820>.

221. Robertson, J.E., Karlstrom, K.E., Heizler, M.T., and Crossey, L.C., 2021, Realignments of the Colorado River by ~2 m.y. of rotational bedrock landsliding: The Surprise Valley landslide complex, Grand Canyon, Arizona: *Geosphere*, v. 17, <https://doi.org/10.1130/GES02280.1>.

222. Crow, R., Schwing, J., Karlstrom, K.E., Heizler, M., Pearthree, P., House, P.K., Dulin, S., Janeke, S.U., Stelten, M., and Crossey, L.J., 2021, Refining the age of the Colorado River: *Geology*, v. 49., <https://doi.org/10.1130/G48080.1>

223. Anderson, J.C., Karlstrom, K.E., and Heizler, M.T., 2021, Neogene drainage reversal and Colorado Plateau uplift in the Salt River area, Arizona, USA: *Geomorphology*, v. <https://doi.org/10.1016/j.geomorph.2021.107964>

224. Karlstrom, K.E., Crossey, L.J., Mathis, A, and Bowman, C., 2021, Telling Time at Grand Canyon National Park, 2020 Update: *Natural Resource Report NPS/GRCA/NRR—2021/2246*

225. Heizler, M.T., Karlstrom, K.E., Albonico, M., Hereford, R., Beard, L.S., Cather, S.M., Crossey, L.J., and Sundell, K.E., 2021, Detrital sanidine  $^{40}\text{Ar}/^{39}\text{Ar}$  dating confirms <2 Ma age of Crooked Ridge paleoriver and subsequent deep denudation of the southwestern Colorado Plateau: *Geosphere*, v. 17, no. X, p. 1– 17, <https://doi.org/10.1130/GES02319.1>.

226. Seaman, S.J., Williams, M.L., Karlstrom, K.E., and Low, P.C., 2021, Petrogenesis of the 91-Mile peridotite in the Grand Canyon: Ophiolite or deep-arc fragment?: *Geosphere*, v. 17, no. X, p. 1– 18, <https://doi.org/10.1130/GES02302.1>.

227. Thacker, J. O., Kelley, S. A., & Karlstrom, K. E., 2021, Cretaceous–Recent low-temperature cooling history and tectonic analysis of the Zuni Mountains, west-central New Mexico. *Tectonics*, 40, e2020TC006643. <https://doi.org/10.1029/2020TC006643>

228. Ricketts, J.W., Roiz, J., Karlstrom, K.E., Heizler, M.T., Guenthner, W.R., and Timmons, J.M., 2021, Tectonic controls on basement exhumation in the southern Rocky Mountains (United States): The power of combined zircon (U-Th)/He and K-feldspar 40Ar/39Ar thermochronology: *Geology*, v. 49, <https://doi.org/10.1130/G49141.1>.

229. Thurston, O.G., Guenthner, W.R., Karlstrom, K.E., Ricketts, J.W., Heizler, M.T., and Timmons, J.R., 2021, Zircon (U-Th)/He thermochronology of Grand Canyon resolves 1250 Ma unroofing at the Great Unconformity and <20 Ma canyon carving: *Geology*, v. <https://doi.org/10.1130/G48699.1>.

230. Karlstrom, K.E., Wilgus, J., Thacker, J.O., Schmandt, B., Coblenz, D., and Albonico, M., 2022, Tectonics of the Colorado Plateau and Its Margins: *Annual Reviews of Earth and Planetary Sciences*, 50:295-322, <https://doi.org/10.1146/annurev-earth-032320-111432>.

231. Crow, R., Schwing, J., Karlstrom, K.E., Heizler, M., Pearthree, P., House, P.K., Dulin, S., Janeke, S.U., Stelten, M., and Crossey, L.J., 2021, Redefining the age of the lower Colorado River, southwestern United States: REPLY, *Geology*, v. 49 (9), e532–e533 <https://doi.org/10.1130/G49334Y.1>

232. Karlstrom, K.E., Guenthner, W.R., Thurston, O.G., Heizler, M.T., Ricketts, J.W., and Timmons, J.M., 2022, COMMENT Zircon (U-Th)/He thermochronology reveals pre-Great Unconformity paleotopography in the Grand Canyon region, USA: *Geology*, <https://doi.org/10.1130/G49843C.1>

233. Mohammed, A.M., Crossey, L.J., Karlstrom, K.E., Krishnamurthy, R.V., Kehew, A.E., Darrah, T.H., Emry, E.L., 2022, Mantle-derived fluids in the continental-scale Nubian aquifer: *Chemical geology*, <https://doi.org/10.1016/j.chemgeo.2022.121023>.

234. Pecha, M.E., Blum, M.D., Gehrels, G.E., Sundell, K.E., Karlstrom, K.E., Gonzales, D.A., Malone, D.H., and Mahoney, J.B., 2022, Linking the Gulf of Mexico and Coast Mountains batholith during late Paleocene time: Insights from Hf isotopes in detrital zircons, in Craddock, J.P., Malone, D.H., Foreman, B.Z., and Konstantinou, A., eds., *Tectonic Evolution of the Sevier-Laramide Hinterland, Thrust Belt, and Foreland, and Postorogenic Slab Rollback (180–20 Ma): Geological Society of America Special Paper 555*, p. 265–292, [https://doi.org/10.1130/2021.2555\(10\)](https://doi.org/10.1130/2021.2555(10)).

235. Klemperer, S.L., Ping, Zhao, Whyte C.J., Thomas H. Darrah, T.H., Crossey, L.J., Karlstrom, K.E., Liu, T., Winn, C., Hilton, D.R., and Ding, L., 2022, Limited underthrusting of India below Tibet:  $^3\text{He}/^4\text{He}$  analysis of thermal springs locates the mantle suture in continental collision: *Proceedings of the National Academy of Sciences*, v. 119, no. 12, <https://doi.org/10.1073/pnas.2113877119>.

236. McGibbon\*, C., Crossey, L.J., and Karlstrom, K.E., 2022, Fence Spring system of Grand Canyon: Insight into the karst aquifer system of the Colorado Plateau region: *Hydrogeology Journal*, <https://doi.org/10.1007/s10040-022-02541-1>

237. Thacker J.O., Karlstrom, K.E., Kelley, S.A., Crow, R.S., J. Kendall, J.J., 2023, Late Cretaceous time-transgressive onset of Laramide arch exhumation and basin subsidence across northern Arizona–New Mexico, USA, and the role of a dehydrating Farallon flat slab: *Geological Society of America Bulletin*, v. 135; no. 1/2; p. 389–406; <https://doi.org/10.1130/B36245.1>.

238. Curry, B.H., Crossey, L.J., and Karlstrom, K.E., 2023, Grand Canyon National Park's water corridor: Water supply, water quality, and recharge along the Bright Angel fault: *Hydrogeology Journal*, v. 31, p. 1773–1794, <https://doi.org/10.1007/s10040-023-02633-6>

239. Hillenbrand, I., Williams, M.L., Karlstrom, K.E., Gilmer, A.K., Lowers, H.A., Jercinovic, M.J., Suarez, K.A., Souders, A.K., 2023, Monazite and xenotime petrochronologic constraints on four Proterozoic tectonic episodes and ca. 1705 Ma age of the Uncompahgre Formation, southwestern Colorado: *Geosphere*, v. 19, no. 4, <https://doi.org/10.1130/GES02631.1>

240. Hillenbrand, I.W., Karlstrom, K.E., Williams, M.L., Gilmer, A., Premo, W., Davis, P., 2023, Geochemical evidence for evolving Proterozoic crustal thickness and orogenic styles in southwestern Laurentia: *Earth and Planetary Science Letters*, v. 622, <http://creativecommons.org/licenses/by-nc/4.0/>

241. Polyak, V.J., Curry, B.H., Lavery, D.J., Strasberg, J.L., Cutler, S., Song, W., Crossey, L.J., Karlstrom, K.E., Asmeron, Y., 2023, Large negative  $\delta^{238}\text{U}$  anomalies in endogenic-type travertine systems: *Geology*, <https://doi.org/10.1130/G51333.1>

242. Dehler, C., Schmitz, M., Bullard, A. Porter S., Timmons, M., Karlstrom, K., Cothren, H., 2023, Precise U-Pb age models refine Neoproterozoic western Laurentian rift initiation, correlation, and Earth system changes: *Precambrian Research*, v. 396, <https://doi.org/10.1016/j.precamres.2023.107156>

243. Holland, M.E., Mohr, M., Schmitz, M., Madronich, L., and Karlstrom, K., 2024, Source-to-sink tandem geochronology reveals tectonic influences on the Cambrian Transcontinental Arch of Laurentia: *Terra Nova*, v. 36, p. 161–169. DOI: 10.1111/ter.12692

244. Hillenbrand, I.W., Gilmer, A.K., Willimas, M.L., and Karlstrom, K.E., Souders, K., Jercinovic, M.J., Vazquez, J., and Premo, W.R., 2024, Heterogeneous multi-stage accretionary orogenesis — Evidence from the Gunnison block in the Yavapai Province, southwest USA: *Precambrian Research* v. 401, <https://doi.org/10.1016/j.precamres.2023.107256>

245. Autrey-Mulligan, S., Bonamici, C., Williams, M., Karlstrom K., 2024, Resolving pressure differences across the Grand Canyon: Implications for Proterozoic tectonics: *Geology*, v. 52 (4), p. 266–270, <https://doi.org/10.1130/G51706.1>.

246. Crossey, L.J., Karlstrom, K.E., Curry, B., McGibbon C , Reed C , Wilgus, J., Whyte, C., and Darrah, T. , 2024, Hydrotectonics of Grand Canyon Groundwater: *Annual Reviews of Earth and Planetary Sciences*, v. 52, p. 521–547, <https://doi.org/10.1146/annurev-earth-080723-083513>

247. Thurston, O.G., Guenthner, W.R., Karlstrom, K.E., Heizler, M.T., Ricketts, J.W., McDannell, K., 2024, Deep-time thermal history of the Great Unconformity in Grand Canyon: combined zircon (U-Th)/He and K-feldspar  $^{40}\text{Ar}/^{39}\text{Ar}$  thermochronometers: *GSA Bulletin*, v. 136; no. 11/12; p. 4815–4835; <https://doi.org/10.1130/B37358.1>.

248. Crossey, L.J., Karlstrom, K.E., Kreamer, D., Lederer, S., and Tilousi, C., 2024, Scientific hydrologic perspective on uranium mining at Pinyon Plain Mine near Grand Canyon: *Boatman's Quarterly Review*, v. 37, no.3, p. 8-12.

249. Dehler, C., Sundberg, F., Karlstrom, K., Crossey, l., Schmitz, M., Rowland, S., and Hagadorn, J., 2024, The Cambrian of the Grand Canyon: Refinement of a classic stratigraphic model: *GSA Today*, v. 34, no. 11, p. 4–11, <https://doi.org/10.1130/GSATG604A.1>.

250. Mohr, M.T., Schmitz, M.D., Swanson-Hysell, N.L., Karlstrom, K.E., Macdonald, F.A., Holland, M.E., Zhang, Y., and Anderson, N.S., 2024, High-precision U-Pb geochronology links magmatism in the Southwestern Laurentia large igneous province and Midcontinent Rift: *Geology*, v. 52, p. 193–198, <https://doi.org/10.1130/G51786.1>

251. Zhang, Y., Anderson, N. S., Mohr, M. T., Nelson, L. L., Macdonald, F. A., Schmitz, M. D., et al. (2024). Paleomagnetic records from pulsed magmatism in the southwestern Laurentia large igneous province and Cardenas Basalt support rapid late Mesoproterozoic plate motion. *Journal of Geophysical Research: Solid Earth*, 129, e2024JB029036. <https://doi.org/10.1029/2024JB029036>.

252. Albonico, M.T., Karlstrom, K.E., Heizler, M.T., Gillam, M.L., Aslan, A., Crossey, L.J., Reed, C., Klema, N.T., Karlstrom, L., and Granger, D.E., 2025, Incision history of the San Juan River, USA, in the past 1.2 million years: *Geosphere*, v. 21, no. X, p. 1–22, <https://doi.org/10.1130/GES02834.1>.

253. Aslan, A., Heizler, M., Karlstrom, K., Flann, L., Granger, D., Ouimet, W., and Mahan, S., 2025, A 2 m.y. record of bedrock incision and drainage integration of the upper Green River, western United States: *Geosphere*, v. 21, no. 4, p. 637–662, <https://doi.org/10.1130/GES02826.1>.

254. Hillenbrand, I.W., Williams, M.L., Gilmer, A.K., Karlstrom, K.E., Jercinovic, M.J., and Young, D.J., 2025, Finding the Hidden Orogeny—The Proterozoic Polymetamorphic History of Northern New Mexico: *Terra Nova*, <https://doi.org/10.1111/ter.12778>.

255. Muhlbauer, J.G., Schmitz, M.D., Sundberg, F.A., Dehler, C.M., Karlstrom, K.E., and Hagadorn, J.W., 2025, Age and provenance of Cambrian strata in southeastern Arizona, U.S.A.: *Terra Nova*, v. 37, no. 6, 367–376, p. <https://doi.org/10.1111/ter.12783>

256. Mussini, G., Hagadorn, J.W., Miller, A.E., Karlstrom, K.E., Evans, R., Dehler, C.E., Bastien, S., and Butterfield, N.J., 2025, Evolutionary escalation in an exceptionally preserved Cambrian biota from the Grand Canyon (Arizona, USA): *ScienceAdvances*, v. 11, no. 30, DOI: [10.1126/sciadv.adv6383](https://doi.org/10.1126/sciadv.adv6383).

257. Karlstrom, K.E., Baisan, C.H., Kring, D.A., Hereford, R., Turney, C., Hogg, A., Norman, L.M., O'Brien, P., Palmer, J.G., Rittenour, T.M., Ballensky, J., Crossey, L.J., 2025, Grand Canyon landslide-dam and paleolake triggered by the Meteor Crater impact at 56 ka: *Geology*, v. 53, p. 821–826, <https://doi.org/10.1130/G53571.1>.

Lucas, S., Heizler, M., Karlstrom, K.E., Simpson, E.L., and Ricci, J., 2025, Detrital sanidine ages from the upper Jurassic Brushy Basin Member of the Morrison Formation and adjacent units, Sandoval County, New Mexico: NMGS Fall Field Conference Guidebook, 2025

Rizzo, A.I., Bekker, A., Kuznetsov, A., Ershova, V., Karlstrom, K.E., Poulton, S.W., and Love, G.E., 2026, From Red To Green: A Lipid Biomarker Record of the Tonian-Ediacaran Algal Transition in Siberia: submitted to *Geobiology*

Farrell, T.P., Schmitz, M.D., Sundberg, F.A., Dehler, C.M., Karlstrom, K.E., Crossey, L.J., and Hagadorn, J.W., 2026, New insights into Cambrian time and the Sauk transgression from the Grand Canyon: submitted to *Geological Magazine*

Craig, J.W., Klemperer, S.L., Crossey, L.J., and Karlstrom, K.E., 2025, Himalaya-Tibet Geothermal Systems Circulate Meteoric Fluids in the Upper Crust through Extensional-to- Transtensional Faults: submitted to *Geology*

## GEOLOGIC MAPS

1. Houston, R.S., Karlstrom, K.E., Lanthier, L.R., Miller, W.R., and Bigsby, P.R., 1984. Mineral resource potential of the Snowy Range Wilderness study area, Albany and Carbon Counties, Wyoming: U.S. Geological Survey Miscellaneous Field Studies Map MF-1596-A, with accompanying text.
2. Houston, R.S., and Karlstrom, K.E., 1992. Geologic map of Precambrian metasedimentary rocks of the Medicine Bow Mountains, Albany and Carbon Counties, Wyoming: U.S. Geological Survey Miscellaneous Investigation Map; I-2280.
3. Karlstrom, K.E., Connell, S.D., Ferguson, C.A., Read, A.S., Osburn, G.R., Kirby, E., Abbott, J., Hitchcock, C., Kelson, K., Noller, J., Sawyer, T., Ralser, S., Love, D.W., Nyman, M., and Bauer, P., 1994, Geology of the Tijeras quadrangle, Bernalillo County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file Digital Map Series OF-DM-4, last modified, 14 December, 1999.
4. Howard, K.A., Dennis\*\*, M.L., Karlstrom, K.E., and Phelps, G.A., 1995. Preliminary geologic map of the Little Piute Mountains San Bernardino County California: U.S.G.S. open-file report 95-598.
5. Ilg, B.R., and Karlstrom, K.E., 1996. Older Precambrian geology of Upper Granite Gorge, Grand Canyon, Arizona, in Huntoon, P., ed., Geologic map of the eastern part of the Grand Canyon National Park (1:62,500): Grand Canyon Natural History Association (new edition).
6. Fergusen, C., Timmons, M., Pazzaglia, F., Karlstrom, K.E., and Bauer, P., 1996, Geology of the Sandia Park 7.5-minute quadrangle, Bernalillo and Sandoval Counties, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Digital Geologic Map GM 1, scale 1:24,000.
7. Connell, S., Cather, S., Karlstrom, K.E., Read, A., Ilg, B., Menne, B., Andronicus, C., Bauer, P., Johnson, P., 1998, Geology of the Placitas 7.5-min quadrangle, Sandoval County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-file digital Geologic Map OF-GM 2, scale 1:24,000.
8. Karlstrom, Karl E.; Connell, Sean D.; Ferguson, Charles A.; Read, Adam S.; Osburn, Glenn R.; Kirby, Eric; Abbott, John; Hitchcock, Christopher; Kelson, Keith; Noller, Jay; Sawyer Thomas; Ralser, Steven; Love, David W.; Nyman, Matthew; Bauer, Paul W., 1994 (Revised: 2/28/00), Geology of the Tijeras quadrangle, Bernalillo County, New Mexico, Scale 1:24,000, Open-file Digital Geologic Map OF-GM 4, scale 1:24,000.
9. Read, Adam S.; Karlstrom, Karl E.; Connell, Sean; Kirby, Eric; Ferguson, Charles A.; Ilg, Bradley; Osburn, Glenn R.; Van Hart, Dirk; Pazzaglia, Frank J., 1995, Geology of the Sandia Crest quadrangle, Bernalillo and Sandoval counties, New Mexico, (Revised: 2/22/00), Scale 1:24,000, OF-GM 6.
10. Karlstrom, K.E., Chamberland, R.M., Connell, S.D., Brown\*, C., Nyman, M., Cavin, W.J., Parchman, M.A., Cook, C., and Sterling\*\*, J., 1998, Geology of the Mount Washington ~7.5-minute quadrangle, Bernalillo and Valencia Countries, New Mexico: New Mexico Bureau of Mines and Mineral Technology Open-File Digital Geologic Map OFGM-8.
11. Connell, Sean D.; Cather, Steve M.; Ilg, Bradley; Karlstrom, Karl E.; Menne, Barbara; Picha, Mark; Andronicus, Chris; Read, Adam S.; Bauer, Paul W.; Johnson, Peggy S., 1995, Geology of the Bernalillo and Placitas quadrangles, Sandoval County, New Mexico, (Revised: 2/17/00), Scale 1:24,000, OF-GM-16.

10. Karlstrom, K.E., Connell, S.D., Edwards, D., Armour, J., Lewis, J., and Jackson, P.G., 1999, Geology of the Bosque Peak 7.5-minute quadrangle, Torrance, Bernalillo and Valencia Counties, NM: New Mexico Bureau of Mines and Mineral Resources, OFGM- 24.
11. MalDonado, F., Love, D.W., Connell, S.D., Slate, J.L., Karlstrom, K.E., and Williams, V.S., 2000, Preliminary geologic map of Isleta Reservation and continuous areas: U.S. Geological Survey open-file map.
12. Karlstrom, K.E., Connell, S.D., Rogers\*\*, S.A., and Crawford\*\*, E.B., 2001, Geology of the Capilla Peak 7.5 –minute Quadrangle, Torrance and Valencia Counties, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open File Digital Geologic Map OFGM-27.
13. Baer, S., Karlstrom, K.E., Bauer, P., and Connell, S.D., 2003, Geology of the Manzano Peak 7.5-Minute Quadrangle, torrance and Valencia Counties, New Mexico: New Mexico Bureau of Mines and Mineral Resources Open-File Report OFDM-61, May, 2003.
14. Scott, L.A., Elrick, M., Connell,S., and Karlstrom, K., 2005, Preliminary Geologic Map of the Scholle 7.5-minute Quadrangle, Valencia, Torrance, and Socorro Counties, New Mexico, New Mexico Bureau of Geology and Mineral Resources, Open-file Geologic Map OF-GM 99, scale 1:24,000.
15. Luther, A.L., Karlstrom, K.E., Scott, L.A., Elrick, M., and Connell, S.D., 2005, Geology of the Becker 7.5-min. quadrangle, Valencia and Socorro Counties, New Mexico, New Mexico Bureau of Mines and Mineral Resources, Open-file Geologic Map OF-GM-100, scale 1:24,000.
16. Koning, D., Karlstrom, K. May, J., Skotnicki, S., Horning, R., Newell, D., and Muehlberger, W.R., 2005, Geology of the Ojo Caliente 7.5-min. quadrangle, Rio Arriba and Taos Counties, New Mexico, New Mexico Bureau of Geology and Mineral Resources, Open-file Geologic Map OF-GM 101, scale 1:24,000.
17. de Moor, M., Zinsser,A., Karlstrom, K.,Chamberlin, R.,Connell, S.,Read, A.,2005,Geology of the La Joya 7.5' quadrangle, Socorro County, New Mexico: New Mexico Bureau of Geology and Mineral Resources, Open-file Geologic Map OF-GM 102, scale 1:24,000.
18. Koning, D.J., Karlstrom, K.E., Salem, A., and Lombardi, C., 2007. Preliminary geologic map of the La Madera quadrangle, Rio Arriba County, New Mexico, New Mexico Bureau of Geology and Mineral Resources, Open-file Geologic Map OF-GM 141, scale 1:24,000.
19. Koning, D., Karlstrom, K.E., May, J., Skotnicki, S., Horning, R., Newell, D., Muelburger, W., and Salen, A.C., 2006, Geologic map of the Ojo Caliente 7.5-minute quadrangle, Rio Arriba and Taos Counties, New Mexico
20. Read, Adam S.; Cather, Steve M.; Chamberlin, Richard M.; Connell, Sean D.; Karlstrom, Karl E.; Hook, Steven C., 2007, Preliminary geologic map of the Ladron Peak quadrangle, Socorro County, New Mexico., Scale 1:24,000, OF-GM-142.
20. Timmons, J.M., Karlstrom, K.E., Pederson, J., 2007, Geologic map of Eastern Grand Canyon (Chuar Valley and Furnace Flats area) at 1:24,000 scale, for release in 2007 by the Grand Canyon Association.
21. Maldonado, F., Slate, J., Love, D.W., Connell, S.D., Cole, J.M., and Karlstrom, K.E., 2007, Geologic map of Pueblo of Isleta Tribal lands and vicinity, Bernalillo, Torrance, and Valencia counties, New Mexico: U.S. Geological Survey Scientific Investigations Map 2913.

22. Kempter, Kirt; Koning, Daniel.; Karlstrom, Karl, 2008, Preliminary geologic map of the Valle Grande Peak 7.5-minute quadrangle map, Rio Arriba County, New Mexico, Scale 1:24,000, OF-GM-180.
23. Ricketts, J., and Karlstrom, K.E., 2014, Geologic Map of the South Garcia SE 7.5- Minute Quadrangle, Valencia County, New Mexico, New Mexico Bureau of Geology and Mineral Resources Open-file Geologic Map OF GM 246.

## REPORTS AND GUIDEBOOKS (\* = graduate student; \*\* = undergraduate student)

1. Karlstrom, K.E., 1977. Geology of the Proterozoic Deep Lake Group, Medicine Bow Mountains, Wyoming: unpublished M.S. thesis, University of Wyoming, 116 p.
2. Miller, W.R., Houston, R.S., Karlstrom, K.E., Hopkins, D.M., and Ficklin, W.H., 1977. Geological and geochemical investigations of uranium occurrences in the Arrastre Lake area of the Medicine Bow Mountains, Wyoming: U.S. Geological Survey Open-File Report 77-92, 30 p.
3. Houston, R.S., Graff, P.J., Karlstrom, K.E., and Root, F.K., 1977. Preliminary report on radioactive conglomerates of Middle Precambrian age in the Sierra Madre and Medicine Bow Mountains of southeastern Wyoming: U.S. Geological Survey Open-File Report 77-584, 31 p.
4. Karlstrom, K.E., and Houston, R.S., 1977a. Stratigraphy and uranium potential of Early Proterozoic metasedimentary rocks in the Medicine Bow Mountains, Wyoming. Wyoming Geological Survey Report of Investigations No. 13, 45 p.
5. Houston, R.S., Karlstrom, K.E., Graff, P.J., and Hausel, W.D., 1978. Radioactive quartz-pebble conglomerates of the Sierra Madre and Medicine Bow Mountains, southeastern Wyoming: Wyoming Geological Survey Professional Paper 1050, p. 30.
6. Houston, R.S., Karlstrom, K.E., and Graff, P.J., 1979. Progress report on the study of radioactive quartz-pebble conglomerate of the Medicine Bow and Sierra Madre, southeastern Wyoming: with a chapter on uranium and thorium minerals in Precambrian metaconglomerates, Medicine Bow Mountains, south-central Wyoming by G.A. Desborough and W.N. Sharp: U.S. Geological Survey Open-File Report 79-1131, 43 p.
7. Houston, R.S., and Karlstrom, K.E., 1980. Precambrian uranium-bearing quartz-pebble conglomerates: exploration model and United States resource potential: Bendix Field Engineering Corporation Open-File Report, GMBX-1(80), 510 p.
8. Karlstrom, K.E., Houston, R.S., Flurkey, A.J., Coolidge, C.M., Kratochvil, A.L., and Sever, C.K., 1981. Volume 1: A summary of the geology and uranium potential of Precambrian conglomerates in southeastern Wyoming: Bendix Field Engineering Report GJBX-139-81, Grand Junction, Colorado, 539 p.
9. Karlstrom, K.E., Houston, R.S., and others, 1981. Volume 2: Drill-hole data, drill-site geology, and geochemical data from the study of Precambrian uraniferous conglomerates of the Medicine Bow Mountains and Sierra Madre of southeastern Wyoming: Bendix Field Engineering Report GJBX-193-81, 682 p.
10. Borgman, L.E., Sever, C.K., Quimby, W.F., Andrew, M.E., Houston, R.S., and Karlstrom, K.E., 1981. Volume 3: Uranium assessment for the Precambrian pebble conglomerate in southeastern Wyoming: Bendix Field Engineering Report GJBX-139-81, 159 p.
11. Karlstrom, K.E., 1981. Late Archean and Early Proterozoic geologic history of metasedimentary rocks of the Medicine Bow Mountains, Wyoming: unpublished Ph.D. thesis, University of Wyoming, 183 p.
12. Conway, C.M., and Karlstrom, K.E., 1986. Early Proterozoic geology of Arizona: Arizona Bureau of Geology and Mineral Technology Field notes, v. 176, p. 10-16.
13. Karlstrom, K.E., and Conway, C.M., 1986. Early Proterozoic geology of Arizona: Geology, v. 14,

p. 626-627.

14. Conway, C.M., and Karlstrom, K.E., 1986. Early Proterozoic geology of Arizona: EOS, v. 67, p. 681-682.
15. Karlstrom, K.E., and Conway, C.M., 1986. Deformational styles and contrasting lithostratigraphic sequences within an Early Proterozoic orogenic belt, central Arizona, in Nations, J.D., Conway, C.M., and Swann, G.A. (eds.), Geology of central and northern Arizona: Geological Society of America, Rocky Mountain Section Field Trip Guidebook, p. 1-26.
16. Karlstrom, K.E., and Robinson, G.R., 1987. Stratabound deposits and massive sulfides: in Theobald, P.K., Billone, M.A., Detra, P.S., and Vassalluzzo, C.A., Summary of a workshop on the search for unconventional ore deposits in Arizona: U.S. Geological Survey Open-File Report 87-498, p. 12-13.
17. Conway, C.M., Karlstrom, K.E., Silver, L.T., and Wrucke, C.T., 1987. Tectonic and magmatic contrasts across a two-province Proterozoic boundary in central Arizona: in Davis, G.H. and Vanden Dolder, E.M. (eds.), Geologic diversity of Arizona and its margins: Excursions to choice areas: Arizona Bureau of Geology and Mineral Technology Geological Survey Branch Special Paper 5, p. 158-175.
18. Houston, R.S., and Karlstrom, K.E., 1987. Application of the time and strata bound model for the origin of uranium bearing quartz-pebble conglomerate in southeastern Wyoming, U.S.A.: in Uranium Deposits in Proterozoic Quartz-Pebble Conglomerate: International Atomic Energy Agency, IAEA-TECDOC-427, p. 99-132.
19. Karlstrom, K.E., Doe,\* M.F., Wessels,\* R.L., Bowring, S.A., Dann, J.C., and Williams, M.L., 1990. Juxtaposition of Proterozoic crustal blocks: 1.65-1.60 Ga Mazatzal orogeny, in Gehrels, G.E. and Spencer, J.E., eds., Geologic excursions through the Sonoran Desert region, Arizona and Sonora: Arizona Geological Survey Special Paper 7, p. 114-123.
20. Kirby,\* E., Karlstrom, K.E., and Andronicos,\*\* C.L., 1995. Structural and thermal setting during emplacement of the Sandia Pluton, in Bauer, P.W. and others (eds.) Geology of the Santa Fe region, NM: New Mexico Geological Society 46th annual field conference, p. 219-225.
21. Timmons,\*\* J.M. Karlstrom, K.E., and Kirby, E., 1995. Geology of the Monte Largo Hills area, New Mexico, structural and metamorphic study of the eastern aureole of the Sandia plutons in Bauer, P.W. and others (eds.) Geology of the Santa Fe region, New Mexico: New Mexico Geological Society 46th annual field conference, p. 219-225.
22. Daniel\*, C.G., Karlstrom, K.E., Williams, M.L., and Pedrick\*, J.N., 1995. The reconstruction of a middle Proterozoic orogenic belt in north-central New Mexico, U.S. A., in Bauer, P.W. and others (eds.) Geology of the Santa Fe region, New Mexico: New Mexico Geological Society 46th annual field conference, p. 219-225.
23. Bauer, P.W., Kues, B.S., Dunbar, N.W., Karlstrom, K.E., and Harrison, B., (eds.), 1995. Geology of the Santa Fe Region, New Mexico: New Mexico Geological Society 46th annual field conference guidebook, 338 p.
24. Brown, C.L., Karlstrom, K.E., Heizler, M.T., and Unrué, D., 1999, Paleoproterozoic deformation, metamorphism and  $^{40}\text{Ar}/^{39}\text{Ar}$  thermal history of the 1.65 Ga Manzanita pluton, Manzanita. New Mexico: New Mexico Geological Society Guidebook, 50<sup>th</sup>, Albuquerque Country, p. 255-268

25. Karlstrom, K.E., Cather, S., Kelley, S., Heizler, M., Pazzaglia, F.J., and Roy, M., 1999, Sandia Mountains and Rio Grande Rift: Ancestry of structures (Proterozoic to Laramide) and history of development of a segmented crust: New Mexico Geological Society Guidebook, 50<sup>th</sup>, Albuquerque Country, p. 155-165.
26. Roy, M., Karlstrom, K.E., Kelley, S.A., Pazzaglia, F.J., and Cather, S.M., 1999, Topographic Setting of the Rio Grande Rift, New Mexico: Assessing the role of “rift-flank uplift”: New Mexico Geological Society Guidebook, 50<sup>th</sup>, Albuquerque Country, p. 1267-174.
27. Karlstrom, K.E., 1999, Southern Margin of the Sandia Pluton and the “Cibola Problem”: New Mexico Geological Society Guidebook, 50<sup>th</sup>, Albuquerque Country, p. 30.
28. Read\*, A.S., Karlstrom, K.E., and Ilg\*, B., 1999, Mississippian Del Padre Sandstone or Proterozoic quartzite: New Mexico Geological Society Guidebook, 50<sup>th</sup>, Albuquerque Country, p. 41.
29. Lucas, S.G., Read\*, A., and Karlstrom, K.E., 1999, Second-Day Trip 1 Road Log: Albuquerque to Tijeras, Cedar Crest, and Sandia Crest: New Mexico Geological Society Guidebook, 50<sup>th</sup>, Albuquerque Country, p. 27-46.
30. Pazzaglia, F.J., Lucas, S.G., Estep, J.W., Connell, S.D., S.G., Estep, J.W., Connell, S.D., Karlstrom, K.E., Black, B.A., Smith, G.A., Hawley, J.W., Johnson, P., Cather, S., and Stearns, C., 1999, First-Day Road Log from Albuquerque to Placitas, Hagan Basin and Espinoso Ridge: New Mexico Geological Society Guidebook, 50<sup>th</sup>, Albuquerque Country, p. 1-26.
31. Karlstrom, K.E., Connell, S.D., Edwards, D.L., Armour\*\*, J., Lewis\*\*, J., and Jackson, P.B., 1999, Geology of the Bosque Peak Quadrangle, Torrance, Bernalillo and Valencia Counties, New Mexico: New Mexico Bureau of Mines and Mineral Resources Open-file report 24.
32. Karlstrom, K.E., Connell, S.D., Rogers\*\*, S.A., and Crawford\*\*, E.B., 2001, Geology of the Capilla Peak 7.5-minute Quadrangle, Torrance and Valencia Counties, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Open-File Report OFDM-27, 18 p.
33. Quigley\*, M., Karlstrom, K.E., Beard, S., and Bohannon, B., 2002, Influence of Proterozoic and Laramide structures on the Miocene extensional strain field, northern Virgin Mountains, Nevada/Arizona, in Field guide to geologic excursions in southwestern Utah and adjacent areas of Arizona and Nevada: USGS open-file report 02-172, p. 85-104 (GSA fieldtrip for Rocky Mountain section meeting).
34. Aster, R., Carlson, R., Karlstrom, K., van der Vink, G., Meth, C., and Raymond, P., 2005, First National EarthScope Meeting: launching the decade-long science and education program: Eos,
35. Karlstrom, K.E., Goff, F., Aster, R., Kelley, S., Timmons, M., Crossey, L., Newell, D., Cox, C., and Moats, W., 2005, EarthScope Field Trip to Jemez Mountains area of northern New Mexico: EarthScope National Meeting Abstracts, p. 33-41 (attended by ~ 60 participants).
36. Aslan, A., Karlstrom, K., Hood, W., Cole, R.D., Oesleby, T., Betton, C., Sandoval, M., Darling, A., Kelley, S., Hudson, A., Kaproth, B., Schoepfer, S., Benage, M., and Landman, R., 2007, River incision histories of the Black Canyon of The Gunnison and Unaweep Canyon: Interplay between late Cenozoic tectonism, climate change, and drainage integration in the western Rocky Mountains, in Raynolds, R.G., ed., Roaming the Rocky Mountains and Environs: Geological 10 Field Trips: Geological Society of America Field Guide 10, p. XX-XX, doi: 10.1130/2007.fld010(XX): The Geological Society of America Field Guide 10, 2008.

37. Aster, R., MacCarthy, J., Heizler, M., Kelley, S., Karlstrom, K.E., Crossey, L., Dueker, K., and the CREST team, 2009, CREST Experiment Probes the Roots and geologic History of the Colorado Rockies: *Outcrop*, v. 58, no.1, p. 6-21.
38. Semken, S., Dodick, J., Ben-David, O., Pineda, M., Bueno Watts, N., & Karlstrom, K., 2009, Timeline and time scale cognition experiments for a geological interpretative exhibit at Grand Canyon. *Proceedings of the National Association for Research in Science Teaching*, Garden Grove, California, 8 p.
39. Semken, S., Dodick, J., Frus, R., Perry, D., Wells, M., Bryan, J., Williams, M., Crow, R., Crossey, L., and Karlstrom, K., 2010, Studies of Informal Geologic Time Learning at the “Trail of Time” in Grand Canyon National Park: *Informal Learning Review*,
40. Aslan, A., Karlstrom, K.E., Crossey, L.J., Kelley, S., Cole, R., Lazear, G., and Darling, A., 2010, Late Cenozoic evolution of the Colorado Rockies: Evidence for Neogene uplift and drainage integration, *in* Morgan, L.A., and Quane, S.L., eds., *Through the Generations: Geologic and Anthropogenic Field Excursions in the Rocky Mountains from Modern to Ancient: Geological Society of America Field Guide* 18, p. 21–54, doi: 10.1130/2010.0018(02).
41. Karl Karlstrom, Sue Beard, Kyle House, Dick Young, Andres Aslan, George Billingsley, and Joel Pederson, 2011, CRevolution II: Origin and Evolution of the Colorado River System II: Summary Report, *in* Beard, L. Sue, Karlstrom, Karl E., Young, Richard E., and Billingsley, George H., CRevolution 2—Origin and Evolution of the Colorado River System, Workshop Abstracts: U.S. Geological Survey Open-file Report 2011-1210, p. 3-16.
42. Crossey, L.J., Karlstrom, K.E., Newell, D.L., Kooser, A., and Tafoya, A., 2011, The La Madera travertines, Rio Ojo Caliente, northern New Mexico: investigating the linked system of CO<sub>2</sub>-rich springs and travertines as neotectonic and paleoclimate indicators, *in* Koning, D.J., Karlstrom K.E., Kelley, S.A., Lueth, V.W., and Aby, S. B., eds., *Geology of the Tusas Mountains and Ojo Caliente Area: New Mexico Geological Society, Guidebook* 62, p. 301-316.
43. Koning, Daniel J.; Karlstrom, Karl E.; Kelley, Shari A.; Lueth, Virgil W.; Aby, Scott B., 2011, *Geology of the Tusas Mountains and Ojo Caliente: New Mexico Geological Society Fall Field Conference FFC-62*, 418 pages, ISBN: 9781585460977.
44. Davis, P., Williams, M.L., Karlstrom, K.E., 2011. Structural Evolution and Timing of Deformation Along the Proterozoic Spring Creek Shear Zone of the Northern Tusas Mountains New Mexico. *New Mexico Geological Society 62nd Annual Field Conference*, p. 177-190.
45. Beard, L.S., Karlstrom, K.E., Young, R.A., Billingsley, G.H., 2011, CRevolution 2—Origin and Evolution of the Colorado River System: US Geological Survey Open-File Report 2011-1210, 300 p.
46. Crossey, L. J., Priestley S. C., Shand P., Karlstrom K. E., Love A. J., Keppel M., 2013. Source and origin of western GAB spring water. *Allocating Water and Maintaining Springs in the Great Artesian Basin, Groundwater Discharge of the Western Great Artesian Basin*. Canberra: National Water Commission.
47. Keppel, M., Karlstrom, K. E., Love, A. J., Priestley, S., Wohling D. and DeRitter, S., 2012, *Hydrogeological Framework of the Western Great Artesian Basin*, National Water Commission, Canberra.

48. Timmons, J.M., and Karlstrom, K.E., eds., 2013, Grand Canyon Geology: 2 Billion Years of Earth History: Geological Society of America Special Paper 489, 156 p.
49. Karlstrom, K.E., Timmons, J.M., and Crossey, L.J., 2013, Introduction to the Monograph and Geologic Overview of Eastern Grand Canyon, in Timmons, J.M., and Karlstrom, K.E., eds., Grand Canyon Geology: 2 Billion Years of Earth History: Geological Society of America Special Paper 489, p. 1-6.
50. Karlstrom, K.E., Ilg, B.R., Hawkins, D., Williams, M.L., Dumond, G., Mahan, K., and Bowring, S.A., 2013, Vishnu basement rocks of the upper Granite Gorge: continent formation 1.84 to 1.66 billion years ago, in Timmons, J.M., and Karlstrom, K.E., eds., Grand Canyon Geology: 2 Billion Years of Earth History: Geological Society of America Special Paper 489, p. 7-24.
51. Timmons, J.M., Bloch, J., Fletcher, K., Karlstrom, K.E., Heizler, M., and Crossey, L., 2013, The Grand Canyon Unkar Group: Mesoproterozoic basin formation in the continental interior during supercontinent assembly, in Timmons, J.M., and Karlstrom, K.E., eds., Grand Canyon Geology: 2 Billion Years of Earth History: Geological Society of America Special Paper 489, p. 25-48.
52. Karlstrom, K.E., and Timmons, J.M., 2013, Many unconformities make one “Great Unconformity”, in Timmons, J.M., and Karlstrom, K.E., eds., Grand Canyon Geology: 2 Billion Years of Earth History: Geological Society of America Special Paper 489, p. 73-80.
53. Karlstrom, K.E., and Timmons, J.M., 2013, Faulting and uplift in the Grand Canyon Region, in Timmons, J.M., and Karlstrom, K.E., eds., Grand Canyon Geology: 2 Billion Years of Earth History: Geological Society of America Special Paper 489, p. 93-108.
54. Kelley, S. A., and Karlstrom, K.E., 2013, The Laramide and Post-Laramide Uplift and Erosional History of the Eastern Grand Canyon: Evidence from apatite fission-track thermochronology, in Timmons, J.M., and Karlstrom, K.E., eds., Grand Canyon Geology: 2 Billion Years of Earth History: Geological Society of America Special Paper 489, p. 109-118.
55. Crossey, L.J., and Karlstrom, K.E., 2013, Travertines and travertine springs in eastern Grand Canyon: What they tell us about groundwater, paleoclimate, and incision of Grand Canyon, in Timmons, J.M., and Karlstrom, K.E., eds., Grand Canyon Geology: 2 Billion Years of Earth History: Geological Society of America Special Paper 489, p. 131-144.
56. Kolomaznik, M., Ricketts, J.W., Priewisch, A., Crossey, L.J., and Karlstrom, K.E., 2013, U-series dating and stable isotope analysis of Quaternary travertines with implications for incision rates in western Rio Grande rift, Carrizo Arroyo, New Mexico: New Mexico Geological Society Guidebook, 64, Geology of Route 66 Region: Flagstaff to Grants, p. 199-204 (2013).
57. Priewisch, A., Karlstrom, K.E., and Crossey, L.J., 2013, U-series ages and morphology of a Quaternary large-volume travertine deposit at Mesa del Oro, NM, Implications for paleohydrology, paleoclimate, and neotectonic processes: New Mexico Geological Society Guidebook, 64, Geology of Route 66 Region: Flagstaff to Grants, p. 229-237 (2013).58.
58. Karlstrom, K.E., Crossey, L.J., and Crow, R., 2013, The Trail of Time: Innovative informal geoscience education at Grand Canyon: New Mexico Geological Society Guidebook, 64, Geology of Route 66 Region: Flagstaff to Grants, p. 7-8 (2013).
59. Grambling\*\*, T.A., Holland, M., Karlstrom, K.E., Gehrels, G.E., and Pecha, M., 2015, Revised location for the Yavapai-Mazatzal crustal province boundary in New Mexico: Hf isotopic data

from Proterozoic rocks of the Nacimiento Mountains: New Mexico Geological Society 66<sup>th</sup> Fall Field Conference Guidebook, p. 175-184.

60. Crow, R., Karlstrom, K., Howard, K., Beard, S., House, P.K., Sharp, W., Polyak, V., Peters, L., Asmerom, Y., McIntosh, W., Block, D., and Crossey, L.C., 2016, Integrating lower Colorado River alluvial deposits and Grand Canyon incision constraints to reconstruct paleo Colorado River profiles and determine Colorado Plateau uplift, in Reynolds, R., ed., Going Loco: Investigations along the Lower Colorado River: California State University Desert Studies Center 2016 Desert Symposium Field Guide and Proceedings April 2016, p. 87-90.
61. Karlstrom, K.E., Crossey, L.C., Crow, R., and Dorsey, R., 2016, New directions in research on the Bouse Formation and the origins of the lower Colorado River, in Reynolds, R., ed., Going Loco: Investigations along the Lower Colorado River: California State University Desert Studies Center 2016 Desert Symposium Field Guide and Proceedings April 2016, p. 91-96.
62. Crossey, L.C., Karlstrom, K. E., Crow, R. S., House P. K., and Pearthree P., 2016, Travertines of the Bouse Formation 166, in Reynolds, R., ed., Going Loco: Investigations along the Lower Colorado River: California State University Desert Studies Center 2016 Desert Symposium Field Guide and Proceedings April 2016, p. 166-170.
63. Blomgren, V., Williams, A., Crossey, L.J., Karlstrom, K.E., and Goff, F., 2016, Identifying the sources of CO<sub>2</sub> in carbonic springs in the Albuquerque-Belen Basin: *in* Frey, B.A., Karlstrom, K.E., Lucas, S.G., Williams, S., Zeigler, K., McLemore, V., and Ulmer-Scholle, D.S., eds., New Mexico Geological Society Fall Field Conference Guidebook 67, p. 419-427.
64. Frey, B.A., Karlstrom, K.E., Lucas, S.G., Williams, S., Zeigler, K., McLemore, V., and Ulmer-Scholle, D.S., 2016, New Mexico Geological Society Fall Field Conference Guidebook 67: The Geology of the Belen Area: New Mexico Geological Society Fall Field Conference Guidebooks, 512 p.
65. Crossey, L.C., Karlstrom, K.E., Priewisch, A., Ricketts, J.W., Frey, B.A., Lucas, S.G., McCraw, D., Williams, A., Miller, P.L., Lardner, J., and Blomgren, V., 2016, Day 3 Road Log: New Mexico travertine quarries and Salado Arroyo carbonic spring, *in* Frey, B.A., Karlstrom, K.E., Lucas, S.G., Williams, S., Zeigler, K., McLemore, V., and Ulmer-Scholle, D.S., eds., New Mexico Geological Society Fall Field Conference Guidebook 67, p. 119-127.
66. Frey, B.A., Karlstrom, K.E., Lucas, S.G., Ricketts, J.W., Channer, M., Miller, P.L., Dunbar, N., Williams, S., and McCraw, D., 2016, Day 2 Road Log: Carrizo Arroyo and San Jose Gorge: *in* Frey, B.A., Karlstrom, K.E., Lucas, S.G., Williams, S., Zeigler, K., McLemore, V., and Ulmer-Scholle, D.S., eds., New Mexico Geological Society Fall Field Conference Guidebook 67, p. 97-111.
67. Grambling, T.A., Karlstrom, K.E., Holland, M.E., and Grambling, N.L., 2016, Proterozoic magmatism and regional contact metamorphism in the Sandia-Manzano Mountains, New Mexico, USA: *in* Frey, B.A., Karlstrom, K.E., Lucas, S.G., Williams, S., Zeigler, K., McLemore, V., and Ulmer-Scholle, D.S., eds., New Mexico Geological Society Fall Field Conference Guidebook 67, p. 169-176.
68. Karlstrom, K.E., Williams, M.L., Heizler, M.T., Holland, M.E., Grambling, T.A., and Amato, J.M., 2016, U-Pb Monazite and 40Ar/39Ar data supporting polyphase tectonism in the Manzano Mountains: a record of both the Mazatzal (1.66-1.60 Ga) and Picuris (1.45 Ga) Orogenies: *in* Frey, B.A., Karlstrom, K.E., Lucas, S.G., Williams, S., Zeigler, K., McLemore, V., and Ulmer-

Scholle, D.S., eds., New Mexico Geological Society Fall Field Conference Guidebook 67, p. 177-184.

69. Holland, M.E., Karlstrom, K.E., Grambling, T.A., and Heizler, M.T., 2016, Geochronology of Proterozoic rocks of the Sandia-Manzano-Los Pinos Uplift: implications for the timing of crustal assembly of the southwestern United States: in Frey, B.A., Karlstrom, K.E., Lucas, S.G., Williams, S., Zeigler, K., McLemore, V., and Ulmer-Scholle, D.S., eds., New Mexico Geological Society Fall Field Conference Guidebook 67, p. 161-168.

70. Repasch, M., Karlstrom, K.E., Heizler, M.T., and Koning, D., 2016, New insights on the late Pleistocene Rio Grande-Rio Chama fluvial system from detrital zircon dating: in Frey, B.A., Karlstrom, K.E., Lucas, S.G., Williams, S., Zeigler, K., McLemore, V., and Ulmer-Scholle, D.S., eds., New Mexico Geological Society Fall Field Conference Guidebook 67, p. 479-489.

71. Ricketts, J.W., Karlstrom, K.E., and Heizler, M.T., 2016, Tectonic evolution of the Lucero Uplift: in Frey, B.A., Karlstrom, K.E., Lucas, S.G., Williams, S., Zeigler, K., McLemore, V., and Ulmer-Scholle, D.S., eds., New Mexico Geological Society Fall Field Conference Guidebook 67, p. 185-194.

72. Ricketts, J.W., Karlstrom, K.E., and Heizler, M.T., 2016, Processes controlling the development of the Rio Grande Rift at long timescales: in Frey, B.A., Karlstrom, K.E., Lucas, S.G., Williams, S., Zeigler, K., McLemore, V., and Ulmer-Scholle, D.S., eds., New Mexico Geological Society Fall Field Conference Guidebook 67, p. 195-202.

73. Love, D.W., Karlstrom, K.E., Frey, B.A., Lucas, S.G., Williams, S., Miller, P., Holland, M.E., Williams, M.L., Heizler, M.T., and Grambling, T.A., 2016, Day 1 road log: The Rio Grande Rift, the southern Albuquerque Basin and the southern Manzano Mountains: in Frey, B.A., Karlstrom, K.E., Lucas, S.G., Williams, S., Zeigler, K., McLemore, V., and Ulmer-Scholle, D.S., eds., New Mexico Geological Society Fall Field Conference Guidebook 67, p. 63-82.

74. Priewisch, A., Crossey, L.J., Karlstrom, K.E., Chafetz, H.S., and Cook, M.A., 2016, Geochronology and geochemical analysis of Quaternary travertine deposits at the Belen quarries of Mesa Aparejo, NM: evaluation of travertine facies for paleohydrology and paleoenvironment studies: in Frey, B.A., Karlstrom, K.E., Lucas, S.G., Williams, S., Zeigler, K., McLemore, V., and Ulmer-Scholle, D.S., eds., New Mexico Geological Society Fall Field Conference Guidebook 67, p. 405-418.

75. Karlstrom, K.E., Gonzales, D.A., Zimmerer, M.J., Heizler, M., Ulmer-Scholle, D.S., 2017, Geology of the Ouray-Silverton area: New Mexico Geological Society 68th Annual Field Conference, September, 2017: ISBN NO. 978-1-58546-106-6.

76. Karlstrom, K.E., and Gonzales, D.A., Day 0 Pre-Trip Hiking Log: Molas Lake to the Animas River and Train Ride on the Durango-Silverton Railroad to Silverton: New Mexico Geological Society 68th Annual Field Conference, p. 1-10.

77. Gonzales, D.A., Karlstrom, K.E., Crossey, L., Heizler, M., Lucas, S.G., 2017, Day 1 Hiking Log: Ouray Perimeter Trail: New Mexico Geological Society 68th Annual Field Conference, p. 11-22.

78. Zimmerer, M.J., Gonzales, D.A., Karlstrom, K.E., 2017, Day 2 Road Log from Ouray to South of Animas Forks Via Silverton: Geology Along the Million Dollar Highway and of the Western San Juan Calderas: New Mexico Geological Society 68th Annual Field Conference Guidebook, p. 23-46.

79. Hrncir, J., Holt, B., Gonzales, D.A., Aslan, A., Karlstrom, K.E., Crossey, L.J., Heizler, M., 2017, Day 3A Road Log: From Ouray to Rico Hot Springs of the San Juan Region: New Mexico Geological Society 68th Annual Field Conference Guidebook, p. 47-58.

80. Karlstrom, K.E., Gonzales, D.A., Heizler, M., and Zinnser, A., 2017,  $^{40}\text{Ar}/^{39}\text{Ar}$  age constraints on the deposition and metamorphism of the Uncompahgre Group, southwestern Colorado: New Mexico Geological Society 68th Annual Field Conference Guidebook, p. 83-90.

81. Kelley, S.A., and Karlstrom, K.E., 2017, Thermal and structural history of Paleozoic and Proterozoic rocks in the vicinity of Molas Pass, northern Needle Mountains, south western Colorado: New Mexico Geological Society 68th Annual Field Conference Guidebook, p. 897-102.

82. Karlstrom, K.E., Liu, L., Zhou, Q., Crossey, L.J., Thacker, J., Crow, R., Beard, L.S., 2017, Mechanisms for post-Bouse (post-5 Ma) deformation in the lower Colorado River region: ECSZ Does It, Revisiting the Eastern California shear zone, Robert E. Reynolds, editor, p. 145-149.

83. Thacker, J.O., Karlstrom, K.E., Crossey, L.J., Crow, R., Beard, L.S., Dorsey, R.J., 2017, Hypothesis for post-Bouse distributed deformation of the Lower Colorado River corridor: ECSZ Does It, Revisiting the Eastern California shear zone, Robert E. Reynolds, editor, p. 158- 164.

84. Crossey, L.C., Karlstrom, K.E., Crow, R.S., Ferguson, C., Dorsey, R., 2017, Towards a depositional model for travertines of the Bouse Formation: examples from the southern Blythe Basin: ECSZ Does It, Revisiting the Eastern California shear zone, Robert E. Reynolds, editor, p. 174-181.

85. Cohen, A., Cassidy, C., Crow, R., Bright, J., Crossey, L., Dorsey, R., Gootee, B., House, K., Howard, K., Karlstrom, K. and Pearthree, P., 2019. The Bouse Formation, a controversial Neogene archive of the evolving Colorado River: a scientific drilling workshop report (28 February-3 March 2019-BlueWater Resort & Casino, Parker, AZ, USA).

86. Karlstrom, Karl, 2019, Grand Canyon Geology and Geoscience Education Public Symposium (April 18-20, 2019): final program and abstracts, v3, University of New Mexico, Dataset, <https://doi.org/10.5061/dryad.9s4mw6mbz>. This publication contains 8 abstracts authored by KEK, LJC, and students.

87. Karlstrom, K.E., and Crossey, L.J., 2023, Our common geoheritage: THE FIRST 100 international geoheritage sites from the Basque Coast to Grand Canyon: Boatman's Quarterly Review, v. 36, no.1, p.4-6.

88. Cron, B., Crossey, L.J., Karlstrom, K.E., Polyak, V., and Asmerom Y., 2024, Geochemistry and Microbial Diversity of CO<sub>2</sub>-Rich Springs and U-Series Dating of Travertine from the Tierra Amarilla Anticline, New Mexico, *in* Karlstrom, K.E., Koning, D.J., Lucas, S.G., Iverson, N.A., Crumpler, L.S., Aubele, J.C., Blake, J.M., Goff, F., and Kelley, S.A., eds., Geology of the Nacimiento Mountains and Río Puerco Valley: New Mexico Geological Society Guidebook 74, p. 225–235.

89. Jean, A., Crossey, L.J., Karlstrom, K.E., Polyak, V., and Asmerom, Y., 2024, Uranium-series geochronology of travertine from Soda Dam, New Mexico: A Quaternary record of episodic spring discharge and river incision in the Jemez Mountains, *in* Karlstrom, K.E., Koning, D.J., Lucas, S.G., Iverson, N.A., Crumpler, L.S., Aubele, J.C., Blake, J.M., Goff, F., and Kelley, S.A., eds., Geology of the Nacimiento Mountains and Río Puerco Valley: New Mexico Geological Society Guidebook 74, p. 257–270.

90. Karlstrom, K.E., Koning, D., Lucas, S.G., Crumpler, L.S., Goff, F., Kelley, S., Iverson, N., Reed, C., and Crossey, L.J., 2024, Synopsis of the Nacimiento geologic nexus, *in* Karlstrom, K.E., Koning, D.J., Lucas, S.G., Iverson, N.A., Crumpler, L.S., Aubele, J.C., Blake, J.M., Goff, F., and Kelley, S.A., eds., Geology of the Nacimiento Mountains and Río Puerco Valley: New Mexico Geological Society Guidebook 74, p. 105–126.
91. Reed, C., Karlstrom K.E., Rodriguez, B., Iverson, N., Heizler, M., Rose-Coss, D., Crossey, L.J., Cox, C., Jean, A., Polyak, V., and Asmerom, Y., 2024, Differential river incision due to Quaternary faulting on the Río Salado-Jemez system at the million-year timescale, *in* Karlstrom, K.E., Koning, D.J., Lucas, S.G., Iverson, N.A., Crumpler, L.S., Aubele, J.C., Blake, J.M., Goff, F., and Kelley, S.A., eds., Geology of the Nacimiento Mountains and Río Puerco Valley: New Mexico Geological Society Guidebook 74, p. 237–256.
92. Karlstrom, K.E., Koning, D.J., Lucas, S.G., Iverson, N.A., Crumpler, L.S., Aubele, J.C., Blake, J.M., Goff, F., and Kelley, S.A., eds., Geology of the Nacimiento Mountains and Río Puerco Valley: New Mexico Geological Society Guidebook 74, 332 p. with 3 days of roadlogs.
93. Bailey, J.M., Karlstrom, K.E., Reed, C.C., and Heizler, M.T., 2024, Structural geology of the Tierra Amarilla anticline, New Mexico, *in* Karlstrom, K.E., Koning, D.J., Lucas, S.G., Iverson, N.A., Crumpler, L.S., Aubele, J.C., Blake, J.M., Goff, F., and Kelley, S.A., eds., Geology of the Nacimiento Mountains and Río Puerco Valley: New Mexico Geological Society Guidebook 74, p. 281–289.

## ABSTRACTS (\* = graduate student; \*\* = undergraduate student)

1. Houston, R.S., Karlstrom, K.E., and Graff, P.J., 1977. Uranium indications in the Precambrian of southern Wyoming (abstract). NURE Uranium Geology Symposium, Dec 7-8, 1977, Metamorphic Host Rock Session, p. 36.
2. Karlstrom, K.E., 1978. Stratigraphy of the Deep Lake Group and a review of the tectonic history of the Medicine Bow Mountains (abstract), in Lageson, D.R. and Hausel, W.D. (eds.), Occurrences of uranium in Precambrian and younger rocks of Wyoming and adjacent areas: Wyoming Geological Survey Public Information Circular No. 7, p. 23-24.
3. Houston, R.S., Karlstrom, K.E., Hills F.A., and Smithson, S.B., 1979. The Cheyenne Belt: the major Precambrian crustal boundary in the western U.S. (abstract): Geological Society of America Abstracts with Programs, v. 11 p. 446.
4. Houston, R.S., Karlstrom, K.E., and Graff, P.J., 1979. Uranium potential for Sierra Madre and Medicine Bow Mountains, Wyoming: U.S. Geological Survey Professional Paper 1150, p. 46.
5. Houston, R.S., and Karlstrom, K.E., 1980. Uranium, gold, and thorium potential of Sierra Madre and Medicine Bow Mountains, Wyoming: U.S. Geological Survey Professional Paper 1175.
6. Karlstrom, K.E., Flurkey, A.J., and Houston, R.S., (abstract), 1981. Plate margin sedimentation and island arc - continent collisional orogenesis in the Early Proterozoic of southern Wyoming, in Steidtmann, J.R., (ed.), Sedimentary tectonics, principles, and applications: Wyoming Geological Association 1981 Meeting.
7. Flurkey, A.J., Houston, R.S., and Karlstrom, K.E., 1982. Deposition of the Late Archean Jack Creek Quartzite: Eleventh International Conference on Sedimentology, Hamilton, Ontario.
8. Karlstrom, K.E., Van Der Pluijm, B.A., and Williams, P.F., (abstract), 1982. Regional asymmetrical folding in Ordovician and Silurian rocks of northeastern Newfoundland: Rock Deformation Meeting, Oct 1981, University of New Brunswick, Fredericton, New Brunswick.
9. Karlstrom, K.E., Van Der Pluijm, B.A., and Williams, P.F., (abstract), 1982. Implications of structural studies in eastern Notre Dame Bay; evidence for an allochthonous Dunnage Zone: a paper presented at the 1982 Atlantic Geoscience Colloquium and later published in Maritime and Atlantic Geology.
10. Karlstrom, K.E., Johnson, R.A., Houston, R.S., and Smithson, S.B., 1983. Gravity profiles across an Early Proterozoic suture in southern Wyoming: Geological Society of America Abstracts, v. 15.
11. Karlstrom, K.E., and O'hara, P.F., 1984. Polyphase folding in Proterozoic rocks of central Arizona (abstract): Geological Society of America Abstracts, v. 16, p. 226.
12. Karlstrom, K.E., and Puls,\* D.D., 1984. Geometry of structures in a Proterozoic thrust belt, Mazatzal Mountains, central Arizona (abstract): Geological Society of America Abstracts, v. 16, p. 554.
13. Johnson, R.A., Smithson, S.B., and Karlstrom, K.E., 1984. Gravity evidence for Precambrian crustal structure in southeastern Wyoming and northern Colorado: EOS, v., p.
14. Puls,\* D.D., and Karlstrom, K.E., 1985. Proterozoic foreland thrusting in the Mazatzal Mountains of central Arizona (abstract): Geological Society of America Abstracts, v. 17 p. 261.
15. Karlstrom, K.E., and Argenbright,\* D.N., 1985. Structural evidence for syntectonic intrusion of the

Proterozoic Crazy Basin Quartz Monzonite, central Arizona (abstract): Geological Society of America Abstracts, v. 17, p. 228.

16. Karlstrom, K.E., 1986. Thrusting and strike-slip faulting during Proterozoic accretion in central Arizona (abstract): Geological Society of America Abstracts, v. 18, p. 365.
17. Argenbright,\* D.N., and Karlstrom, K.E., 1986. Revised structural and stratigraphic interpretation of the Proterozoic Yavapai Supergroup, Crazy Basin Arizona (abstract): Geological Society of America Abstracts, v. 18, p. 338.
18. Darrach,\* M.E., Karlstrom, K.E., and Argenbright,\* D.N., 1986. The Creator Mylonite Zone: Sinistral strike-slip adjacent to the Shylock Fault Zone, central Arizona (abstract): Geological Society of America Abstracts, v. 18, p. 350.
19. Roller,\* J.A., and Karlstrom, K.E., 1986. Structural geometry of the upper Alder Group, Mazatzal Mountains, central Arizona: Geological Society of America Abstracts, v. 18, p. 404.
20. Puls,\* D.D., and Karlstrom, K.E., 1986. Proposed names for major thrusts in the northern Mazatzal Mountains, central Arizona: Geological Society of America Abstracts, v. 18, p. 404.
21. Bowring, S.A., Karlstrom, K.E., and Chamberlain, K., 1986. U-Pb zircon constraints on tectonic and magmatic evolution in central Arizona: Geological Society of America Abstracts, v. 18, p. 343.
22. Karlstrom, K.E., Bowring, S.A., and Chamberlain, K., 1986. Timing of deformation during Early Proterozoic orogeny in central Arizona: Abstracts of the Symposium on Southwestern Geology and Paleontology, Museum of Northern Arizona, p. 8.
23. Brady,\* T.B., and Karlstrom, K.E., 1987. An Early Proterozoic Caldera in the northern Sierra Anchas, central Arizona: Arizona-Nevada Academy of Science, 31st Annual Meeting, p. 47.
24. Brady,\* T.B., Sherlock,\* S.M., and Karlstrom, K.E., 1987. Early Proterozoic crustal shortening by tectonic wedging, northern Sierra Anchas, central Arizona: Geological Society of America Abstracts, v. 19, p. 263.
25. Fletcher,\* J., and Karlstrom, K.E., 1987. Fold geometry and deformational microfabric in the Piute Range, southeastern California: Geological Society of America Abstracts, v. 19, p. 377.
26. Darrach,\* M.E., and Karlstrom, K.E., 1987. Mechanisms and timing of pseudotachylite development in the Early Proterozoic Creator shear zone, central Arizona: Arizona-Nevada Academy of Science, 31st Annual Meeting, p. 45.
27. Williamson,\* R.R., and Karlstrom, K.E., 1987. The Chaparral fault zone: Evidence for timing and sense of movement: Arizona-Nevada Academy of Science, 31st Annual Meeting, p. 46.
28. Karlstrom, K.E., and Bowring, S.A., 1987. Proterozoic tectono-stratigraphic terranes in Arizona: Geological Society of America Abstracts with Programs, v. 19, p. 721.
29. Kelly,\* M.M., Fletcher,\* J.M., Ring,\* T.E., and Karlstrom, K.E., 1987. Southwest-directed Cretaceous thrusting in the Piute Mountains/Fenner Hills, southeast California: Geological Society of America Abstracts with Programs, v. 19, p. 724.
30. Chamberlain, K., Bowring, S.A., Karlstrom, K.E., and Wooden, J.L., 1988. U-Pb zircon ages from northwestern Arizona: Implications for Proterozoic crustal growth: Geological Society of America

Abstracts with Programs, v. 20, p. 149.

31. Ring,\* T.E., Fletcher,\* J.M., Kelly,\* M.M., and Karlstrom, K.E., 1988. Mesozoic crustal shortening by deep-seated tectonic wedging along Proterozoic anisotropies, Piute Mountains, southeastern California: Geological Society of America Abstracts with Programs, v. 20, p. 224.
32. Bowring, S.A., and Karlstrom, K.E., 1988. Recognition of "Terranes" in Proterozoic orogenic belts: Geological Society of America Abstracts with Programs, v. 20, p. 145.
33. Albin,\* A., Shastri,\*\* L., and Karlstrom, K.E., 1988. Proterozoic shear zone system in northwestern Arizona: Museum of Northern Arizona, 41st Annual Symposium on Southwestern Geology and Paleontology.
34. Labrenz,\* M.E., and Karlstrom, K.E., 1988. Timing of the Proterozoic Mazatzal orogeny, central Arizona: Museum of Northern Arizona, 41st Annual Symposium on Southwestern Geology and Paleontology.
35. Ring,\* T.E., Fletcher,\* J.M., and Karlstrom, K.E., 1988. Timing and character of Mesozoic compressional deformation, metamorphism, and plutonism, eastern Mojave Desert, California: Museum of Northern Arizona, 41st Annual Symposium on Southwestern Geology and Paleontology.
36. Fletcher,\* J.M., Karlstrom, K.E., Ring,\* T.L., and Wooden, J.L., 1988. Tectonic style and timing of deep-seated Mesozoic crustal shortening: Piute Mountains, eastern Mojave Desert: Geological Society of America Abstracts with Programs, v. 20, p. A272.
37. Rothstein,\* D.A., Hoisch, T.D., and Karlstrom, K.E., 1989. Relative timing of ductile deformation, regional metamorphism, fluid interaction, and granitoid pluton emplacement in the central Old Woman Mountains, south-eastern California: Geological Society of America Abstracts with Programs, v. 21, p. A215.
38. Chamberlain, K.R., Bowring, S.A., Williams, M.L., and Karlstrom, K.E., 1989. Differential uplift and protected regional cooling in Proterozoic of NW Arizona: Geological Society of America Abstracts with Programs, v. 21, p. A142.
39. Rothstein,\* D., Hoisch, T.D., and Karlstrom, K.E., 1989. Regional metamorphism, ductile deformation, and plutonism in the central Old Woman Mountains, southeastern California: Arizona-Nevada Academy of Sciences Annual Meeting, Las Vegas.
40. Adams,\*\* P.S., and Karlstrom, K.E., 1989. Crustal shortening in the western Grand Canyon; Precambrian and Laramide: Abstracts of the Symposium on Southwestern Geology and Paleontology, Museum of Northern Arizona, p. 1.
41. Callahan,\*\* M.B., Karlstrom, K.E., and Ball,\*\* B., 1989. Multiple phases of 1700 Ma plutonism, Crazy Basin Quartz Monzonite, and observed deformational fabrics: Abstracts of the Symposium on Southwestern Geology and Paleontology, Museum of Northern Arizona, p. 4.
42. Gillentine,\*\* J.M., Karlstrom, K.E., and Parnell, R.A., 1989. Mineralogic constraints on Proterozoic metamorphism in the Mazatzal block using x-ray diffraction: Abstracts of the Symposium on Southwestern Geology and Paleontology, Museum of Northern Arizona, p. 8.
43. Hays,\*\* J., Morgan, P., and Karlstrom, K.E., 1989. Crustal radiogenic heat production in the Colorado Plateau and adjacent provinces: A possible mechanism for crustal stability: Abstracts of the Symposium on Southwestern Geology and Paleontology, Museum of Northern Arizona, p. 12.

44. Vail,\*\* J., Best, D.M., and Karlstrom, K.E., 1989. Preliminary sub-surface models of basement structure in the Transition Zone of central Arizona: Abstracts of the Symposium on Southwestern Geology and Paleontology, Museum of Northern Arizona, p. 25.
45. Kingsbury,\*\* M.A., Miller, C.F., and Karlstrom, K.E., 1989. Petrologic constraints on synplutonic deformation, East Piute pluton, Piute Mountains, SE California: Geological Society of America Abstracts with Programs, v. 21, p. A307.
46. Chamberlain, K.R., Bowring, S.A., Williams, M.E., and Karlstrom, K.E., 1989. Differential uplift and protracted regional cooling in Proterozoic of NW Arizona: Geological Society of America Abstracts with Programs, v. 21, p. A142.
47. Albin,\* A.L., and Karlstrom, K.E., 1990. The Gneiss Canyon shear zone: a Proterozoic migmatite zone in northwestern Arizona: Geological Society of America Abstracts with Programs, v. 22, p. 1.
48. Karlstrom, K.E., and Bowring, S.A., 1990. Overview of Proterozoic orogenic history in Arizona: Geological Society of America Abstracts with Programs, v. 22, p. 33.
49. Nicholson,\* H.T., and Karlstrom, K.E., 1990. Evolution of the Scanlon shear zone, Old Woman Mountains, eastern Mojave Desert, CA: Geological Society of America Abstracts with Programs, v. 22, p. 72.
50. Wessels,\* R.L., and Karlstrom, K.E., 1990. Re-evaluation of the Slate Creek shear zone: character of the transition from foreland to hinterland of the Mazatzal orogen: Geological Society of America Abstracts with Programs, v. 22, p. 93.
51. Bickel,\*\* S., and Karlstrom, K.E., 1990. Syntectonic deposition and deformational geometry of the Proterozoic Mazatzal Group in Chino Valley, Arizona: Museum of Northern Arizona Symposium on Geology and Paleontology of Arizona.
52. Stover,\*\* S.F., and Karlstrom, K.E., 1990. Re-Evaluation of the unconformity at the base of the Texas Gulch Formation, Brady Butte, central Arizona: Museum of Northern Arizona Symposium on Geology and Paleontology of Arizona.
53. Wilson,\*\* K.P., Pierce,\*\* G., Karlstrom, K.E., Potochnik, A.R., and Ilg, B.R., 1990. Geometry of the Verde monocline: Laramide foreland shortening in the Transition Zone, Chino Valley, Arizona: Museum of Northern Arizona Symposium on Geology and Paleontology of Arizona.
54. Karlstrom, K.E., and Bowring, S.A., 1991. Styles and timing of Early Proterozoic deformation in Arizona - constraints on tectonic models: Geological Society of America Bulletin, v. 23, p. 37.
55. Bowring, S.A., Chamberlain, K.R., Dann, J.C., and Karlstrom, K.E., 1991. U-Pb geochronologic constraints on the Early Proterozoic evolution of Arizona: Geological Society of America Abstracts with Programs, v. 23, p. 7.
56. Chamberlain, K.R., Karlstrom, K.E., and Bowring, S.A., 1991. U-Pb geochronologic constraints on the Early Proterozoic evolution of Arizona: Geological Society America Abstracts, v. 23, p. 11.
57. Albin,\* A.A., Shastri,\*\* L.L., Bowring, S.A., and Karlstrom, K.E., 1991. Geologic and geochronologic data from the Gneiss Canyon shear zone of NW Arizona: Timing and development of orthogonal fabrics: Geological Society of America Abstracts with Programs, v. 23, p. 1.

58. Smith,\*\* C., Mitchell,\*\* C., Grecu,\*\* V., ILG, B., and Karlstrom, K.E., 1991. Tertiary reactivation along the Laramide Bull Basin monocline: Arizona-Nevada Academy of Sciences, Spring, 1991.

59. Hays,\*\* J., Morgan, P., and Karlstrom, K.E., 1991. Crustal radiogenic heat production and crustal stability: Arizona-Nevada Academy of Sciences, Spring, 1991.

60. Karlstrom, K.E., Miller, C.F., Kingsbury,\*\* J.A., and Wooden, J.L., 1992. Synchronous magmatism and compressional deformation, Piute Mountains, SE California, EOS, v. p.

61. Karlstrom, K.E., and Bowring, S.A., 1992. Evaluation of Proterozoic tectonic boundaries in the Southwest: Speculations using plate tectonic models: EOS, v. p.

62. Dennis,\*\* M.L., and Karlstrom, K.E., 1992. Geometry and kinematic history of mid-crustal Mesozoic deformation: Little Piute Mountains, southern Cordillera: Geological Society of America Abstracts with Programs, v. 24, no. 5, p. 19.

63. Villalobos,\* A.J., and Karlstrom, K.E., 1992. Structural analysis of the Early Proterozoic northern Shylock shear zone, central Arizona: Geological Society of America Abstracts with Programs, v. 24, p. 66.

64. Ilg,\* B.R., and Karlstrom, K.E., 1992. Early Proterozoic geology of Upper Granite Gorge, Grand Canyon, Arizona: Geological Society of America Abstracts with Programs, v. 24, no. 6, p. 19.

65. Owens,\* M.W., and Karlstrom, K.E., 1992. Deformational style of the southwestern Scalon shear zone, southern Old Woman Mountains, CA: Geological Society of America Abstracts with Programs, v. 24, no. 5, p. 73.

66. Bowring, S.A., and Karlstrom, K.E., 1992. Early Proterozoic (1.8-1.4 Ga) evolution of the southwestern U.S.: EOS, v. , p. (Montreal AGU).

67. Bauer, P.W., Bowring, S.A., and Karlstrom, K.E., 1992. Timing of Proterozoic regional deformation in the southern Manzano Mountains, central New Mexico: Geological Society of America Abstracts with Programs, v. 24, no. 7, p. A146.

68. Goodwin, L., Ralser, S., Bauer, P.W., and Karlstrom, K.E., 1992. Mylonitization events bracketing a granitoid intrusion - A Proterozoic example from the Manzano Mountains New Mexico: Geological Society of America Abstracts with Programs, v. 24, no. 7, p. A146.

69. Karlstrom, K.E., 1993. Synthesis of Early and Middle Proterozoic orogenies in the Southwest: Geological Society of America Abstracts with Programs, v. 25, no. 1, p. 17.

70. Karlstrom, K.E., Kirby,\* E., Andronicus,\*\* C., and Courtwright, R., 1993. Syn-extensional emplacement of the 1.42 Ga Sandia Granite, N.M.: Geological Society of America Abstracts with Programs, v. 25, no. 1, p. 17.

71. Wooden, J.L., Miller, D.M., Howard, K., Dewitt, E., Karlstrom, K.E., and Nutman, A., 1993. Early Proterozoic crustal provinces in the Southwestern U.S.: What they represent and implications about continental reconstructions: Geological Society of America Abstracts with Programs, v. 25, no. 1, p. 46.

72. Ilg,\* B.R., and Karlstrom, K.E., 1993. A transect of Early Proterozoic middle crust: Upper Granite Gorge, Grand Canyon Arizona: Geological Society of America Abstracts with Programs, v. 25, no. 5, p. 55.

73. Daniel,\* C.G., and Karlstrom, K.E., 1993. A reconstruction of Proterozoic rocks in north-central New Mexico: Tectonic implications from the Proterozoic to the Cenozoic: Geological Society of America Abstracts with Programs, v. 25, no. 5, p. 27.

74. Thompson,\* A.G., and Karlstrom, K.E., 1993. Use of Porphyroblast-Matrix Relationships to Solve a Complex Polyphase Geologic History in Middle Proterozoic Rocks of Central New Mexico: Geological Society of America Abstracts with Programs, v. 25, no. 5, p. 154.

75. Andronicos,\*\* C.L., Karlstrom, K.E., and Kirby,\* E., 1993. Transtensional Deformation of the 1.4 GA Sandia Granite, a Record of Middle Proterozoic Tectonism: New Mexico Geological Society, 1993 Proceedings, p. 20.

76. Kirby,\* E., Karlstrom, K.E., and Andronicos,\*\* C., 1993. Synchronous Pluton Emplacement and Deformation: The 1.42 Ga Sandia Granite: New Mexico Geological Society, 1993 Proceedings, p. 19.

77. Smith,\*\* A.G., Karlstrom, K.E., and Thompson,\* A.G., 1993. Proterozoic Tectonic History of Bartolo Canyon, Manzano Mountains, Central New Mexico: New Mexico Geological Society, 1993 Proceedings, p. 21.

78. Wickham,\*\* T.A., and Karlstrom, K.E., 1993. Structural Analysis of the Vadito Group, Southern, Picuris Mountains, New Mexico: New Mexico Geological Society, 1993 Proceedings, p. 17.

79. Daniel,\* C.G., and Karlstrom, K.E., 1993. Restoration of Laramide(?) Right Lateral Strike Slip in Northern New Mexico: Tectonic Implications from the Proterozoic to the Cenozoic: New Mexico Geological Society, 1993 Proceedings, p. 22.

80. Thompson,\* A.G. and Karlstrom, K.E., 1993. Porphyroblast-Matrix Relationships Used to Recognize Polyphase Geologic History in Middle Proterozoic Rocks of Central New Mexico. New Mexico Geological Society, 1993 Proceedings, p. 18.

81. Karlstrom, K.E., and Grambling, J.G., 1993. Proterozoic orogenic history in New Mexico: A merging of conflicting models: New Mexico Geological Society, 1993 Proceedings, p. 16.

82. Bowring, S.A., and Karlstrom, K.E., 1993. Evolution of Proterozoic lithosphere in the southwestern U.S.: Geological Society of America Abstracts with Programs, v. 25, no. 6, p. 237.

83. Kirby,\* E., and Karlstrom, K.E., 1993. Syntectonic emplacement of the 1.4 Ga Sandia Granite, northern New Mexico: Geological Society of America Abstracts with Programs, v. 25, no. 6, p. 304.

84. Hawkins, D.P., Bowring, S.A., Karlstrom, K.E., and Ilg\*, B.R., 1993. U-Pb geochronologic constraints on Early Proterozoic crustal evolution, upper Granite Gorge, Grand Canyon, Arizona: Geological Society of America Abstracts with Programs, v. 25, no. 6, p. 238.

85. Karlstrom, K.E., 1994. Proterozoic Middle Continental Crust of the Southwest: its role in lithospheric evolution: Iliad workshop of IRIS consortium, Taos New Mexico, November 1994.

86. Ilg,\* B., and Karlstrom, K.E., 1994. New 1:24,000 geologic maps of Early Proterozoic rocks exposed in the Upper Granite Gorge of the Grand Canyon, Arizona: Geological Society of America Abstracts with Programs, v. 26, no. 6, p. 20.

87. Bowring, S.A., and Karlstrom, K.E., 1994. Thermochronologic constraints on Proterozoic lithospheric evolution, southwestern U.S.: Geological Society of America Abstracts with Programs, v. 26, no. 6, p.

6.

88. Karlstrom, K.E., Pedrick,\* J., and Bowring, S.A., 1994. Reconciliation of contrasting models for Proterozoic tectonism in northern New Mexico: Geological Society of America Abstracts with Programs, v. 26, no. 6, p. 22.
89. Karlstrom, K.E., Ilg,\* B., Hutchison,\* J., Hawkins, D., Bowring, S.A., and Williams, M.L., 1994. Paleoproterozoic heterogeneous middle crustal flow during 1.71-1.68 Ga contractional deformation, Grand Canyon, Arizona: Geological Society of America Abstracts with Programs, v. 26, no. 6, p. 22.
90. Nyman, M.W., and Karlstrom, K.E., 1994. Tectonic setting of ca. 1.4 Ga "Anorogenic" plutons, central Arizona: A record of Mesoproterozoic contraction and reactivation: Geological Society of America Abstracts with Programs, v. 26, no. 7, p. A-405.
91. Karlstrom, K.E., and 10 others, 1994. Evidence for low angle detachment faulting in southwestern New Mexico based on reconnaissance structural studies of the Little Hatchet Mountains: New Mexico Geological Society, Proceedings, 1994, p. 41.
92. Andronicos,\*\* C.L., and Karlstrom, K.E., 1994. Proterozoic and Cenozoic deformational history of the northern Sandia Mountains, New Mexico: New Mexico Geological Society, Proceedings, 1994, p. 42.
93. Kirby,\* E., and Karlstrom, K.E., 1994. New Geologic Map of Precambrian rocks in the Tijeras 7.5 Quadrangle: Implications from the Proterozoic to the Tertiary: New Mexico Geological Society, Proceedings, 1994, p. 46.
94. Hawkins, D.P., Bowring, S.A., and Karlstrom, K.E., 1994. Evidence for pre-1.8 Ga crust in the Upper Granite Gorge, Grand Canyon, Arizona, Geological Society of America Abstracts with Programs, v. 26, no. 6, p. 17.
95. Daniel,\* C.G., Karlstrom, K.E., and White,\* C.A., 1994. Proterozoic crustal and deformational boundaries in northern New Mexico: Geological Society of America Abstracts with Programs, v. 26, no. 6, p. 10.
96. Nyman, M.W., and Karlstrom, K.E., 1994. Emplacement of 1.4 Ga plutons during transpression along Early Proterozoic boundaries: Geological Society of America Abstracts with Programs, v. 26, no. 6, p. 57.
97. Kirby,\* E., and Karlstrom, K.E., 1994. Middle Proterozoic tectonism in central New Mexico: implications for deformational provinces in the Southwest: Geological Society of America Abstracts with Programs, v. 26, no. 6, p. 23.
98. Karlstrom, K.E., and Morgan, P., 1995. Comparison of Mesoproterozoic and Cenozoic plateau uplift in the Southwest -Isostatic response to thermal/magmatic event: American Geophysical Union v. 76, no. 46, p. F619.
99. Kirby,\* E., and Karlstrom, K.E., 1995. Comparison of the use of shear band and porphyroblast systems for evaluating general shear Ar example from the Mesoproterozoic Sandia pluton, New Mexico, Geological Society of America Abstracts with Programs, v. 27, no. 6, p. 23.
100. Karlstrom, K.E., Ilg,\* B., and Williams, M.L., 1995. Proterozoic Tectonic History of western North America: Grand Canyon National Park, from Rim to River and Beyond, Aug 1995, p.

101. Ilg,\* B., Karlstrom, K.E., and Williams, M.L., 1995. Tectonic history of Paleoproterozoic rocks in the Grand Canyon, Arizona: Grand Canyon National Park, from Rim to River and Beyond, Aug, 1995, p.
102. Williams, M.L., Karlstrom, K.E., and Ilg, B., 1995. Metamorphic petrology of Proterozoic rocks of the Grand Canyon: Grand Canyon National Park, from Rim to River and Beyond, August, 1995, p.
103. Karlstrom, K.E., and P. Morgan, 1995. Comparison of Mesoproterozoic and Cenozoic plateau uplift in the Southwest - Isostatic response to thermal/magmatic event, American Geophysical Union, v. 76, no. 46, p. F619.
104. Kirby\*, E., and Karlstrom, K.E., 1995. Comparison of the use of shear band and porphyroblast systems for evaluating general shear Ar example from the Mesoproterozoic Sandia pluton, New Mexico, Geological Society of America Abstracts with Programs, v. 27, no. 6, p. 23.
105. Karlstrom, K.E., and Williams, M.L., 1996. Nature of Middle Crustal Tectonism during continental assembly and long term residence at 8-20 km: Composite crustal profile exposed by Proterozoic rocks of the Southwest, Geological Society of America Abstracts with Programs, v. 28, no. 7, p. A-452.
106. Karlstrom, K.E., 1996. Persistence of Proterozoic accretionary boundaries in the tectonic development of the southern Rocky Mountains, Geological Society of America Abstracts with Programs, v. 28, no. 7, p. A-270.
107. Hodgins\*, M., Selverstone, J., Karlstrom, K.E., and Pletsch-Rivera, L., 1996. 1.4 Ga. contractional deformation and strain partitioning in the northern Colorado Front Range, Geological Society of America Abstracts with Programs, v. 28, no. 7, p. A-374.
108. Bowring, S.A., Hodges, K.V., Hawkins,\* D.P., Coleman, D.S., Davidik, K.L., and Karlstrom, K.E., 1996. Thermochronology of Proterozoic middle crust, Southwestern U.S., Implications for models of lithospheric evolution, Geological Society of America Abstracts with Programs, v. 28, no. 7, p. A-452 (1996).
109. Williams, M.L., and Karlstrom, K.E., 1996. Looping P-T paths, HTLP metamorphism, and long-term residence in the middle crust: the Proterozoic of southwestern North America, Geological Society of America Abstracts with Programs, v. 28, no. 7, p. A-452.
110. Hawkins,\* D.P., Bowring, S.A., Williams, M.L., and Karlstrom, K.E., 1996. A detailed thermal evolution of Paleoproterozoic middle crust in the Grand Canyon: constraints from U-Pb monazite, xenotime and sphene thermochronology, Geological Society of America Abstracts with Programs, v. 28, no. 7, p. A-316.
111. Pedrick\*, J.N., and Karlstrom, K.E., 1996. Polyphase Proterozoic middle-crustal tectonism in northern New Mexico, Geological Society of America Abstracts with Programs, v. 28, no. 7, p. A-495.
112. Read,\* A.S., Karlstrom, K.E., and Selverstone, J., 1996. A transition from steep to sub-horizontal tectonic fabrics, granite sheets as middle-crustal detachments: Rincon Range, Mora County New Mexico, Geological Society of America Abstracts with Programs, v. 28, no. 7, p. A-495.
113. Lombardi,\* C.E., Williams, M.L., Breuninger,\* A.B., Karlstrom, K.E., and Heizler, M.T., 1996. Mushroom interference patterns, tectonometamorphic gradients, and regional correlation of fabrics and units, Proterozoic rocks, Tusas Mountains, NM: Geological Society of America Abstracts with Programs, v. 28, no. 7, p. A-495.
114. Nyman, M.W., Karlstrom, K.E., Williams, M.L., and Heizler, M.T., 1996. Metamorphic and

geochronologic evidence for ca. 500 m.y. of midcrustal residence of Proterozoic rocks, Hualapai Mountains, NW Arizona, Geological Society of America Abstracts with Programs, v. 28, no. 7, p. A-375.

115. Shaw\*, C.A., and Karlstrom, K.E., 1997. Heterogeneity of 1.7 - 1.68 Ga deformation in southern Colorado: Implications for orogenic province boundaries: Geological Society of America Abstracts with Programs, v. 29, no. 6, p. A-467.

116. Seaman, S.J., Karlstrom K.E., William, M.L., and Petruski, A.J., 1997. Proterozoic ultramafic bodies in the Grand Canyon: Geological Society of America Abstracts with Programs, v. 29, no. 6, p. A-89.

117. Karlstrom, K.E., Heizler, M., and Williams, M.L., 1997. Ar-Ar muscovite thermochronology within the Upper Granite Gorge of the Grand Canyon: American Geophysical Union, Fall 1997 meeting (1997).

118. Karlstrom, K.E., 1998. Proterozoic lithosphere of the southwestern North America: Geological Society of America Abstracts with Programs, v. 30, no.7, p. A-46.

119. Davidek, K.L., Bowring, S.A., Karlstrom, K.E., Williams, M.L., and Hawkins, D.P., 1998. Geochronological, thermochronological, and geochronological constraints on Proterozoic mid-crustal suturing in the western Grand Canyon: Geological Society of America Abstracts with Programs, v. 30, no.7, p. 160.

120. Karlstrom, K.E., Williams, M.L., and Bowring, S.A., 1998. Gneiss Canyon shear zone: P-T-t-D paths and character of Proterozoic midcrustal suturing in the western Grand Canyon: Geological Association of Canada NUNA conference proceedings, Sept, 1998, p. 31.

121. Karlstrom, K.E., 1999, Ancestry of structures and record of a composite uplift history in the Rocky Mountains: Geological Society of America Abstracts with Programs, v. 31, no. 7, p. A-244.

122. Shaw\*, C.A., Karlstrom, K.E., McCoy\*, A.M., and Williams, M.L., 1999, Multiple displacements on Proterozoic Intracontinental Shear Zones in Colorado: Insights into the Lithospheric Evolution of the Rocky Mountains: Geological Society of America Abstracts with Programs, v. 31,no. 7, p. A-107.

123. Weil, A., Van Der Voo, R., Geissman, J., and Karlstrom, K.E., 1999, Preliminary Paleomagnetic results from the Neoproterozoic Chuar Group, grand Canyon Supergroup, Arizona: Geological Society of America Abstracts with Programs, v. 31, no. 7, p. A-317.

124. Timmons\*, J.M., and Karlstrom, K.E., 1999, Multistage Proterozoic extension and establishment of the N-S and NW tectonic grains in the southwestern United States: Evidence from 1:12,000 mapping of the Grand Canyon Supergroup: Geological Society of America Abstracts with Programs, v. 31, no. 7, p. A-177.

125. Karlstrom, K.E., Heizler, M., and Williams, M.L., 1999, Erosional demise of an orogenic plateau-Record from the Great Unconformity of the western U.S.: Geological Society of America Abstracts with Programs, v. 31, no. 7, p. A-67.

126. Dehler\*, C.M., Des Marais, D.J., Bowring, S.A., Sharp, Z., Karlstrom, K.E., and Elrick, M., 1999, Chuar Group (1.1-0.74 Ga), Grand Canyon: Carbon-isotope systematics at the onset of Sturation-glaciation: Geological Society of America Abstracts with Programs, v. 31, no. 7, p. A-487.

127. Karlstrom, K.E., and Shaw\*, C.A., 1999, Continental Dynamics-Rocky Mountain Project (CD-

ROM): 4-D imaging of the continental lithosphere: v. 80, no. 46, p. F640.

128. Karlstrom, K.E., and Williams, M.L., 1999, Heterogeneity of the middle crust: Perspectives from well-exposed transects of Proterozoic rocks in the southwestern United States: EOS, Transactions, American Geophysical Union, v. 80, no.46, p. F943.

129. Heizler, M.T., Karlstrom, K.E., and Timmons, M.J., 1999, where have all the old micas gone?: New Mexico Geological Society Spring Meeting.

130. Karlstrom, K.E., 1999, New results from geologic mapping of the basin margins: Geometry and history of development of a fault-segmented crust: Third annual USGS Middle Rio Grande Basin study workshop, p. 8.

131. Karlstrom, K.E., 2000, Long-lived (1.8-1.0 Ga) convergent orogen in southwestern Laurentia: Its extensions to Australia and Baltica, and implications for refining Rodinia: Geological Society of America Abstracts with Programs, v. 32, no. 10, p. A-317.

132. Williams, M.L., Jercinovic, M.J., and Karlstrom, K.E., 2000, In Situ monazite age mapping and dating by microprobe: Timing the pulses of Proterozoic tectonism in southwestern Laurentia: Geological Society of America Abstracts with Programs, v. 32, no. 10, p. A-317.

133. Kelley, S.A., Chapin, C.E., and Karlstrom, K.E., 2000, Laramide cooling histories of the Grand Canyon, Arizona, and the Front Range, Colorado: Geological Society of America Abstracts with Programs, v. 32, no. 10, p. A-42.

134. McCoy\*, A.M., Shaw\*, C., Karlstrom, K.E., Williams, M.L., and Jercinovic, M.J., 2000, Geometry, kinematics, and protracted deformation along the Colorado Mineral Belt mylonite network: Geological Society of America Abstracts with Programs, v. 32, no. 10, p. A-230.

135. Dehler\*, C.M., Elrick, M.E., Karlstrom, K.E., Crossey, L.J., and Smith, G.A., 2000, Cyclostratigraphy of the mid-Neoproterozoic Chuar group (800-742 Ma), Grand canyon: A record of climatic and tectonic transitions into the Sturtian glacial and during Rodinia breakup: Geological Society of America Abstracts with Programs, v. 32, no. 10, p. A-375.

136. Strickland\*\*, D., Karlstrom, K.E., Selverstone, J., and Heizler, M.T., 2000, Proterozoic evolution of the Zuni Mountains, New Mexico, and a history of reactivation through the present: Geological Society of America Abstracts with Programs, v. 32, no. 10, p. A-453.

137. Heizler, M.T., Timmons\*, M.J., and Karlstrom, K.E., 2000, Ancestry of the Ancestral Rocky Mountains: Geological Society of America Abstracts with Programs, v. 32, no. 10, p. A-465.

138. Buscemi\*, P.A., Seaman, S.J., Williams, M.L., Karlstrom, K.E., and Bowring, S.A., 2000, Significance of Proterozoic ultramafic rocks in the Yavapai Orogen, Upper Granite Gorge, Grand Canyon: Geological Society of America Abstracts with Programs, v. 32, no. 10, p. A-435.

139. Quigley\* M.C., Karlstrom, K.E., and Hook, S.J., 2000, Geologic Evolution of the North Virgin Mountains, Southeast Nevada and Northwest Arizona: An integrated structural, remote sensing, and petrologic study: American Geophysical Union Fall Meeting, v. p. F1216.

140. Morozova, E.A., Wan, X., Smithson, S.B., Johnson, R, and Karlstrom, K.E., 2000, Seismic evidence for lithosphere structure across the Archean-Proterozoic boundary, Wyoming-Colorado: the CD-ROM project: American Geophysical Union Fall Meeting, p. F1196.

141. Karlstrom, K.E., Quigley\*, M.C., Bowring, S.A., Kirby, E., Hook, S.J., and Heizler, M., 2001, Low angle detachment along the Great Unconformity near the Colorado Plateau-Basin and Range breakaway: arguments against a tipped crustal section in the Gold butte area, southern Nevada: Mackin Conference Sept 2001, p.
142. Quigley\*, M.C., and Karlstrom, K.E., 2001, Tectonic inheritance at the Colorado Plateau – Basin and Range margin: Miocene uplift of the Virgin Mountain anticline influenced by reactivation of Proterozoic and Laramide structures: Mackin Conference Sept 2001, p.
142. Quigley\*, M.C., and Karlstrom, K.E., 2001, Tectonic inheritance at the Colorado Plateau – Basin and Range margin: Miocene uplift of the Virgin Mountain anticline influenced by reactivation of Proterozoic and Laramide structures: Mackin Conference Sept 2001, p. .
143. Seaman, S.J., Williams, M.L., and Karlstrom, K.E., 2001, Punctuated Granitoid Magmatism as Cause and Effect of Proterozoic Tectonism in the Grand Canyon, Arizona, Geological Society of America, Abstracts with Programs, v. 33, No. 5, p. A4.
144. Williams, M.L., Karlstrom K.E., Jercinovic, M.J., and Stevens\*, L., 2001, Microprobe Monazite Geochronology from the Manzano Mountains, New Mexico: Distinguishing Stages in a Long-Lived and Reactivated Orogen, Geological Society of America, Abstracts with Programs, v. 33, No. 5, p. A4.
145. Bowring, S.A., Matzel\*, J.P., Karlstrom, K.E., and Hawkins, D.P., 2001, Geochronological and Thermochronological Constraints on Proterozoic Lithospheric Evolution of the Southwestern U.S., Geological Society of America, Abstracts with Programs, v. 33, No. 5, p A5.
146. MalDonado, F., Love, D.W., Connell, S.D., Slate, J.L., and Karlstrom, K.E., 2001, Geology of Isleta Reservation, Central, New Mexico, Geological Society of America, Abstracts with Programs, v. 33, No. 5, p A6.
147. McCoy\*, A.M., Shaw\*, C.A., Karlstrom, K.E., and Williams, M.L., 2001, Tectonic “Fingerprint” for Deformational History in the Colorado Mineral Belt: Two ~100 Ma Orogenic Intervals Punctuated by ~5 Ma Tectonic Pulses, Geological Society of America, Abstracts with Programs, v. 33, No. 5, p. A10.
148. Shaw\*, C.A., Karlstrom, K.E., and Heizler, M., 2001, CA. 1.4 GA Metamorphic Temperatures of the Southwestern U.S. Estimated from Regional 40Ar/39Ar Data, Geological Society of America, Abstracts with Programs, v. 33, No. 5, p A10.
149. Kirby, E., Hodges, K.V., Bowring, S.A., and Karlstrom, K.E., 2001, New Geochronologic Data from the Sandia Pluton, New Mexico, Geological Society of America, Abstracts with Programs, v. 33, No. 5, p. A11.
150. Timmons\*, J.M., Karlstrom, K.E., Heizler, M.T., and Bowring, S.A., 2001, A Synthesis From the Unkar Group of Grand Canyon, and Inferences on Late MesoProterozoic Intracratonic Sedimentation and Deformation in the Western U.S., Geological Society of America, Abstracts with Programs, v. 33, No. 5, p A20.
151. Dehler\*, C.M., Prave, A.R., Crossey, L.J., Karlstrom, K.E., Atudorei, V., and Porter, S.M., 2001, Linking Mid-Neoproterozoic Successions in the Western U.S.: The Chuar Group-Uinta Mountain Group-Pahrump Group Connection (Chump), Geological Society of America, Abstracts with Programs, v. 33, No. 5, p. A20.

152. Crossey, L.J., Timmons\*, M.J., Karlstrom, K.E., Ashby\*, J.M., Rampe\*, J., Tyson\*, A., Johnson\*, S., Marshall\*, K., Dehler\*, C.M., and Prave, A.R., 2001, Petrologic Approaches to Correlate Late Mesoproterozoic to Neoproterozoic Stratigraphic Successions in Western North America, Geological Society of America, Abstracts with Programs, v. 33, No. 5, p A42.

153. Tyson\*, A.R., Karlstrom, K.E., Chamberlain, K.R., Foster, C.T., Morozova, E.A., and Smithson, S.B., Farwell Mountain Shear Zone: Terrane Boundary in the Park Range of Colorado Based on Structural, Petrologic, and Seismic Evidence, Geological Society of America, Abstracts with Programs, v. 33, No. 5, p. A42.

154. Jessup\*, M.J., Karlstrom, K.E., and Shaw, C., 2001, Cross Section of Proterozoic Rocks of the Black Canyon, Colorado and Use of Dated Plutons as “Snap Shots” of Evolving Deformational Conditions, Geological Society of America, Abstracts with Programs, v. 33, No. 5, p. A43.

155. McCoy\*, A., Keller, R.G., and Karlstrom, K.E., 2001, Gravity Modeling of the Colorado Mineral Belt, Geological Society of America, Abstracts with Programs, v. 33, No. 5 p. A43.

156. Rogers\*\*, S.A., Karlstrom, K.E., Crawford\*\*, E.B., Doran\*\*, L.M., Ashby\*, J.M., and Throne\*\*, J.F., 2001, Geologic Mapping of the Capilla Peak State Quadrangle, Central New Mexico, Geological Society of America, Abstracts with Programs, v. 33, No. 5, p. A45.

157. Morozova, E.A., Wan, X., Chamberlain, K. Smithson, S.B. Johnson, R., Karlstrom, K.E., and Tyson, A.R., 2001, Geologic Interpretation of Crustal Reflection Profile Across the Cheyenne Belt, Proterozoic Suture, SE WY and No CO, GSA Abstracts with Programs, v. 33, No. 5, p. A49.

158. Erslev, E.A., Bolay\*, N.V., Ehrlich, T.K., and Karlstrom, K.E., 2001, Mechanisms for Precambrian Basement Control of Laramide and Ancestral Rocky Mountain Structures, Geological Society of America, Abstracts with Programs, v. 33, No. 5, p. A51.

159. Tyson\*, A.R., Karlstrom, K.E., Chamberlain, K.R., Foster, C.T., Morozova, E., and Smithson, S.B., 2001, Paleoproterozoic suture (?) in northern Colorado: insights into the geometry and kinematics of continental assembly in the southwestern U.S.: Geological Society of America Abstracts with programs, v. 33, no.6, p. A450.

160. Karlstrom, K.E., Crossey, L.J., and Williams, M.L, 2001, The Trail of Time: Integrating research and education at Grand Canyon: Geological Society of America Abstracts with Programs, v. 35, no. 6, p. A122.

161. Low\*, P.C., Seaman, S.J., Karlstrom, K.E., and Williams, M.L., 2002, Proterozoic Ultramafic Rocks in Southwestern North America: Distinguishing Ophiolites from Arc Cumulates: Geological Society of America Abstracts with Programs, v. 34, no. 6., p. 181.

162. Jessup\*, M., Karlstrom, K.E., Connelly, J., Jones, J., and Williams, M., 2002, Tectonic Evolution of the Black Canyon of the Gunnison, Colorado: New U/Pb Geochronology and Evidence for both Paleoproterozoic and Mesoproterozoic Deformation and Metamorphism: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 181.

163. Timmons\*, M.J., Heizler, M., and Karlstrom, K.E., 2002, Proterozoic and Paleozoic Ancestry of Regional Laramide Fault Networks: Using  $^{40}\text{Ar}/^{39}\text{Ar}$  K-Feldspar Thermochronology to Evaluate Early Cooling/Exhumation Histories Across Discrete Fault Zones: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 181.

164. Karlstrom, K.E., 2002, Lithospheric Structure and Evolution of the Rocky Mountains-Summary of

Results of the CD-ROM (Continental Dynamics of the Rocky Mountains) Experiment: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 182.

165. Keller, R.G., Karlstrom, K.E., Miller, K.C., Snelson, C., Andronicos, C., Williams, M., and Levander, A. 2002, Crustal Evolution of the Southern Rocky Mountain Region: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 254.
166. Schneeflock\*\*, F., Meyer, G., Karlstrom, K.E., and Wagner, S., 2002, Quaternary Drainage Development and Incision History in the Black Canyon of the Gunnison Area, Colorado: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 472.
167. Magnani, M.B., Miller, K., Levander, A., Eshete, T., and Karlstrom, K.E., 2002, Seismic Reflection Image of the Jemez Lineament of New Mexico: Evidence for A South-Dipping Paleosubduction Boundary Between the Yavapai and Mazatzal Provinces: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 473.
168. Karlstrom, K.E., and Williams, M., 2002, Long Lived (1.8 – 1.0 GA) Convergent Orogen in Southern Laurentia-Evaluation of the Auswsu Model for Rodinia: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 559.
169. Williams, M.L., Jercinovic, M.J., and Karlstrom, K.E., 2002, Parsing the Long-Lived Orogen: Using Microstructural Analysis and Microprobe Monazite Dating to Clarify the Proterozoic History of Southwestern North America: GSA Abstracts with Programs, v. 34, no. 6, p. 180.
170. Siddoway, C.S., Jones, J., Williams, M.L., Andronicos, C.L., Connelly, J., and Karlstrom, K.E., 2002, The Mesoproterozoic Record in the Wet Mountains, Colorado: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 181.
171. Crowley, J.L., Matzel, J.P., Bowring, S.A., Williams, M.L., Farmer, G.L., and Karlstrom, K.E., 2002, Paleoproterozoic to Mesoproterozoic Evolution of Southwestern North America: The View from the Lower Crust: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 253.
172. Dehler, C.M., Crossey, L.J., Atudorei, V., Bloch, J.D., and Karlstrom, K.E., 2002, Characterization of the Red Pine Shale, Uinta Mountain Group: Mid-Neoproterozoic Paleogeography of NE Utah: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 272.
173. Wagner, S.S., and Karlstrom, K.E., 2002, Neogene Profile of the Colorado River: Different Reaches and Differential Incision within a Young River System: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 321.
174. Crossey, L.J., Karlstrom, K.E., Patchett, P.J., Hilton, D., Fischer, T., Sharp, W., Pederson, J., Schmidt, D.L., Antweiler, R.C., and Reynolds, A.C., 2002, Active Springs and Quaternary Travertines in Grand Canyon: Linking Modern and Paleo- Hydrologic Systems: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 395.
175. Karlstrom, K.E., Crossey, L.J., and Williams, M.L., 2002, The Trail of Time at Grand Canyon: A Progress Report: Geological Society of America Abstracts with Programs, v. 34, no. 6, p. 540.
176. Baer, S.H., Karlstrom, K.E. and Bauer, P. (2002), New Mapping from the Manzano Peak Quadrangle, central New Mexico. Geological Society of America Abstracts with Programs, v. 34, no. p. (Cedar City RM section meeting).

177. McIntosh, W.C., Peters, L., Karlstrom, K.E., and Pederson, J., 2002, New 40Ar-39Ar dates on basalts in Grand canyon: constraints on rates of Quaternary river incision and slip on the Toroweap fault, and implications for lava dams: Geological Society of America Abstracts with Programs, v. 34, no. 4, p. A-61.

178. Baer\*, S.H. Karlstrom, K.E., Williams, M.L., Jervinovic, M.J., Rogers, S. and Schneeflock, F. (2003) Geometry and timing of movements in the Proterozoic Manzano thrust belt, central New Mexico: Geological Society of America Abstracts with Programs, v. 35, no. 5, p. 42.

179. Crossey, L.J., Fischer, T., Karlstrom, K.E., Patchett, J., Hilton, D., Sharp, W., Reynolds, A., 2003, Springs, gases and travertines of the Colorado Plateau: Xenowhiffs, links to tectonism, and view of a deeply-dissected hydrologic system: Geological Society of America Abstracts with Programs: v. 35, no. 6, p. 200.

180. Crossey, L.C., Karlstrom, K.E., Crow\*, Ryan, Weimer, Paul, Austin, J., Roesink, J., and Williams, M.L., 2003, The virtual and physical “Trail of Time”: complementary approaches for teaching geology at the National Parks: Geological Society of America Abstracts with Programs, v. 35, no. 6, p. 356.

181. Williams, M., Crossey, L.J., Jercinovic, M., Bloch, J.D., Karlstrom, K.E., Dehler\*, C.M., Heizler, M., Bowring, S., Goncalves, P., 2003. Dating sedimentary sequences: In situ U/Th-Pb microprobe dating of early diagenetic monazite and Ar-Ar dating of marcasite nodules: case study from Neoproterozoic black shales in the southwestern U.S.: Geological Society of America Abstracts with Programs, v. 35, no. 6, p. 595.

182. Newell, D.L., Koning\*, D., Connell, S., Karlstrom, K.E., Crossey, L., and Cleveland\*\*, T., 2003, Plio-Pleistocene incision of the Rio Ojo Caliente, northern Espanola Basin, New Mexico: Geological Society of America Abstracts with Programs, v. 35, no. 6, p. 542.

183. Baer\*, S.H., Karlstrom, K.E., Williams, M.L., Jercinovic, M.J., Rogers\*\*, S., and Schneeflock\*\*, F., 2003, Geometry and Timing of movements in the Proterozoic Manzano thrust belt, central New Mexico: Geological Society of America Abstracts with Programs, v. 35, no. 5, p. 42.

184. Williams, M.L., Jercinovic, M.J., Karlstrom, K.E., Mahan\*, K., 2003, Interactions between deformation and metamorphism: new techniques for interpreting P-T paths from metamorphic rocks: Geological Society of America Abstracts with Programs, v. 35, no. 6, p. 90.

185. Karlstrom, K.E., et al., 2003, Southern Laurentia in Rodinia: collaborative compilation of a tectonic map for IGCP 440: Geological Society of America Abstracts with Programs, v. 35, no. 6, p. 342.

186. Pederson, J.L., Anders\*, M.D., Rittenour, T.M., Sharp, W.D., Gosse, J.C., Karlstrom, K.E., 2003, Using Fill Terraces and Multiple Dating Techniques to Calculate Incision Rates for Grand Canyon: Eos Transactions of the American Geophysical Union, v. 84, no. 46, p.

187. Treiman, A.H., Newsom, H., Hoehler, T., Tsairides, C., Karlstrom, K.E., Crossey, L., Kiefer, W., Kadel, S., Garcia-Pichel, F., Aubelle, J., Crumpler, L., 2003, Field/Lab Training Workshops in Planetary Geology and Astrobiology for Secondary School Teachers: Eos Transactions of the American Geophysical Union, v. 84, no. 46, p.

188. Coblenz, D.D., and Karlstrom, K.E., 2003, A topographic analysis of the Colorado River drainage: Insights into interaction between topography and incision history: Eos Transactions of the American Geophysical Union, v. 84, no. 46, p.

189. Shaw\*, C.A. and Karlstrom, K.E., 2003, Window into the middle crust: a deeply exhumed Proterozoic orogenic plateau in the western U.S.: *Eos Transactions of the American Geophysical Union*, v. 84, no. 46, p.

190. Crowley, J.L., Schmitz, M.D., Bowring, S.A., Williams, M.L., and Karlstrom, K.E., 2003, Timing of magmatism and metamorphism in the lower crust beneath the Colorado Plateau from coupled U-Pb and Lu-Hf isotopic analysis of zircon from xenoliths: *Eos Transactions of the American Geophysical Union*, v. 84, no. 46, p. F1567.

191. Heizler, M.T., Karlstrom, K.E., Timmons\*, J.M., and Sanders\*, R.E., 2004, Exploitation of Precambrian fault networks by younger orogenesis: a test using Ar-Ar analysis of K-feldspars: *New Mexico Geological Society Proceedings*, p. 24.

192. Karlstrom, K.E., 2004, Tectonic map of the Laurentia at 800 Ma within Rodinia: 32<sup>nd</sup> International Geologic Congress, Florence Italy, August 20-28, 2004. T31.02.

193. Karlstrom Karl, Newell\*, Dennis, Crossey Laura, Sharp Warren, 2004, Hypothesis for interacting paleoseismic and climatic controls for travertine deposition in the Colorado Plateau region: 32<sup>nd</sup> International Geologic Congress, Florence Italy, August 20-28, G19.01 (335-3)

194. Williams Michael L., Mahan Kevin, Jercinovic Michael, 2004, Goncalves Philippe, Karlstrom Karl, 2004, Linking deformation and metamorphism: constraining tectonics from metamorphic rocks: 32<sup>nd</sup> International Geologic Congress, Florence Italy, August 20-28, G05.05 (65-2).

195. Newell\* Dennis, Crossey Laura J., Fischer Tobias P., Karlstrom Karl E., Sharp Zachary, Burke Cougar, 2004, Tracing the origins of travertine-depositing springs of the Colorado Plateau Region, USA: 32<sup>nd</sup> International Geologic Congress, Florence Italy, August 20-28

196. Levander Alan, Zelt C.A., Magnani M.B., Miller K.C., Keller G.R., Dueker K.G., Karlstrom K.E. 2004, Multi-band seismic images of Proterozoic plate tectonics and modern basalt extraction structures in the western US: 32<sup>nd</sup> International Geologic Congress, Florence Italy, G20.01 (184).

197. Keller G. Randy, Snelson Catherine, Miller Kate, Levander Alan, Andronicos Christopher, Karlstrom Karl, Prodehl Claus, 2004, Lithospheric structure across an Archean-Proterozoic suture in the Rocky Mountain region of the United States: 32<sup>nd</sup> International Geologic Congress, Florence Italy, August 20-28, G: 20.01 (184).

198. Crossey Laura, Fischer Tobias, Newell Dennis, Karlstrom Karl, Hilton David, Patchett Jonathan, Huntoon Peter, 2004, Travertines, springs and gases of the southwestern US: xenowhiffs, links to tectonism, and views of a deeply-dissected hydrologic system: 32<sup>nd</sup> International Geologic Congress, Florence Italy, August 20-28, G19.01 (335).

199. Boganova Svetlana, Kampunzu Henri, Li Zheng-xiang, Pisarevsky Sergei, Davidson Anthony, Fuck Reinhardt, Gladkochoub Dmitry, Karlstrom Karl, Myers John, Pease Victoria, 2004, The evolution of Rodinia: Mesoproterozoic assembly and Neoproterozoic breakup, 32<sup>nd</sup> International Geologic Congress, Florence Italy, August 20-28, T31.02 (188).

200. Whitmeyer, S.J., and Karlstrom, K.E., 2004, Progressive Proterozoic Growth of Southern Laurentia by Magmatic Stabilization of Lithosphere, *Geological Society of America Abstracts with Programs*, v. 36, no. 5, p. 404.

201. Karlstrom, K.E., and Aster, R., 2005, Opportunities and challenges for EarthScope-leveraged 3D super-experiments to resolve the nature of mantle velocity domains and the heterogeneous structure

and polyphase evolution of the continental lithosphere: Case study from the southern Rocky Mountains: 2005 EarthScope National Meeting Abstracts, p. 162-163.

202. Crossey, L., Karlstrom, K., Newell, D., Fischer, T., Hilton, D., Patchett, P.J., 2005, Quaternary travertine-depositing systems: A geologic record of mantle degassing: 2005 EarthScope National Meeting Abstracts, p. 102.

203. Newell, D., Crossey, L., Fischer, T.P., Hilton, D., Karlstrom, K., and Kennedy, M., 2005, Xenowiffs—the link between mantle tectonism and groundwater: 2005 EarthScope National Meeting abstracts, p. 204.

204. Karlstrom, K.E., and Whitmeyer, S. J., 2005, Progressive Proterozoic development of southern Laurentia: new map and linked databases: Supercontinents and Earth Evolution Symposium, Perth, Australia, September, 2005, p. 72.

205. Crossey, L.J., Karlstrom, K.E., and Williams, M.L., 2005, Dating sedimentary sequences via microprobe dating of authigenic monazites: Supercontinents and Earth Evolution Symposium, Perth, Australia, September, 2005, p. 122.

206. Aster, R., and Karlstrom, K., 2005, Opportunities for EarthScope-Leveraged 3-D “Superexperiment” in the Southern Rocky Mountains of the United States: 2005 General Assembly of the European Geosciences Union, Vienna, Austria, April 24-29

207. Cox\*\*, C., Kelley, S., Karlstrom, K.E., Crossey, L., and Dillon, M., 2005, Quaternary incision history of the upper reaches of the Jemez River: New Mexico Geological Society Meeting, p. 11.

208. Cather, S.M. and Karlstrom, K.E., 2005, Constraints on Ancestral Rocky Mountain and Laramide Dextral-Oblique Deformation in North-Central New Mexico Using Regional Aeromagnetic Patterns and Structural Balancing Considerations: New Mexico Geological Society Meeting, 2005, p. 10.

209. Timmons\*, J.M., Karlstrom, K.E., Pederson, J. and Anders, M., 2005, Geologic Map of Eastern Grand Canyon, Arizona: Documenting Multi-Phase Late Proterozoic Deformation and Laramide Reactivation in the Southwestern United States: New Mexico Geological Society Meeting, p. 57.

210. Luther\*, A. and Karlstrom, K., 2005, Opportunity for Direct Dating of ~1.65 Ga Quartzite-Rhyolite Succession: Were There Two Quartzite-Rhyolite “Events” During Crustal Assembly of the Southwestern United States: New Mexico Geological Society Meeting, p. 40.

211. Zinsser\*, A. and Karlstrom, K.E., 2005, Stratigraphic Association of Uncompaghre Group and The Vallecito Conglomerate? Insight into PaleoProterozoic Intra-Cratonic Basin Formation: New Mexico Geological Society Meeting, p.66.

212. Karlstrom, K.E., 2005, Influences of Quaternary tectonism on the profile and incision history of the Colorado River system of the southwestern U.S.: GSA Abstracts with Programs: v. 37, no. 6, p.15

213. Newell\*, D.L., Cox\*\*, C., Dillon\*\*, M., Karlstrom, K.E., and de Moore\*, M., 2005, Variability in bedrock incision rates in the eastern Colorado Plateau and southern Rockies: Evidence for neotectonics control on landscape evolution: Geological Society of America Abstracts with Programs, v. 37, no. 6, p. 15.

214. Crossey, L.J., Newell\*, D., Karlstrom, K.E., and Fischer, T., 2005, Travertine-depositing systems of the western U.S.: regional links between Cenozoic tectonism and water quality: Geological Society of America Abstracts with Programs, v. 37, no. 6, p. 16.

215. Karlstrom, K.E., Whitmeyer, S., Jessup\*, M., 2005, Proterozoic rocks of the Southwest: episodic crustal growth, long-lived (1.8 to 1.0 Ga) plate margin along southern Laurentia, and preservation of Proterozoic subduction scars in the modern day lithosphere: Geological Society of America Abstracts with Programs, v. 37, no. 6, p. 41.

216. Zinsser\*, A. and Karlstrom, K.E., 2005, Autochthoneity of the Proterozoic Uncompahgre Group, Needle Mountains, Colorado: Insight into regional ~ 1.7 Ga quartzite deposition: Geological Society of America Abstracts with Programs, v. 37, no. 6, p. 41.

217. Luther\*, A., and Karlstrom, K.E., 2005, A case study of a ~ 1.66 Ga quartzite-rhyolite succession in central New Mexico: Significance of two quartzite-rhyolite "events" during assembly of Laurentia: Geological Society of America Abstracts with Programs, v. 37, no. 6, p. 41.

218. Karlstrom, K.E., Crossey, L.J., and Williams, M.L., 2005, Geoscience education in the National Parks: Trail of Time at Grand Canyon and EarthScope in the parks: GSA Abstracts with Programs, v. 37, no. 7, p. 410.

219. Crow\*, R .S.,Karlstrom, K.E.,McIntosh, W. C, Dunbar, N. W., Peters, L., Raucci\*, J., and Umhoeffer, P.J , 2005, Quaternary basalts in Grand Canyon: Correlation of flows using Lidar, 40Ar/39Ar dating, Geochemical correlation, neotectonic studies, and history of lava dams AGU abstracts, Fall 2005 meeting, T51D-1386.

220. Sandoval\*, M, Coblenz, D., Karlstrom, K.E., Sussman, A., 2005, Connecting topographic analysis with Colorado River incision history: Sensitive gauges of neotectonics in the Rocky Mountains: AGU abstracts, Fall, 2005: T23C-0580.

221. Crossey, L.J., Karlstrom, K.E., Newell, D.L., Kirk, M.L., Takacs-Vesbach, C., Dahm, C.N., Fischer, T., and Hilton, D., 2005, Cool CO<sub>2</sub> springs of the western U.S.: Continental "smokers": AGU Abstracts, Fall, 2005: B21A-1011.

222. Karlstrom, K.E., Crossey, L. J., Sharp, W. D., Lyons, A., Rittenour, T., 2005, Travertine in western Grand Canyon: paleoclimatically driven aggradation and incision directly dated by U-Series AGU Abstracts, Fall, 2005: V13A-0516.

Heizler, MT; Karlstrom, KE; Timmons\*, JM; et al., 2005, Reactivation of Precambrian fault networks: A K-feldspar Ar-40/Ar-39 study: 5th Annual V M Goldschmidt Conference Location: Moscow, ID: *Geochemica et Cosmochimica Acta*, v. 69, no. 10, p. A293.

223. Karlstrom, K.E., 2006, The CD-ROM Experiment: 4-D Image of the lithosphere beneath the Rocky Mountains and a model for geodynamic interplay between ancient compositional heterogeneity and modern asthenospheric processes: Geological Society of America Abstracts with Programs, v. 38, no. 7, p. 209.

224. Sandoval\*, M., and Karlstrom, K.E., 2006, Incision history of the Black Canyon of the Gunnison: update and summary of available constraints and problems: Geological Society of America Abstracts with programs, v. 38, no. 6, p. 11.

225. Sandoval\*, M., Karlstrom, K.E., Aslan, A., Kirby, E., and Granger, D., 2006, Incision history of the Black Canyon of the Gunnison: *Eos Transactions of the American Geophysical Union*, v. 87, T11A-0421.

226. Karlstrom, K.E., Crossey, L., Williams, M., Crow\*, R., Semken, S., 2006, Its About Time: Plans for

installation of Trail of Time at Grand Canyon National Park and investigations of public cognition of deep time and Earth processes: Geological Society of America Abstracts with Programs, v. 38, no. 7, p. 271.

227. Crow, R., Karlstrom, K.E., McIntosh, W., Peters, L., Dunbar, N., 2006, Interactions between volcanism, river incision, and normal faulting in western Grand Canyon and implications for neotectonic models: Geological Society of America Abstracts with Programs, v. 38, no. 7, p. 282.

228. Price\*, N.A., Williams, M.L., Karlstrom, K.E., 2006, Regional Mn horizon and Mn-andalusite mineralization in Proterozoic quartzites of the southwestern U.S.A: Geological Society of America Abstracts with Programs, v. 38, no. 7, p. 294.

229. Low, P.C., Seaman, S.J., Williams, M., Jercinovic, M.J., Dyar, M.D., Karlstrom, K.E., 2006, Compositional and textural evidence of an igneous origin for olivine coronas in Iherzolite from Mile 91 Canyon: Geological Society of America Abstracts with Programs, v. 38, no. 7, p. 295.

230. Muehlberger, W.R., Hatcher, R.D. Jr., Denison, R.E., Karlstrom, K.E., Saleeby, J., Martinez, C.M., 2006, Transcontinental Geologic Cross Section: Geological Society of America Abstracts with Programs, v. 38, no. 7, p. 415.

231. Crossey, L., Karlstrom, K.E., Hilton, D.R., Fischer, T.P., Mitchell, E., Takacs-Vesbach, C., Dahm C.N., Jackson, W.O., 2006, CO<sub>2</sub>-Rich springs and travertines of the Rocky Mountain region: Mantle helium associated with the Aspen Anomaly and geomicrobiology of continental smokers: Geological Society of America Abstracts with Programs, v. 38, no. 7, p. 465.

232. Jones, J.V., III, Connelly, J.N., Karlstrom, K.E., Williams, M.L., 2006, Depositional age and provenance of supermature Proterozoic quartzites, Colorado and New Mexico: New insights from detrital zircon geochronology: Geological Society of America Abstracts with Programs, v. 38, no. 7, p. 503.

233. Crossey, L. J., Karlstrom, K.E., Takacs-Vesbach, C., Dahm, C.N., Hilton, D., and Fischer, T., 2006, CO<sub>2</sub> mound springs of the western U.S.: Towards a model for continental "smokers" ?: Joint Congress of the 9th Australasian Environmental Isotope Conference and 2nd Australasian Hydrogeology Research Conference, Adelaide South Australia, December, 2006, p. 33.

234. Embid\*, E., Crossey, L. J., Karlstrom, K.E., Eagar, K.C., Fouch, M.J., Crumpler, L.S., and Aubele, J.C., 2006, "Chemical volcanoes" in the Springerville area, Arizona; using travertines, springs, and microseismicity to link water quality, paleohydrology and neotectonics: Abstracts with Programs - Geological Society of America, vol.38, no.6, p.10.

235. Semken, S., Bueno Watts, N., Ault, C., Dodick, J., Alvarado, C., Pineda, M., Dunbar, K., Karlstrom, K.E., Crossey, L.J., and Williams, M.L., 2007, Timeline interpretation and time scale cognition experiments for the Trail of Time at Grand Canyon National Park: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 562.

236. Karlstrom, K.E., Crossey, L.J., and Fischer, T.P., 2007, Advanced summer field geology studies at the University of New Mexico: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 546.

237. Crossey, L.J., Karlstrom, K.E., Semken, S., and Crow, R.S., 2007, First stage installation of the Trail of Time at Grand Canyon: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 460.

238. Karlstrom, K.E., and the CREST Working Group, 2007, Cenozoic uplift associated with the Aspen Anomaly, central Colorado, and update on the CREST project (Colorado Rockies Experiment and Seismic Transects): Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 202.

239. Karlstrom, K.E., Kirby, E., Kelley, S., Aslan, A., Sandoval, M., and Crow, R.S., 2007, Neotectonic influences on the longitudinal profile of the Colorado River system in Grand Canyon and the Rocky Mountains: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 194.

240. Karlstrom, K.E., Crow, R.S., Peters, L., McIntosh, B., Crossey, L.J., 2007, Quantifying the interaction of river incision and normal faulting across the western edge of the Colorado Plateau via  $40\text{Ar}/39\text{Ar}$  and field studies of Quaternary basalts in Grand Canyon: Geological Society of America Abstracts with Programs, v. 39, No. 6, p. 185.

241. Crossey, L.J., Karlstrom, K.E., Takacs-Vesbach, C., Dahm, C., Hilton, D., Newell, D., and Fischer, T., 2007,  $\text{CO}_2$ -rich mound springs of the western U.S.: Continental Smokers and their influence on geomicrobiology and water quality: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 38.

242. Heizler, M.T., Parsons, I., Sanders, R.E., Heozler, L.L., and Karlstrom, K.E., 2007, K-feldspar  $40\text{Ar}/39\text{Ar}$  thermochronology of western USA Precambrian lithosphere: improved understanding of systematics towards more accurate geological models: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 201.

243. Crow, Ryan, Karlstrom, K.E., McIntosh, W., Peters, L., and Dunbar, N., 2007, History of Quaternary volcanism in Grand Canyon based on LIDAR analysis, Ar/Ar dating, and field studies: implications for flow stratigraphy, timing of volcanic events, and lava dam stability: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 185.

244. Darling\*, A., Aslan, A., Betton, C., Cole, R., and Karlstrom, K.E., 2007, Late Quaternary incision rates and drainage evolution of the confluence of the Uncompahgre and Gunnison rivers based on terraces dated with lava creek B ash, western Colorado: Geological Society of America Abstracts with Programs, v. 39, no. 6, p. 306.

245. Heizler, M., Karlstrom, K.E., Schneider, D., and Condie, K.C., 2007, Continental-scale geodynamics documented by  $40\text{Ar}-39\text{Ar}$  thermochronology studies: Evolution of southern Laurentia and the Trans-Hudson orogen: Ores and Orogenesis, a symposium honoring the career of William R. Dickinson, Tucson Arizona: Arizona Geological Society, p. 56-57.

246. Karlstrom, K.E., Whitmeyer, S.J., Williams, M.L., Bowring, S.A., and Jessup, M.J., 2007, Arc-accretion model for the Paleoproterozoic evolution of southern Laurentia: Ores and Orogenesis, a symposium honoring the career of William R. Dickinson, Tucson Arizona: Arizona Geological Society, p. 57-58.

247. Salem\*, A., Geier, J., McFarlane, B., and Karlstrom, K.E., 2007, Preliminary results of field investigations in the Big Maria, Palen, and McCoy Mountains, Maria Fold and Thrust Belt and McCoy Basin, SE California: Ores and Orogenesis, a symposium honoring the career of William R. Dickinson, Tucson Arizona: Arizona Geological Society, p. 151- 152.

248. Karlstrom, K.E. and the CREST project team, 2007, Interconnections between the mantle and the near-surface system above the Aspen Anomaly, central Colorado, and implications for Cenozoic uplift of the Rocky Mountains: American Geophysical Union Fall meeting, Eos Transactions of the American Geophysical Union, v. 88, no. 52, T14C-02.

249. Price\*, N.A., Williams, M.L., and Karlstrom, K.E., 2007, Mn-andalusite horizon in the Ortega Fm. quartzite: implications for the Proterozoic tectonic history of the Tusas Mts., northern New Mexico: Geological Society of America Abstracts with Programs, v. 39, no. 5, p. 40.

250. Embid\*, E., Crossey, L.J., and Karlstrom, K.E., 2007, Travertines of the Springerville Area, Arizona: “Chemical Volcanoes” linking water quality, paleohydrology and neotectonics: New Mexico Geological Society Program with Abstracts, p 17.

251. Muehlberger, W.R., Karlstrom, K.E., Saleeby, J., Saleeby, Z., Denison, R., Martinez, C., and Hatcher, R.D., 2008, Geologic Cross Section of the North American Plate near 36° Latitude, Part I: Western U.S. from the Pacific Oceanic Crust to the Mid-Continent: Geological Society of America Abstracts with Programs, 251-11.

252. Aslan, A., Hood, W., Karlstrom, K.E., Kirby, E., Granger, D., Betton, C., Darling, A., Benage, M., and Schoepfer, S., 2008, Abandonment of Unaweep Canyon ~1 Ma and the Effects of Transient Knickpoint Migration, Western Colorado: Geological Society of America Abstracts with Programs 178-9.

253. Muehlberger, W.R., Hatcher, R.D., Denison, R., Martinez, C., Karlstrom, K.E., Saleeby, J., Saleeby, Z., 2008, Geologic Cross Section of the North American Plate near 36° Latitude, Part II: Atlantic Ocean Crust to 99° W Longitude Geological Society of America Abstracts with Programs, 251-10.

254. Karlstrom, K.E., Kirby, E., Kelley, S., Aslan, A., Ouimet, W., Coblenz, D., and van Wijk, J., 2008, Colorado River system of the southwestern U.S.: analysis of the longitudinal profile, differential incision, and hypothesis for dynamic uplift and rapid incision in the last 6 Ma: T11C-1896, AGU Fall meeting.

255. Coblenz, D., van Wijk, J., Phillips, W.S., Karlstrom, K.E., and Chase, C., 2008, The Geodynamic Origins of Western U.S. Topography: Correlations and Speculations: T11C-1892, AGU Fall meeting.

256. Darling\*, A., Karlstrom, K.E., Kirby, E., Ouimet, W., Coblenz, D., and Aslan, A., 2008, Evaluating Neogene uplift and denudational history of the Colorado Rockies using river profiles and incision records: T11C-1893, AGU Fall Meeting.

257. Brown\*\*, S., Karlstrom, K.E., Kirby, E., Ouimet, W., Dillon, M., Cox, C., Newell, D., De moore, M., van Wijk, J., Coblenz, D., and Crossey, L.J., 2008, Hypothesis for epeirogenic uplift above the Jemez lineament: Is Neogene doming recorded by river profiles and terraces?: T11C-1894, AGU Fall Meeting.

258. Cron\*, B., Crossey, L.J., Hall, J., Takacs- Vesbach, C., Dahm, K., Northrup, D., and Karlstrom, K.E., 2008, Comparing carbonate-depositing hydrothermal systems along the MAR at Lost City hydrothermal field and along the Rio Grande rift in the southwestern US: Geochemistry, Geomicrobiology and Mineralogy: B51D-0407, AGU Fall Meeting.

259. MacCarthy\*, J. K., Aster, R., Dueker, K., Karlstrom, K .E ., Hansen, S. M., Stachnik, J. C., and Zang, Z., 2008, High Resolution Imaging of the Aspen Anomaly - CREST and USArray: U43B,0057,AGU Fall Meeting.

260. Takacs-Vesbach, C., Hall, J., Crossey, L. J., Karlstrom, K. E., Fischer, T., and Cron, B., 2008, Microbial Communities of Terrestrial Springs in Extensional Settings of the Western U.S.A: B51D-0427, AGU Fall Meeting.

261. Darling\*, A., Karlstrom, K., Kirby, E ,2009, Comparison of the modern profiles and discharge of the Green and Colorado rvers and implications for epeirogenic uplift of the Colorado Plateau and Rocky Mountains: Geological Society of America Abstracts with Programs, v. 41(7), p. 306-307.

262. Darling, A.L., K. E. Karlstrom, K.E., Kirby, E., Ouimet, W.B., Aslan, A., and Granger, D.E., 2009, Incision history of the Colorado River system over the last several Ma from cosmogenic burial dating of high terrace gravels: AGU Fall Meeting, T43d-2154.

263. Feldman JD, Heizler MT, Kelley S, Karlstrom K, Gehrels G. 2009. Geo and thermochronological evidence for the emplacement and exhumational history of the twin lakes batholith; implications for the Laramide orogeny; *New Mexico Geology*. 31(2):42-3.

264. Feldman, J, Heizler, M. Kelley, S., and Karlstrom, K., 2009, Geo and thermochronological evidence for the emplacement and exhumational history of the Twin Lakes batholith: Implications for the Laramide Orogeny: Geological Society of America Abstracts with Programs, v. 41(7), p. 58.

265. Hatcher, R.D., Jr., Muehlberger, W.R., Denison, R., Keller, G.R., Martinez, C. M., Karlstrom, K., Saleeby, J., Saleeby, Z., 2009, Transcontinental geologic cross section of the North American plate near 36° latitude, Part II: Atlantic ocean crust to the mid-continent: Geological Society Of America Abstracts With Programs, v. 41(7), p. 132.

266. Karlstrom, K.E., Dueker, K., Aster, R. MaCarthy, J.K., Hansen, S., Crow, R, Kelley, S., Coblenz, D., 2010, CREST- Colorado Rockies Experiment and Seismic Transects: Time-space patterns of Neogene uplift and their correspondence to the Aspen anomaly: Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 77.

267. Karlstrom, K.E., Van Wijk, Jolante, Coblenz, David, and Crest, Working Group, 2009, Dynamic uplift of the Colorado Plateau- Rocky Mountain region driven by asthenosphere-lithosphere interactions: Geological Society of America Abstracts with Programs, v. 41(7), p. 178.

268. Karlstrom, K.E., Coblenz, D.D., Ouimet, W.B., Kirby, E., Van Wijk, J.W., Schmandt, B., Crossey, L.J., Crow, R., Kelley, S., McKeon, R.E., Aslan, A., Darling, A.L., Dueker, K.G., Aster, R.C., Lazear, G.D., And Hilton, D.R., 2009, Dynamic uplift of the Colorado Rockies and western Colorado Plateau in the last 6 Ma driven by mantle flow and buoyancy: Evidence from the Colorado River region. AGU Fall Meeting, T51f-0.

269. Low, P.C., Seaman, Sheila J., Williams, Michael L., And Karlstrom, Karl E., 2009, The Origin Of Dunite And Harzburgite Enclaves In Layered Cumulates Of The Ninetyone Mile Creek Canyon Peridotite, Grand Canyon, U.S.A. : Geological Society Of America Abstracts With Programs,

270. MacCarthy, J.K., Aster, R.C., Hansen, S.M., Stachnik, J.C., Dueker, K.G., And Karlstrom, K.E., 2009, Joint inversion of teleseismic body wave residuals and joint inversion of teleseismic body wave residuals and Bouguer gravity data to constrain the origin of the Colorado Rockies: AGU Fall Meeting, S13b-1745.

271. Muelberger, W.R., Karlstrom, K.E., Saleeby, J., Saleeby, Z., Denison, R.E., Martinez, C., Hatcher, R.D., Jr., 2009, Transcontinental geologic cross section of the North American plate near 36°

latitude, Part I: western U.S., from Tte Pacific oceanic crust to the mid-continent: Geological Society of America Abstracts with Programs, v. 41(7), p. 131-132.

272. Ouimet, W.B., Kirby, E., and Karlstrom, K.E., 2009, Tectonic, lithologic and climatic controls on stream gradients across the Colorado Plateau and Rocky Mountains: AGU Fall Meeting, Ep41b-0607.

273. Shufeld\*t, Owen P., Karlstrom, Karl, And Gehrels, George E., 2009, Surprising Predominance Of 1.84 Ga And And 2.5 Ga Detrital Zircons In The 1.75 Ga Vishnu Schist, Upper Granite Gorge, Grand Canyon, Arizona: Geological Society Of America Abstracts With Programs,

274. Feldman\*, Josh, Heizler, M., Kelley, Shari, And Karlstrom, Karl, 2009, Geo And Thermochronological Evidence For The Emplacement And Exhumational History Of The Twin Lakes Batholith: Implications For The Laramide Orogeny: Geological Society Of America Abstracts With Programs,

275. Jones, James V. III, Karlstrom, Karl, And Williams, Michael L., 2009, U-Pb Detrital Zircon Geochronology Of Paleoproterozoic Orthoquartzites In The Southwestern United States: An Essential Tool For Regional Correlation, Tectonic Studies, And More: Geological Society Of America Abstracts With Programs,

276. Love, A., Crossey, L. J., Karlstrom, K.E., Hilton, D. R., Wolaver, B. D., and Rousseau-Gueutin, P., 2009, Toward a new paradigm for the Great Artesian Basin: Hydrologic mixing, partitioned sub-basins, and mantle influences on groundwater quality: Geological Society Of America Abstracts With Programs, v. 41, no. 7, p. 28.

277. Crossey, L.J., Love, A. Karlstrom, K.E., Hilton, D.R., and Keppel\*, M., 2009, Travertine-depositing mound springs of South Australia: Key for characterizing groundwater mixing and paleohydrology in the Great Artesian Basin: Geological Society Of America Abstracts With Programs, v. 41, no. 7, p. 28.

278. Bickford, M.E., Karlstrom, K.E., Van Schmus, W.R., Mueller, P.A., Griffin , W.L., Kamenov, G.D., Begg, G.C., and Belousova, E., 2010, Early Mesoproterozoic (1.5-1.3 Ga) magmatic and tectonic evolution of the SE Laurentian cratonic margin: Implications of U-Pb, Sm-Nd, and Lu-Hf data: Geological Society of America Abstracts with Programs, v. p.

279. Cole R.D., Heizler, M., Karlstrom, K.E., and Stork, A., 2010, Eruptive history of the Grand Mesa basalt field, western Colorado: Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 76.

280. Nereson\*, A.L., Brown, S.W., and Karlstrom, K.E., 2010, Evaluating a hypothesis for mantle-driven epeirogenic uplift along the Jemez lineament of northeastern New Mexico using river terraces and long profile analysis: Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 76

281. Aslan, A. and Karlstrom, K.E., Kirby, E., Lazear, G., Ouimet, W., Kelley, S., Darling, A., and Heizler, M., 2010, Post-10 Ma river incision rates in western Colorado: implications for Neogene uplift of the Colorado Rockies: Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 77.

282. Crow, R.S., Karlstrom, K.E., Asmerom, Y., Schmandt, B., Polyak, V., and Dufrane, S.A., 2010, Geochemical and geochronologic evidence for upwelling mantle asthenosphere under the Colorado Plateau: more support for Neogene uplift: Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 76.

283. MacCarthy\*, J K., Aster, R C., Hansen, S M., Stachnik, J C, Dueker, K G, Karlstrom, K E, and the CREST Group, 2010, Mantle Lithosphere Support of Colorado Rocky Mountain Elevation: 3D Tomography from CREST: Abstract T21E-2217 presented at 2010 Fall AGU meeting, San Francisco, Calif, 13-17 Dec.

284. Levander, A, Schmandt, B, Miller, M S, Liu, K., Karlstrom, K E, Crow, R S, Lee, C, and Humphreys, E, 2010, Seismic Evidence for Thermochemical Delamination and Convective Downwelling under the Western Colorado Plateau: Abstract T14C-06 presented at 2010 Fall AGU meeting, San Francisco, Calif, 13-17 Dec.

285. Darling\*, A L, Karlstrom, K E, Granger, D E, Aslan, A, Kirby, E, Ouimet, W B, Coblenz, D D, and the CREST Working Group, 2010, New incision rates along the Colorado River system based on cosmogenic burial dating of terraces: implications for regional controls on differential incision: Abstract T21E-2215 presented at 2010 Fall AGU meeting, San Francisco, Calif, 13-17 Dec.

286. Karlstrom, K E, Levander, A, Schmandt, B, Dueker, K G, Crow, R, Coblenz, D D, Miller, M S, Aster, R C, and Humphreys, E, 2010, Post- Cretaceous stability and lithospheric architecture of the Colorado Plateau (CP): multiple working hypotheses for complex Moho structure: Abstract T14C-05 presented at 2010 Fall AGU meeting, San Francisco, Calif, 13-17 Dec.

287. Karlstrom, K.E., Love, A., Crossey, L.J., Priestley, S., Asmerom, Y., and Embid, E., 2009, Mantle degassing and travertine deposits as neotectonic indicators in the Great Artesian Basin of Australia: Geological Society of America Abstracts with Programs, v. 41, no. 7, p. 447.

287. Cron\*, B., Crossey, L.J., Northup, D.E., and Karlstrom, K.E., 2010, Microbial richness and diversity in CO<sub>2</sub>-rich mound springs of the Tierra Amarilla anticline, New Mexico: New Mexico Geological Society Spring meeting, 2010, p. 9.

288. Priewisch\*, A., Crossey, L.J., Embid, E., and Karlstrom, K.E., 2010, geochronology, geochemistry, and tectonic occurrence of travertine deposits in New Mexico and Arizona: New Mexico Geological Society Spring meeting, 2010, p. 38.

289. Reyes\*\*, F., Adelberg, S., Williams, A., Crossey, L.J., and Karlstrom, K.E., 2010, A salinization study within the San Acacia region, Sevilleta National Wildlife refuge (SNWR), New Mexico, New Mexico Geological Society Spring meeting, 2010, p. 41.

290. Williams\*, A.J., Crossey, L.J., and Karlstrom, K.E., 2010, An integrated geochemical and structural study of the Sevilleta National Wildlife Refuge; geochemistry and salinity sources of waters spanning the Rio Grande Rift, New Mexico: Geological Society of America, Abstracts with Programs, v. 41 no. 7, p. 413.

291. Priewisch\*, A., Crossey, L.J., Embid, E., and Karlstrom, K.E., 2010, Geochronology, geochemistry and tectonic occurrence of travertine deposits in New Mexico and Arizona: Geological Society of America, Abstracts with Programs, v. 41 no. 5, p. 109.

292. Nevarez, A., Williams, A., Crossey, L.J., and Karlstrom, K.e., 2010, A four-year comparative study of the geochemistry and hydrology of select springs in the Sevilleta National Wildlife Refuge: Geological Society of America, Abstracts with Programs, v. 41 no. 5, p. 285.

294. Jochems\*\*, A.P., Sherson, L.R., Crossey, L.J., and Karlstrom, K.E., 2010, Predictive Analysis of Geochemical Controls in an Alpine Stream: presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec, H31D-1041

295. Paffett\*\*, K., Crossey, L.J., Crowley, L., and Karlstrom, K.E., 2010, Sustainable Management of Springs and Associated Wetlands in Aridland Regions: A Water Quality Perspective for Cibola National Forest, NM: presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec, H51D-0938.

296. Crossey, L.J., Karlstrom, K.E., Love, A., Priestley\*, S., and Shand, P., 2010, Geochemical evidence for groundwater mixing in the western Great Artesian Basin and recognition of deep inputs in continental-scale flow systems: presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec: H21D-1073..

297. Love, A., Karlstrom, K.E., Crossey, L.J., Shand, P., Rousseau-Gueutin, P., Priestley\*, S., and Poreda, R., 2010, , Developing a new model for the Great Artesian Basin of Australia: hydrologic mixing, multi-scale flow systems, fault-partitioned sub-basins, and mantle influences on groundwater quality, superimposed on regional flow systems: presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec, H14D-08.

298. MacCarthy\*, J.K., Aster, R.C., Hansen, S.M., Stachnik, J.C., Dueker, K.G., Karlstrom, K.E., and the CREST Group, 2010, Mantle Lithosphere Support of Colorado Rocky Mountain Elevation: 3D Tomography from CREST: presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec, T21E-2217

299. Levander, A., Schmandt, B., Miller, M.S., Liu, K., Karlstrom, K.E., Crow, R.S., Lee, C., and Humphreys, E., 2010, Seismic Evidence for Thermochemical Delamination and Convective Downwelling under the Western Colorado Plateau: presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec, T14C-06

300. Karlstrom, K.E., and Crow\*, R., 2010, Differential river incision across active normal faults in Grand Canyon: a response to mantle-driven uplift of the western Colorado Plateau: presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec, EP44A-04.

301. Darling\*, A.L., Karlstrom, K.E., Granger, D.E., Aslan, A., Kirby, E., Ouimet, W.B., Coblenz, D.D., and the CREST Working Group, 2010, New incision rates along the Colorado River system based on cosmogenic burial dating of terraces: implications for regional controls on differential incision: presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec, T21E-2215.

302. Crow\*, R., Karlstrom, K.E., McIntosh, W.C., Peters, L., and Dunbar, N.W., 2010, Reconstructing western Grand Canyon's lava dams and their failure mechanisms: new insights from geochemical correlation and 40Ar/39Ar dating: presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec, EP43B-0754.

303. Karlstrom, K.E., Levander, A., Schmandt, B., Dueker, K., G., Crow\*, R., Coblenz, D.D., Miller, M.S., Aster, R.C., and Humphreys, E., 2010, Post- Cretaceous stability and lithospheric architecture of the Colorado Plateau (CP): multiple working hypotheses for complex Moho structure: presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec, T14C-05.

304 Priestley\*, S., Karlstrom, K.E., Crossey, L.J., Love, A., Polyak, V., Asmerom, Y., and Embid, E., 2010, U-series dates on travertine deposits in the Great Artesian Basin as paleohydrogeology and neotectonic indicators: presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec, H21D-1082.

305. Aslan, A., and the CREST Working Group, 2011, Origin of the ancestral Colorado and Gunnison Rivers and post-10 Ma river incision rates in western Colorado, *in* Beard, S., Karlstrom, K.E., House, K., Young, D., Aslan, A., Billingsley, G., and Pederson, J.: USGS Open File Report 2011-1210, p. 22-27.

306. Crossey, L.J., Karlstrom, K.E., Lopez-Pearce\*, J., and Dorsey, R., Geochemistry of springs, travertines and lacustrine carbonates of the Grand Canyon region over the past 12 million years: The importance of groundwater on the evolution of the Colorado River system, *in* Beard, S., Karlstrom, K.E., House, K., Young, D., Aslan, A., Billingsley, G., and Pederson, J.: USGS Open File Report 2011-1210, p. 62-687.

307. Crow\*, R., Karlstrom, K.E., and McIntosh, W., Incision history of Grand Canyon from dated Colorado River gravels, *in* Beard et al., Origin and Evolution of the Colorado River System: *in* Beard, S., Karlstrom, K.E., House, K., Young, D., Aslan, A., Billingsley, G., and Pederson, J.: USGS Open File Report 2011-1210, p. 69-73.

308. Darling\*, A., Karlstrom, K.E., Aslan, A., and Granger, D., Differential incision rates in the upper Colorado River system: implications for knickpoint transience, *in* Beard, S., Karlstrom, K.E., House, K., Young, D., Aslan, A., Billingsley, G., and Pederson, J.: USGS Open File Report 2011-1210, p. 74-79.

309. Embid\*, E.H., Crossey, L.J., and Karlstrom, K.E., Incision history of the Little Colorado River based on K-Ar dating of basalts and U-series dating of travertine in the Springerville area, *in* Beard, S., Karlstrom, K.E., House, K., Young, D., Aslan, A., Billingsley, G., and Pederson, J.: USGS Open File Report 2011-1210, p. 99-102.

310. Karlstrom, K.E., Coblenz, D., Ouimet, W., Kirby, E., Van Wijk, J., Schmandt, B., Crossey, L.J., Crow, R., Kelley, S., Aslan, A., Darling\*, A., Dueker, K., Aster, R., MacCarthy J., Lazear, G., and the CREST working group, Evidence from the Colorado River system for surface uplift of the Colorado Rockies and Western Colorado Plateau in the last 10 Ma driven by mantle flow and buoyancy, , *in* Beard et al., Origin and Evolution of the Colorado River System: *in* Beard, S.,

Karlstrom, K.E., House, K., Young, D., Aslan, A., Billingsley, G., and Pederson, J.: USGS Open File Report 2011-1210, p. 153-159.

311. Kelley, S.A., Karlstrom, K.E., Stockli, D., McKeon\*, R., Hoffman\*, M., Lee\*, J., Pederson, J., Garcia, R., and Coblenz, D., A summary and evaluation of thermochronologic constraints on the exhumation history of the Colorado Plateau- Rocky Mountain region, *in* Beard et al., Origin and Evolution of the Colorado River System: *in* Beard, S., Karlstrom, K.E., House, K., Young, D., Aslan, A., Billingsley, G., and Pederson, J.: USGS Open File Report 2011-1210, p. 160-167.

312. Lazear, G.D., Karlstrom, K.E., Aslan, A., Schmandt, B., and the CREST working group, Denudational flexural isostacy of the Colorado Plateau: Implications for incision rates and tectonic uplift, *in* Beard, S., Karlstrom, K.E., House, K., Young, D., Aslan, A., Billingsley, G., and Pederson, J.: USGS Open File Report 2011-1210, p. 287-295.

313. Pearce\*, J. L., Crossey, L.J., Karlstrom, K.E., Gehrels, G., Pecha, M., Beard, S., and Wan, E., Syntectonic deposition and paleohydrology of the spring-fed Hualapai limestone and implications for the 6-5 Ma integration of the Colorado River system through the Grand Canyon, *in* Beard, S., Karlstrom, K.E., House, K., Young, D., Aslan, A., Billingsley, G., and Pederson, J.: USGS Open File Report 2011-1210, p. 180-185.

314. Sandoval\*, M.M., Karlstrom, K.E., Darling, A., Aslan, A., Granger, D., Wan, E., Noe, D., and Dickinson, R., Quaternary incision history of the Black Canyon of the Gunnison, Colorado, *in* Beard, S., Karlstrom, K.E., House, K., Young, D., Aslan, A., Billingsley, G., and Pederson, J.: USGS Open File Report 2011-1210, p. 245-249.

315. Young, R.A., Crow\*, R., and Peters, L., Oligocene tuff corroborates older Paleocene-Eocene age of Hualapai Plateau basal Tertiary section, *in* Beard, S., Karlstrom, K.E., House, K., Young, D., Aslan, A., Billingsley, G., and Pederson, J.: USGS Open File Report 2011-1210, p. 22-27.

316. Crossey, L.J., Karlstrom, K.E., Love, A.J., Priestly\*, A.J., and Shand, P., 2011, Geochemistry of mound springs and groundwater in the western Great Artesian Basin: Recognition of deep inputs to continental scale flow systems: 11<sup>th</sup> Australasian Environmental Isotope Conference and 4<sup>th</sup> Australasian Hydrogeology Research Conference, Cairns, Australia, July, 2011, p. 72

317. Karlstrom, K.E., Crossey, L.J., Love, A.J., and Priestley\*, S., 2011, Mantle degassing and travertine mound springs deposits as neotectonic indicators in the Great Artesian Basin of Australia: 11<sup>th</sup> Australasian Environmental Isotope Conference and 4<sup>th</sup> Australasian Hydrogeology Research Conference, Cairns, Australia, p. 87.

318. Love, A.J., Rousseau-Gueutin, P., Karlstrom, K.E., Crossey, L.J., Purtshurt, R., Priestley\*, S., Shand, P.S., Fulton, S.G., Wohling, D., Harrington, G., Smerdon, B., Garnder, P., and Simmons, C.T., and Keppel\*, M., 2011, Revisiting the hydrology of the western margin of the Great Artesian Basin, Australia: 11<sup>th</sup> Australasian Environmental Isotope Conference and 4<sup>th</sup> Australasian Hydrogeology Research Conference, Cairns, Australia, p. 91.

319. Wohling\*, D.L., Love, A.J., Fulton, S.A., Shand, P., Poreda, R.J., Karlstrom, K.E., and Crossey, L.J., 2011, Can recharge contributions from a moderately elevated mountain range to a large

regional aquifer be resolved using environmental tracers and hydraulic heads in an arid environment: 11<sup>th</sup> Australasian Environmental Isotope Conference and 4<sup>th</sup> Australasian Hydrogeology Research Conference, Cairns, Australia, p. 112.

320. Priestley\*, S., C., Love, A.J., Karlstrom, K.E., Crossey, L.J., Polyak, V.J., Asmerom, Y., and Rousseau- Gleutin, P., 2011, Uranium series dating of travertine deposits in the southwestern Great Artesian Basin as indicators for paleohydrology and paleoclimate: 11<sup>th</sup> Australasian Environmental Isotope Conference and 4<sup>th</sup> Australasian Hydrogeology Research Conference, Cairns, Australia, p. 50.

322. Crow\*, R.S., and Karlstrom, K.E., 2011, Short wavelength and high amplitude (~ 1 km) surface uplift in the western Colorado Plateau driven by recent and ongoing mantle flow: AGU meeting, Dec 2011.

323. Donahue\*, M.S., Karlstrom, K.E., Gonzales, D., Pecha, M., McKeon R., 2011, Multi-stage uplift of the Rocky Mountains: new age constraints on the Telluride Conglomerate and regional compilation of apatite fission track ages: AGU meeting, Dec 2011

324. Ricketts\*, J.W., Karl E. Karlstrom, Shari Kelley, Alexandra Priewisch, Laura Crossey, Yemane Asmerom, Victor Polyak, and Moustafa Selmi, 2011, Deciphering past and present tectonics of the Rio Grande rift in New Mexico utilizing apatite fission track thermochronology, geochronology, Quaternary faulting, and cross section restoration: AGU meeting, T21A-2312.

325. Nereson\*, A., Karlstrom, K.<sup>1</sup>, McIntosh, W.<sup>2,3</sup>, Heizler, M.<sup>3</sup>, Kelley, S.<sup>3</sup>, Brown S.<sup>1</sup>, 2011, Dynamic topography of the western Great Plains: landscape evidence for mantle-driven uplift associated with the Jemez lineament of NE New Mexico and SE Colorado AGU meeting, Dec 2011.

326. Tafoya\*, A.J, Crossey, L.J., Karlstrom, K.E., Kolomaznik, M., Polyak, V., Asmerom, Y., and Cox, C., 2011, Uranium-series dating of travertine from Soda Dam, New Mexico: Constructing a history of deposition, with implications for landscape evolution, paleohydrology and paleoclimatology: Abstract PP31C-1896 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.

327. Priewisch\*, A, Crossey, L.J., Embid, E., Karlstrom, K.E., Polyak, V., Asmerom, Y., and Ricketts, J.W., 2011, A record of more than 500,000 years of large-volume travertine formation in the southwestern United States and links between paleohydrology, paleoclimate, and landscape evolution: Abstract PP31C-1897 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.

328. Rosenberg\*, R., Kirby, Eric, Aslan, Andres, Karlstrom, Karl, Heizler, Matt, Shari, Kelley, Furlong, Kevin, Piotraschke, Rachel, 2011, Does Late Miocene Exhumation Along the Western Slope of the Colorado Rockies Reflect Differential Rock Uplift? AGU meeting, Dec 2011

329. Halihan, T., Crossey, L.J., Karlstrom, K.E., and Cron\*\*, B., 2011, ERI investigation of fluid flow in the Nacimiento Fault, New Mexico: Abstract H11H-02 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.

330. Woolsey\*, E.E., Person, M.A., Crossey, L.J., and Karlstrom, K.E., 2011, Role of Faults in Controlling Hydrothermal Fluid Flow, Salinity, Helium, and CO<sub>2</sub> Transport along the Rio Grande Rift: Abstract H13A-1176 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.

331. Aslan, A., Karlstrom, K. E., Kirby, E., Rosenberg\*, R., and Darling, A., 2011, Late Cenozoic river incision rates from the Colorado Rockies and implications for Neogene differential uplift: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 272.

332. Williams, M.L., Karlstrom, K. E., Jones, J.V., and Doe, M., 2011, The Proterozoic evolution of southwestern North America: New constraints and on-going challenges: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 321.

333. Nereson\*, A., Karlstrom, K. E., McIntosh, W., Heizler, M., Kelley, S.A., and Brown, S.W., 2011, Dynamic topography of the western Great Plains: Proposed surface expressions of mantle dynamics in the Raton section of New Mexico and Colorado: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 386.

334. Doe\*, M.F., Karlstrom, K.E., Jones, J.V., Pecha, M., and Gehrels, G., 2011, Reconstructing Rodinia: Hafnium results from the SW Laurentian “Magmatic Gap” (1470-1600 Ma)- Possible links between the Yankee Joe basin and central Australia: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 489.

335. Jones, J.V. III, Daniels, C., Doe\*, M.F., Karlstrom, K.E., Williams, M.L., 2011, Proterozoic metasedimentary successions as indicators of lithospheric stabilization and reactivation in southwestern Laurentia: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 322.

336. Cron\*, B.C., Crossey, L.J., Karlstrom, K.E., Northup, D.E., 2011, Diversity and geochemical cycling of unique carbonate springs in northern New Mexico: The geomicrobiology of Tierra Amarilla anticline: Geological Society of America, Abstracts with Programs, v. 31, p. 584. Jochems, A.P., Sherson, L.R., Crossey, L.J. and Karlstrom, K.E., 2011, Mixing between an alpine river and hydrothermal spring inputs; controls on water quality and solute loading in the Jemez River, New Mexico: New Mexico Geology, v. 33, p. 59.

337. Karlstrom, K.E., Darling\*, A., Crossey, L.J., Crow, R., Coblenz, D., Ouimet, W., Kirby, E., Van Wijk, J., Kelley, S.A., Heizler, M.T., Aster, R., MacCarthy, J., Lazear, G., Dueker, K., Hansen, S. and Stachnik, J., 2011, Neogene and ongoing dynamic uplift of the Rocky Mountains due to mantle convection, and its surface manifestations: New Mexico Geology, v. 33, p. 44.

338. Cron\*, B.C., Crossey, L.J., Karlstrom, K.E., Northup, D.E., 2011, Diversity and geochemical cycling of unique carbonate springs in northern New Mexico: The geomicrobiology of Tierra Amarilla anticline: Geological Society of America, Abstracts with Programs, v. 31, p. 584. Karlstrom, K.E.,

339. Lee\*, J. P., Kelley, S.A., and Crow, R., 2012, Evaluating evidence: the California/ Arizona river model for an old Grand Canyon: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 80.

340. Warme, J.E., Herring, A., Darling\*, A., Crow, R., Karlstrom, K.E., Crossey, L.J., Granger, D., Huntoon, P. and Savage, J., 2012, Pancho's radical runup: New insights into an unusual Grand Canyon landslide: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 81.

341. Crow, R.S., Karlstrom, K.E., Crossey, L.J., Darling, A., Polyak, V., Granger, D.E., and Asmerom,

Y., 2012, Spatial variation in Grand Canyon incision: New geochronology on river terraces and the Surprise Valley landslide: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 81.

342. Karlstrom, K.E., and Williams, M.L., 2012, Perspectives on lithospheric evolution in southwestern Laurentia, and persistent research questions: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 25.

343. Ricketts\*, J.W., Karlstrom, K.E., Read, A., Van Hart, D., and Kelley, S., 2012, Revisiting the importance of low-angle normal faulting in the Rio Grande rift, central New Mexico: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 28.

344. Crossey, L.J., Sherson, L.R., Jochems, A.P., Harding, J.J., Woolsey, E., Karlstrom, K.E., Ali, A.-M., Person, M.A., Halihan, T., and Dahm, C.N., 2012, The water quality challenge: Using new technology to track tectonic salinity sources to surface and ground water: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 5.

345. Nereson\*, A.L., Karlstrom, K.E., Heizler, M.T., Kelley, S.A., McIntosh, W., and Brown, S.W., 2012, The role of mantle dynamics in shaping landscapes of the western Great Plains: An analysis of post-Miocene patterns of erosion and tilting in NE New Mexico and SE Colorado: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 30.

346. Robertson\*, J., Huntoon, P., Darling, A., Crow, R., Karlstrom, K.E., Warme, J., Savage, J., Crossey, L.J., and Channer, M., 2012, Multi-stage evolution of Grand Canyon's Surprise Valley landslides and their interaction with carving of Grand Canyon: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 18.

347. Dehler, C.M., Karlstrom, K.E., Gehrels, G.E., Timmons, J.M., and Crossey, L.J., 2012, Stratigraphic revision, provenance, and new age constraints of the Nankoweap Formation and Chuar Group, Grand Canyon Supergroup, Grand Canyon Arizona: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 82.

348. Aslan, A., Karlstrom, K.E., Kirby, E., and Donahue\*, M.S., 2012, Evidence for a late Miocene Colorado-Gunnison river system in western Colorado: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 81.

349. Frus\*, R.J., Crossey, L.J., Karlstrom, K.E., Dahm, C.N., and Ali, A.-M., 2012, Evaluating deep groundwater inputs to the Albuquerque basin adjacent to the Sandia Mountains: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 68.

350. Mohammed\*, A., Crossey, L. J., Karlstrom, K.E., Kehew, A., Tafoya\*, A.J., Jimenez\*, G., Ricketts\*, J., Anan, T., Krishnamurthy, R.V., 2012, Hydrochemical characteristics and potential tectonic influences on groundwater quality of the continental-scale Nubian Sandstone Aquifer System (NSAS): Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 67.

351. Feldman\*, J., Heizler, M.T., Karlstrom, K.E., and Kelley, S.A., 2012, Magmatic constraints on the enigmatic Colorado Mineral belt: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 30.

352. Williams, M.L., and Karlstrom, K.E., 2012, Proterozoic metamorphism in southwestern North America: New constraints and on-going challenges: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 10.

353. Tafoya\*, A.J., Crossey, L.J., Karlstrom, K.E., Asmerom, Y., Polyak, V. and Cox, C., 2012, Uranium-series dating of travertine from Soda Dam, New Mexico: Constructing a history of deposition, with implications for landscape evolution, paleohydrology and paleoclimatology: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 33.

354. Donahue\*, M., Karlstrom, K.E., and Kelley, S.A., 2012, Exhumation in the Rocky Mountains: Exploring timing, rates, mechanisms, and uplift models using compiled thermochronology data: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 30.

355. Kolomaznik\*\*, M., Ricketts\*, J.W., Crossey, L.J., Karlstrom, K.E., Polyak, V., Asmerom, Y., Priewisch\*, A., and Burkett\*\*, C., 2012, U-series dating and stable isotope analysis of Quaternary travertines with implications for incision rates in western Rio Grande rift, Carrizo Arroyo, New Mexico: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 74.

356. Donahue, M., Karlstrom, K.E., Pecha, M., Gonzales, D., Price\*\*, R., 2012, Insights into paleogeography and sedimentation during early stages of the Oligocene ignimbrite flare-up using detrital zircon U-Pb analyses on sedimentary units in the southern Rocky Mountains: Telluride conglomerate and Blanco Basin Formation: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 20.

357. Jimenez\*, G., Crossey, L.J., Karlstrom, K.E., Ricketts\*, J.W., Tafoya\*, A.J., Tarek, Mohammed, A., 2012, Reconstructing Quaternary pluvial episodes using travertines of Egypt's Western Desert: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 33.

358. Darling\*, A., Whipple, K.X., Nichols, K.K., Karlstrom, K.E., Granger, D., and Bierman, P., 2012, Transient incision in layer-cake stratigraphy: Cosmogenic rates and dates in the context of Glen Canyon: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 19.

359. Priewisch\*, A., Crossey, L.J., Embid\*, E., Karlstrom, K.E., Polyak, V.J., Asmerom, Y., Ricketts, J.W., and Nereson, A. 2012, Large-volume Quaternary travertine deposits in the Rio Grande rift and Jemez lineament, New Mexico and Arizona: Implications for paleoclimate, landscape evolution, and neotectonics: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 33.

360. Doe\*, M., Jones, J.V. III, and Karlstrom, K.E., 2012, Detrital zircon data from the Mazatzal Group of central Arizona: Insights from newly identified disconformities: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 24.

361. Price\*\*, R., Karlstrom, K.E., Donahue\*, M., Aslan, A., and Pecha, M., 2012, Detrital zircon analysis of high terraces of the early Colorado River system (Crooked Ridge river, Grand Mesa, and upper Green River); implications for Colorado Plateau drainage evolution: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 20.

362. Mahon\*, R.C., Dehler, C.M., Karlstrom, K.E., Link, P., 2012, Detrital zircon provenance, age constraints and revised stratigraphy of the Mesoproterozoic and Neoproterozoic Pahrump Group (Supergroup?), Death Valley region, California: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 82.

363. Jones, J.V., Doe\*, M.F., and Karlstrom, K.E., 2012, Tectonic connections between deformed and metamorphosed ca. 1.49–1.43 Ga metasedimentary successions in southwestern Laurentia: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 25.

364. Aster, R., Liu, K., Dueker, K., and Karlstrom, K.E., 2012, Systematic spatial variation of seismic

anisotropy beneath the Colorado Rockies and adjacent regions revealed by CREST: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 31.

365. Burkett\*, C., Wortman, R., Ricketts\*, J.W., Nereson\*, A., and Karlstrom, K.E., Landscape denudation along the western edge of the Rio Grande rift using basalt paleosurfaces: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 75.
366. Woolsey\*, E.E., Person, M.A., Crossey, L.J., Phillips, F.M., and Karlstrom, K.E., 2012, Role of faults in controlling hydrothermal fluid flow, salinity, and helium transport along the Rio Grande rift: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 5.
367. Karlstrom, K.E., Lee\*, J. P., Kelley, S.A., and Crow, R. 2012, Evaluating evidence: the California/Arizona paleoriver model for an old Grand Canyon: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 80.
368. Ricketts\*, J., Priewisch\*, A., Kolomaznik\*\*, M., and Karlstrom, K.E., 2012, Calcite-filled fractures in travertine used to constrain the timing and orientation of Quaternary extension along the western margin of the Rio Grande rift, central New Mexico: New Mexico Geological Society, 2012 Program with Abstracts, p. 36.
369. Jimenez\*, G., Crossey, L.C., Karlstrom, K.E., Ricketts, J., Tafoya\*, A., Anan, T., and Mohammed, A., 2012, Reconstructing Quaternary pluvial episodes using travertines of Egypt's Western Desert: New Mexico Geological Society, 2012 Program with Abstracts, p. 17.
370. Priewisch\*, A., Crossey, L.J., Embid\*, E., Karlstrom, K.E., Polyak, V., Asmerom, Y., Ricketts J., and Nereson, A., 2012, Large-volume Quaternary travertine deposits in the Rio Grande rift and Jemez lineament, New Mexico and Arizona: Implications for paleoclimate, landscape evolution, and neotectonics: New Mexico Geological Society, 2012 Program with Abstracts, p. 34.
371. Vakhramov, P., Crossey, L.J., Dahm, C., Acuna, V., and Ali, A., 2012, Evaluating solute sources in the upper Gila River, New Mexico: New Mexico Geological Society, 2012 Program with Abstracts, p. 47.
372. Whitmeyer, S.J., Karlstrom, K.E., Meier, B., 2012, Using Google Earth and Virtual 4-D animations for tectonic reconstructions: GSA Abstracts with Programs, 2012 Annual meeting
373. Jimenez\*, G., Crossey, L.C., Karlstrom, K.E., Ricketts\*, J., Tafoya\*, A., Tarek Anan, Abdelmawgoud Mohammed, Asmerom, Y., Polyak, P., and Farouk, S., 2012, Reconstructing Quaternary pluvial episodes and paleohydrology using travertines from Egypt's Western Desert AGU Fall 2012
374. Karlstrom, K.E., Lee, J.P., Kelley, S.A., and Crow\*, R., 2012, Multi-stage uplift of the Colorado Plateau and the age of Grand Canyon and precursor canyons: AGU Fall 2102.
375. Woolsey\*, E.E., Person, M.A., Crossey, L.J., Phillips, F.M., Karlstrom, K.E., and Williams, A., 2012, Evaluating Mantle-to-Surface Hydrologic Connections in the Rio Grande Rift using Mathematical Modeling: AGU Fall 2012
376. Robertson, J. Karlstrom, K.E., Huntoon, P., Warne, J., Crow\*, R., Darling\*, A., Grangwer, D., 2013, Deep-seated bedrock landsliding in Grand Canyon: Implications for Grand Canyon evolution: Geological Society of America Abstracts with Programs, v. 45, no.7, p. 641.
377. Karlstrom, K.E., Lee, J., Kelley, S., Crow, R., Crossey, L.J., Young, R.L., Lazear, G., Beard, L.S.,

Ricketts, J., 2013, A paleocanyon solution for integration and carving of the 5-6 Ma Grand Canyon: Geological Society of America Abstracts with Programs, v. 45, no. 7, p. 483.

378. Donahue\*, M., Donahue, J., Karlstrom, K.E., and Crossey, L.J., 2013, Field play: A geologic mobile application incorporating augmented reality field trips and location sensitive educational lessons for personalized, multifaceted, interactive geoscience education: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 504.

379. Pecha, M., Gehrels, G., Dickinson, W.R., Karlstrom, K.E., Donahue\*, M., 2013, Provenance of Cretaceous through mid-Tertiary strata of the four corners region: Insights from detrital zircons in the San Juan basin, New Mexico and Colorado: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 518.

380. Bruce, G., Semken, S., Anbar, A., Karlstrom, K.E., and Crossey, L.J., 2013, Virtual field exploration of Grand Canyon geology and geologic history: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 399.

381. Dickinson, W.R., Karlstrom, K.E., Grove, M.J., Hanson, A., Gehrels, G., Pecha, M., et al., 2013, Detrital zircon evidence for and against flowage of an ancestral Miocene Colorado River into the Virgin depression: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 400.

382. Dorsey, R.J., Crossey, L.C., Cohen, A., Howard, K., Karlstrom, K.e., Bright, J., et al., 2013, Lake-estuary hypothesis for the Bouse formation: new look at an old problem: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 253.

383. Doe\*, M.F., Karlstrom, K.E., Holland\*, M.E., Jones J., III, Gehrels, G., Pecha, M., 2013, Detrital zircon characteristics of unconformity-bound Proterozoic metasedimentary successions in central Arizona: Relatively short-lived syntectonic basins as key elements in the Proterozoic tectonic evolution of southwestern Laurentia: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 461.

384. Karlstrom, K.E., 2013, Was there a Mazatzal orogeny? A test of conflicting models for assembly of Laurentia: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 462.

385. Resor, P., Seixas\*, G., Pearce\*, J.L., Karlstrom, K.E., and Crossey, L.J., 2013, Quantifying deformation across the Basin and Range--Colorado Plateau transition over the last~ 12 Ma: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 400.

386. Crossey, L.C., Sherson\*, L., Kalstrom, K.E., McGibbon\*, C., Jochems\*, A., 2013, The water quality challenge: Using new technology to track tectonic salinity contributions that impair surface and groundwater: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p.48.

387. Karlstrom, K.E., Schmandt, B., Dueker, K., Aster, R., Aslan, A., Kirby, E., Crow\*, R., et al., 2013, Mantle driven uplift of the Rocky Mountain/ Colorado Plateau region, its surface manifestations, and implications for mantle processes: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 56.

388. Mohammed, A., Crossey, L.J., Karlstrom, K.E., Kehew, A.E., Sultan, M., Krishnamurthy, M.V., et al., 2013, Structural control of the deep Nubian sandstone aquifer system constrained by hydrochemical, stable isotope and noble gas data: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 161.

389. Crow, R.S., Karlstrom, K.E., Darling, A., Crossey, L.J., Polyak, V., Granger, D., et al., 2013, Mantle

buoyancy-driven differential incision of the Grand Canyon: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. p.57.

390. Gehrels, G., Pecha, M., Dickinson, W.R., Karlstrom, K.E., Doe\*, M., Blakey, R. et al., 2013, 2 Ga of sediment provenance and crustal evolution in southwestern North America: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 179.

391. McGibbon\*, C., Crossey, L.C., Karlstrom, K.E., Halihan, T., et al., 2013, Continuous monitoring of groundwater movement along the Nacimiento fault, Implications for understanding endogenic inputs into groundwater systems: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 46.

392. Crossey, L.J., Karlstrom, K.E., and Drakos, P., 2013, Continental smokers: mantle degassing, fluid mixing, and unique microbiology in spring vents of the Death Valley – Lake Mead region, western U.S.A.: Devil's Hole Conference, April 2013, Death Valley

393. Drakos, P., McRae, R., Hodgins, M., Klenke, J., Howard, W., Kryder, L., Crossey, L., Karlstrom, K., 2013: Assessment of Selected Springs and Wells and Implications for Recharge in the Pahrump Valley and Spring Mountains, Nye Co., Nevada: Devil's Hole Conference, April 2013, Death Valley

394. Karlstrom, K.E., Williams, M.L., Heizler, M.T., Gaston\*, L., and Mako\*, C., 2013, Was there a Mazatzal orogeny? A test of conflicting models for assembly of Laurentia: GSA Abstracts with Programs, v. 45, no. 7, p. 462.

395. Mako\*, C.A., Williams M.L., Doe, M.F., and Karlstrom, K.E., Timing of deformation at Four Peaks, central Arizona: GSA Abstracts with Programs, v. 45, no. 7, p. 461.

396. Holland\*, M.E., Karlstrom, K.E., Doe\*, M., Gehrels, G., Pecha, M., Shufeldt\*, O., and Wooden, J.L., 2013., Using paired U-Pb and Hf isotopes to characterize the crustal evolution of the Mojave Comparison of igneous and metasedimentary lithologies in Grand Canyon and Death Valley: Geological Society of America Abstracts with Programs, v. 45., no. 7, p. 310.

397. Van Wijk, J., Karlstrom, K.E., Dueker, K., van Hunen, J., 2013, Erosion of the Colorado Plateau mantle lithosphere: EGU General Assembly Conference Abstracts.

398. Levander, A., Humphreys, E., Schmandt, B., Miller, M., Karlstrom, K.E., Crow\*, R., Reid, M., 2013, Convective removal of Colorado Plateau lithosphere from the outside-in and resulting magmatism and surface uplift: : Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 702.

399. Aslan, A., Kirby, E., Karlstrom, K.E. Darling, A., Rosenburg, R., Heizler, M., Boras, M., 2013, New constraints on the timing of Green River integration, southwestern Wyoming and northwestern Colorado: : Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 635.

400. Aster, R., MacCarthy\*, J., Karlstrom, KE., Dueker, K., Schmandt, B., Hansen, S., 2013, Seismic tomography of the Colorado Rocky Mountains upper mantle from CREST: lithosphere - asthenosphere interactions and mantle support of topography: Geological So.iety of America, Abstracts with Programs, v. 45, no. 7, p. 59.

401. Kirby, E., Aslan, A., Karlstrom, K.E., Rosenburg\*, R., Kelley, S., Heizler, M., 2013, Late Cenozoic landscape evolution along the western slope of the Colorado Rockies: a role for differential rock uplift driven by buoyant mantle: : Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 634.

402. Aslan, A., Kirby, E., Karlstrom, K.E., Heizler, M., and Rosenburg\*, R., 2013, Late Cenozoic river incision histories of the upper Colorado river system: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 57.

403. Warneke\*, N., Kelley, S., Stockli, D., Karlstrom, K.E., and Fox, M., 2013, Low-temperature thermochronometric constraints on retreat of the Vermillion cliffs and carving of Marble Canyon: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 482.

404. Kelley, S., Cather, S., Chapin, C., Garcia\*, R., Feldman\*, J., Karlstrom, K.E., and Stockli, D., 2013, Insights into cenozoic landscape evolution of the Rocky Mountain-high Plains region based on thermochronometric data from southwestern Colorado: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 189.

405. Kirby, E., Aslan, A., Rosenburg\*, R., Kelley, S., Karlstrom, K.E., and Firlong, K., 2013, New constraints on the timing and rates of incision along the Colorado River near Rifle, CO: implications for drivers of late Cenozoic landscape evolution: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 634.

406. Rosenburg\*, R., Kirby, E., Aslan, A., Karlstrom, K.E., and Heizler, M., 2013, New constraints on the timing and rates of fluvial incision and channel profile form along the western slope of the Rockies: Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 634.

407. Crossey, I.J., Karlstrom, K.E., Dorsey, R., Pearce\*, J., 2013, Geochemistry of springs, travertines and lacustrine carbonates of the Grand Canyon region over the past 12 million years: the importance of groundwater in initiating downward integration of the Colorado River system: : Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 252.

408. Priewisch\*, A., Crossey, I.K., Karlstrom, K.E., and Ali, A. 2013, Geochemistry and geochronology of large-volume Quaternary travertine deposits of the southeastern Colorado Plateau: implications for paleohydrologic and paleotectonic controls on travertine formation and travertine facies: : Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 244.

409. Hansen, S., Dueker, K., Stachnik, J., Aster, R., 2013, Lithospheric structure of the Colorado Rocky Mountains: Implications for topographic support and Cenozoic evolution: : Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 635.

410. Mako\*, C., Williams, M.L., Doe, M., and Karlstrom, K.E., 2013, Timing of deformation at Four Peaks, central Arizona: : Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 461.

411. Donahue\*, M., Karlstrom, K.E., Kelley, S., Ricketts, J., 2013, Multi-stage uplift of the Rocky Mountains: using thermochronology data to unravel mechanisms and discrete episodes of uplift and intervening tectonic quiescence: : Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 635.

412. Ricketts\*, J., Karlstrom, K.E., Kelley, S., 2013, Updated models on the evolution of the rio grande rift: embryonic core complexes, fluid-enhanced quaternary extension, and apatite (u-th)/he constraints for large- magnitude 18-15 ma fault slip: : Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 444.

413. Crow, R., Karlstrom, K.E., 2013, Tectonic evolution of Grand Canyon and uplift of the Colorado Plateau: : Geological Society of America, Abstracts with Programs, v. 45, no. 7, p. 481.

414. Holland\*, M.E., Karlstrom, K.E., Doe\*, M.F., Gehrels, G.E., Pecha, M., and Shufeldt, O., 2013, Using paired U-Pb and Hf isotopes to characterize the Yavapai – Mojave province boundary in Grand Canyon, AZ: AGU National Meeting, Dec 2013, T11A-2406.

415. Person, M.A., Woolsey\*, E., Pepin\*, J., Crossey, L.J., Karlstrom, K.E., Phillips, F.M., Kelley, S., and Timmons, S., 2013, The use of subsurface thermal data, isotopic tracers and earthquake hypocenter locations to unravel deep regional flow systems within the crystalline basement beneath the Rio Grande rift, New Mexico (Invited): AGU National Meeting, Dec 2013, H13O-05.

416. Ricketts\*, J., Karlstrom, K.E., and Kelley, S., 2013, New perspectives on the evolution of narrow, modest extension continental rifts: Embryonic core complexes and localized, rapid Quaternary extension in the Rio Grande rift, central New Mexico: AGU National Meeting, Dec 2013, T21B-2560.

417. Jimenez\*, G., Crossey, L.J., Karlstrom, K.E., Polyak, V.J., and Asmerom, Y., 2013, Travertine from Egypt's Western Desert: a terrestrial proxy for North African paleohydrology and paleoclimate during the Quaternary: AGU National Meeting, Dec 2013, PP33C-1939.

418. Priewisch\*, A., Crossey, L.J., Karlstrom, K.E., McPherson, B.J., and Mozley, P., 2013, Ancient and modern sites of natural CO<sub>2</sub> leakage: Geochemistry and geochronology of Quaternary and modern travertine deposits on the Colorado Plateau, USA, and implications for CO<sub>2</sub> sequestration: AGU National Meeting, Dec 2013, V41A-2777.

419. Salvato\*\*, L., and Crossey, L.J., 2013, Hydrology and water quality of the Rio Chama river, northern New Mexico: Establishing a base line to manage flows: AGU National Meeting, Dec 2013, H31H-1289.

420. Sears, J.W., Link, P.K., and Karlstrom, K.E., 2014, Amazon-scale, mid-Cenozoic “Bell River” drainage basin of North America: implications for tectonics of the western interior: Geological Society of America Abstracts with Programs, Bozeman 2014

421. Prewische\* et al., 2014, Extensive CO<sub>2</sub> Leakage From Extinct and Modern CO<sub>2</sub> Reservoirs in New Mexico and Arizona: Evaluating the Role of Seal Bypass and Large-Volume Travertine Deposition With Implications for CO<sub>2</sub> Sequestration: AGU ID# 26563

422. Donahue\* et al 2014, Timing and driving mechanisms for multi-stage uplift of the Southern Rocky Mountains: Evidence from thermochronology and detrital zircon analysis: AGU ID# 19585

423. Crow et al., 2014, Deciphering the evolution and origin of the lower Colorado River and uplift of the Colorado Plateau: Preliminary U-Pb carbonate dating results and future directions ID# 18564 AGU

424. Person et al., 2014, Evidence for Long-Time Scale (> 103 years) Changes in Hydrothermal Activity Induced by seismic events: AGU

425. Dehler, C.M., Gehrels, G., Porter, S.M., Cox, G., Heizler, M., Karlstrom, K.E., Crossey, L.J., and Timmons, J.M., 2014, Chump (Chuar-Uinta Mountain-Pahrump) strata of the western U.S. record Cretaceous – like ocean anoxic events (oae)s before Snowball Earth: GSA Abstracts with Programs, v. 46, no. 6, p. 627.437.

426. Mohammed\*, A., Crossey, L.J., Karlstrom, K.E., Kehew, A.E., Sultan, M., Krishnamurthy, R.V.,

2014, Structural control of the continental-scale Nubian sandstone aquifer system constrained by hydrochemical, stable isotopes, and noble gas data: GSA Abstracts with Programs v. 46, no. 6, p 117.

427. Bruce, G., Semken, S., Anbar, A.D., Karlstrom, K.E., Crossey, L.J., 2014, Explore and study Grand Canyon by immersive virtual field trip!: GSA Abstracts with Programs, v. 46, no. 6, p. 91.

428. Rooney, A.D., Strauss, J.V., Brandon, A., Karlstrom, K.E., and MacDonald, F.A., 2014, The tectonic context of Tonian to Cryogenian environmental and evolutionary change: Insights from Re-Os geochronology and weathering proxies: GSA Abstracts with Programs v. 46, no. 6, p. 627.

429. Karlstrom, K.E., and Crossey, L.J., 2014, Grand Canyon: Resolution of the 140-year-long debate about its age, insights into the last 12 million years of an incised aquifer system, and geoscience outreach along the Trail of Time: keynote talk for the 2014 American Institute of Professional Geologists/ Arizona Hydrological Society National Conference, Prescott AZ, p.77-79.

430. Bright, Jordon, Cohen, Andrew S. Dettman, David L., Dorsey, Rebecca J., Karlstrom, Karl E. and Crossey, Laura J. 2015, Abrupt hydrologic change during deposition of the southern Bouse Formation recorded by stable isotopes and microfauna: Implications for an estuarine or lacustrine origin: International Limnology Congress, 2015, Reno NV.

431. Repasch\*, M., Karlstrom, K., Crossey, L., and Blomgren\*, V., 2014, Fault networks of the Embudo Zone, northern New Mexico: Evaluating differential incision in the Rio Grande and implications for hydrothermal fluid pathways: NM Academy of Science NMAS 2014 Research Symposium November 1, ABQ NM.

432. Lee\*, H., McGibbon\*, C.J., Blomgren\*, V., Crossey, L.J., Karlstrom, K.E., Fischer, T.P., 2015: preliminary Study of CO<sub>2</sub> Efflux across the Nacimiento fault, San Ysidro, New Mexico: NM Academy of Science NMAS 2014 Research Symposium November 1, ABQ N

433. Blomgren\*, Crossey, L., Karlstrom, K., and Repasch\*, M., 2014, Evaluating hydrothermal and meteoric water mixing along the Embudo fault system, New Mexico: NM Academy of Science NMAS 2014 Research Symposium November 1, ABQ NM.

434. Grulke\*\*, T., and Crossey, L., 2015, Chemical geothermometers applied to NM groundwaters and springs: NM Academy of Science NMAS 2014 Research Symposium November 1, ABQ NM.

435. Rust\*\*, L. King\*\*, G., and Crossey, L., 2015, Hot springs of New Mexico: summarizing occurrence and history for outreach and education: NM Academy of Science NMAS 2014 Research Symposium November 1, ABQ NM.

436. Minitrez\*\*, Alexandra, Sloan\*\*, Jolivette, and Crossey, L.J., 2015, New Mexico Geothermal Resources: A Database Compilation for NM EPSCoR: NM Academy of Science NMAS 2014 Research Symposium November 1, ABQ NM.

437. McGibbon\*, C., Crossey, L., Karlstrom, K., and Ali, Abdul-Mehdi, 2015, Fluid Flow and Groundwater Mixing along the Nacimiento Fault: San Ysidro, New Mexico, NM Academy of Science NMAS 2014 Research Symposium November 1, ABQ NM.

438. Blomgren\*, V. J. Crossey, L.J., Karlstrom, K.E., 2015, Influence of the Valles Caldera in supplying CO<sub>2</sub> to geothermal springs in northern New Mexico: Geological Society of America *Abstracts with Programs*. Vol. 47, No. 7, p.722.

439. Semken, S.L., Bruce, G., Anbar, A. Buxner, S, Karlstrom, K.E., Crossey, L.J., 2015, Complementary (not comparative) research on geoscience teaching and learning in virtual and in-situ field environments: Geological Society of America *Abstracts with Programs*. Vol. 47, No. 7, p.405.

440. Holland\*, M. E., Karlstrom, K.E., Williams, M.L., Grambling\*\*, T.A. Gehrels, G.A., P, M.Griffin, A.L., Belousova, E. Begg, G., Mako, C., 2015, Growth of continental lithosphere by accretion of arc terranes along the Laurentian margin throughout the Proterozoic: evidence from Hf isotopes: Geological Society of America *Abstracts with Programs*. v. 47, no. 7, p.722.

441. Repasch\*, M., Karlstrom, K.E., Heizler, M., 2015, Neotectonic influences on the evolution of the Rio Grande fluvial system over the last 5 Ma: Geological Society of America *Abstracts with Programs*. Vol. 47, No. 7, p.451.

442. Ward\*\*, V., Benally\*\*, R., Crossey, L.J., Blomgren\*, V., Smith\*, J., Karlstrom, K.E., 2015, The effects of geothermal fluids on surface water quality in the Jemez River system in northern New Mexico: Geological Society of America *Abstracts with Programs*. Vol. 47, No. 7, p.314.

443. Whyte\*, C., Darrah, T., Karlstrom, K.E., Crossey, L.J., Poreda, R., Van Wagenen, B., 2015, Helium isotope geochemistry across the continental U.S. linked to mantle tomographic images: Geological Society of America *Abstracts with Programs*. Vol. 47, No. 7, p.382.

444. Repasch, M.N., Karlstrom, K.E., and Heizler, M.T., 2015, Birth and Evolution of the Rio Grande-Rio Chama fluvial system: the influence of magma-driven dynamic topography on fluvial systems over the last 8 Ma: Abstract EP41A-0912 presented at 2015 Fall Meeting, AGU, San Francisco, CA, 14-18 Dec.

445. Repasch, M.N., Karlstrom, K., and Heizler, M., Birth and evolution of the Rio Grande fluvial system: New insights from river gravel provenance studies and 40Ar/39Ar dated paleoprofiles: Proceedings from the 2015 Annual Spring Meeting, New Mexico Geological Society, Socorro, New Mexico, 24 April.

446. Repasch, M.N., Karlstrom, K.E., Crossey, L.J., and Blomgren, V., 2015, Studying the surface expressions of potential geothermal systems in northern New Mexico: Proceedings from the 2015 All Hands Meeting, New Mexico EPSCoR, Socorro, New Mexico, 17 April.

447. Smith, J.R., Crossey, L., Karlstrom, K., Fischer, T., Lee, H., and McGibbon, C., Fault Networks in the Northwestern Albuquerque Basin and their Potential Role in Controlling Mantle CO<sub>2</sub> Degassing and Fluid Migration from the Valles Caldera; American Geophysical Union Fall 2015 Conference; December 14-18, Abstract V43C-3171.

448. Smith, J.R., Crossey, L., Karlstrom, K., Fischer, T., Lee, H., Grulke, T., Thomas, G., and McGibbon, C., Mantle CO<sub>2</sub> Degassing and Fluid Migration along Fault Networks in the Northwestern Albuquerque Basin and Valles Caldera; New Mexico Academy of Science Research Symposium, November 14, 2015, Abstract.

449. Grambling, T.A., Holland, M.E., Karlstrom, K.E., Gehrels, G.E., and Pecha, M., 2015, Revised location for the Yavapai-Mazatzal crustal province boundary in New Mexico: Hf isotopic data from Proterozoic rocks of the Nacimiento Mountains, *in* Lindline, J., Petronis, M., and Zebroski, J., eds., Guidebook 66- Geology of the Las Vegas Area: New Mexico Geologic Society 66th Annual Fall Field Conference Guidebook, p. 175-184.

450. Grambling, T.A., Holland, M.E., Karlstrom, K.E., Gehrels, G.E., and Pecha, M., 2015, Revised location for the Yavapai-Mazatzal crustal province boundary in New Mexico: Hf isotopic data from

Proterozoic rocks of the Nacimiento Mountains: 2015 New Mexico Geological Society Annual Spring Meeting, Socorro, NM, p. 22. (Abstract)

451. Crow, Ryan S Karl E Karlstrom, Laura J Crossey, Victor J Polyak, Yemane Asmerom and Kyle House, 2015, Deciphering the evolution and origin of the lower Colorado River and uplift of the Colorado Plateau: Preliminary U-Pb carbonate dating results and future directions: 2015 AGU meeting
452. Priewisch, Alexandra Laura J Crossey, Karl E Karlstrom and Peter Mozley, 2015, Extensive CO<sub>2</sub> Leakage From Extinct and Modern CO<sub>2</sub> Reservoirs in New Mexico and Arizona: Evaluating the Role of Seal Bypass and Large-Volume Travertine Deposition With Implications For CO<sub>2</sub> Sequestration : 2015 AGU meeting
453. Karlstrom, K.E., 2015, Cenozoic incision history of the Little Colorado River: its role in carving Grand Canyon and onset of rapid incision in the last ~2 Ma in the Colorado River System: 2015 AGU meeting.
454. Rooney, A., et al., EGU2016-10926, New Re-Os organic-rich shale and sulphide geochronology data from the Pre-Sturtian Chuar Group, Grand Canyon
- 455 Winn, Carmen; Karlstrom, Karl E; Kelley, Shari; Shuster, David L; Fox, Matthew, Fox, 2015, Age of Carving the Westernmost Grand Canyon: Conflicts and Potential Resolutions that Reconcile Geologic and Thermochronologic Data, AGU 2015 Fall Meeting.
456. Repasch, M.N., Karlstrom, K.E., and Heizler, M.T., 2016, Unraveling the 5 Ma birth and evolution of the Rio Grande fluvial system: Proceedings from the 2015 Annual Spring Meeting, New Mexico Geological Society, Socorro, New Mexico, 8 April 2016.
457. Repasch, M.N., 2015, Birth and evolution of the Rio Grande fluvial system: New insights from river gravel provenance studies and 40Ar/39Ar basalt dating: Albuquerque Geological Society Meeting, 02 Dec 2015.
458. Repasch, M.N., Karlstrom, K.E., and Heizler, M.T., 2015, Birth and evolution of the Rio Grande - Rio Chama fluvial system: the influence of magma-driven dynamic topography on fluvial systems over the last 8 Ma: Abstract EP41A-0912 presented at 2015 Fall Meeting, AGU, San Francisco, CA, 14-18 Dec.
459. Repasch, M.N., Karlstrom, K., and Heizler, M., 2015, Neotectonic influences on the evolution of the Rio Grande fluvial system over the last 5 Ma: GSA Abstracts with Programs, n. 214-8.
460. Repasch, M.N., Karlstrom, K., Heizler, M., Appelt, R., 2015, Mantle-surface interactions in northern New Mexico inferred from <sup>40</sup>Ar/<sup>39</sup>Ar dating of Taos Plateau basalts and river incision history: New Mexico Journal of Science, v. 49, no. 1.
461. Repasch, M.N., Karlstrom, K., and Heizler, M., Birth and evolution of the Rio Grande fluvial system: New insights from river gravel provenance studies and <sup>40</sup>Ar/<sup>39</sup>Ar dated paleoprofiles: Proceedings from the 2015 Annual Spring Meeting, New Mexico Geological Society, Socorro, New Mexico, 24 April 2015.
462. Repasch, M.N., Karlstrom, K.E., Crossey, L.J., and Blomgren, V., 2015, Studying the surface expressions of potential geothermal systems in northern New Mexico: Proceedings from the 2015 All Hands Meeting, New Mexico EPSCoR , Socorro, New Mexico, 17 April 2015.

463. Blomgren, V.J., Crossey, L.J., Karlstrom, K.E., 2016. Influence of the Valles Caldera in Supplying Geothermal Chemical Components to Springs in Northern New Mexico: NMGS Annual Spring Meeting.

464. Blomgren, V.J., Crossey, L.J., Karlstrom, K.E., 2015. Influence of the Valles caldera in supplying CO<sub>2</sub> to geothermal springs in northern New Mexico: NM Academy of Science Research Symposium.

465. Blomgren, V.J., Crossey, L.J., Karlstrom, K.E., 2015. Influence of the Valles caldera in supplying CO<sub>2</sub> to geothermal springs in northern: GSA Annual Meeting.

466. Blomgren, V.J., Crossey, L.J., Karlstrom, K.E., 2015. Using Multiple Tracers to Evaluate Hydrothermal and Meteoric Water Mixing in North -Central New Mexico: NMGS Annual Spring Meeting.

467. Blomgren, V.J., Crossey, L.J., Karlstrom, K.E., 2014. Evaluating hydrothermal and meteoric water mixing along the Embudo fault system, New Mexico: New Mexico Academy of Science Research Symposium.

468. Blomgren, V.J., Williams, A., Crossey, L.J., Karlstrom, K.E., Goff, F., 2016. Identifying the sources of CO<sub>2</sub> in carbonic springs in the Albuquerque - Belen basin: New Mexico Geological Society Guidebook Belen area.

469. Smith, J.R., Crossey, L., Karlstrom, K., Fischer, T., Lee, H., and McGibbon, C., 2016: Degassing of CO<sub>2</sub> along Fault Networks from the Valles Caldera and into the Albuquerque Basin: Central Rio Grande Rift, New Mexico; New Mexico Geological Society, Spring 2016 Meeting; April 8,

470. Smith, J.R., Crossey, L., Karlstrom, K., Fischer, T., Lee, H., and McGibbon, C., 2015: Fault Networks in the Northwestern Albuquerque Basin and their Potential Role in Controlling Mantle CO<sub>2</sub> Degassing and Fluid Migration from the Valles Caldera; American Geophysical Union Fall 2015 Conference; December 14-18, Abstract V43C.

471. Anderson, J.C., Karlstrom, K.E., Asmerom, Y., Polyak, V.J., Crossey, L.J., and Dehler, C.M., 2016, Testing a marine signature for the Neoproterozoic Chuar Group of Grand Canyon using Sr isotopic data: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 200.

472. Aslan, A., Karlstrom, K.E., Heizler, M., and Hale, M.L., 2016, Oligo-Miocene river evolution of the upper Colorado River system: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 147.

473. Crow, R.S., Karlstrom, K.E., Crossey, L.J., Polyak, V.J., and Asmerom, Y., 2016, Carving Grand Canyon's Inner Gorge: a test of steady incision versus passage of an incision transient: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 174.

474. Crow, R.S., House, P.K., Howard, K.A., Karlstrom, K.E., Heizler, M.T., Polyak, V.J., Asmerom, Y., Pearthree, P.A., O'Connell, B., Crossey, L.J., Champion, D., Beard, L.S., Dorsey, R., and McDougall, K., 2016, Deciphering Lower Colorado River integration processes through geochronologic studies of the Bouse Formation: preliminary results and future directions: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 292.

475. Grambling, T.A., Holland, M.E., Karlstrom, K.E., and Grambling, N.L., 2016, Paired zircon U-Pb-Hf isotope analysis of the Yavapai-Mazatzal boundary in New Mexico: evidence for a Mazatzal

continental arc system: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 213.

476. Grulke, T., Crossey, L.J., Blomgren, V.J., Karlstrom, K., McGibbon, C., Polyak, V.J., and Asmerom, Y., 2016, Using multiple geochemical tracers to examine geothermal inputs to the Jemez River, northern New Mexico: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 266.

477. Hatcher, Jr., R.D., Karlstrom, K.E., Schmandt, B., Denison, R.E., Keller, G.R., Van der Lee, S., Lin, F.C., Saleeby, J.B., and Saleeby, Z., 2016, Transcontinental geologic and geophysical cross section I: Eastern segment: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 265.

478. Hereford, R., Beard, L.S., Heizler, M.T., Karlstrom, K.E., Crossey, L.J., Pecha, M., and House, P.K. Early Pleistocene (< ca. 2 Ma) denudation of northeast Arizona inferred from reconstruction of the White Mesa paleodrainage: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 147.

479. Holland, M.E., Karlstrom, K.E., Mulder, J., Gehrels, G.E., and Pecha, M., 2016, Growth and evolution of southern Laurentia in the context of the Nuna supercontinent: Paleoproterozoic connections between Australia/Antarctica (Mawson) and Laurentia: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 259.

480. Hrncir, J.A., and Karlstrom, K.E., 2016, Tectonic evolution of the Black Hills, South Dakota from new U-Pb and Hf analyses of igneous and detrital zircon: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 259.

481. Karlstrom, K.E., Liu, L., Zhou, Q., Crow, R.S., Aslan, A. and Schmandt, B., 2016, Dynamic topography in the Colorado Plateau Rocky Mountain region: geologic constraints for geodynamic models and vice versa: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 292.

482. Karlstrom, K.E., Williams, M.L., Condie, K.C., Hawkins, D.P., Chamberlain, K.R., and Crowley, J.L., 2016, Sam Bowring's role in redefining U-Pb geochronology in the Southwestern USA: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 215.

483. Karlstrom, K.E., Williams, M.L., Holland, M.E., Mulder, J., Gehrels, G.E., and Pecha, M., 2016, Proterozoic accretionary orogens of southern Laurentia revisited: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 259.

484. Karlstrom, K.E., Schmandt, B., Hatcher Jr., R.D., Saleeby, J.B., Saleeby, Z., Denison, R., Keller, G.R., Van der Lee, S., and Lin, F.C., 2016, Transcontinental geologic and geophysical cross section II: Western segment: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 265.

485. Lathrop, E.C., Dehler, C.M., Karlstrom, K.E., Crossey, L.J., Anderson, J.C., Pulsipher, M.A., and Timmons, J.M., 2016, Capturing changes in the Mesoproterozoic Earth system:  $\delta^{13}\text{C}_{\text{carb}}$  and  $^{87}\text{Sr}/^{86}\text{Sr}$  stratigraphy of the ~1254 Ma Bass Formation, Grand Canyon Supergroup, AZ., USA: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 200.

486. Mulder, J., Karlstrom, K.E., Jacqueline, A., Jones III, J.V., and Holland, M.E., 2016, The Mesoproterozoic sedimentary record of long-term Australian/Antarctic, Laurentian connections: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 200.

487. Repasch, M.N., Karlstrom, K.E., and Heizler, M., 2016, Birth and evolution of the Rio Grande fluvial system in the last 8 Ma: progressive downward integration and interplay between tectonics, volcanism, and river evolution: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 171.

488. Thomas, G., Crossey, L.J., Smith, J.R., Grulke, T., Karlstrom, K., and McGibbon, C., 2016, Hydrochemistry of Sulphur Creek and Alamo Canyon, Valles caldera: effect of geothermal systems on surface water quality: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 266.

489. Williams, M.L., Karlstrom, K.E., Mako, C.A., and Holland, M.E., 2016, The nature of the Mazatzal orogeny in southwestern North America: new data and persistent questions: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 259.

490. Whyte, C., Karlstrom, K.E., Crossey, L.J., Gonzales, D.A., and Darrah, T.H., 2016, Evaluating mantle-crustal gas dynamics of Southwestern US CO<sub>2</sub> springs using helium isotopes and heavy noble gases: Geological Society of America Abstracts with Programs, v. 48, no. 7, p. 303.

491. Winn, C., Karlstrom, K.E., Shuster, D.L., Kelley, S.A., and Fox, M., 2016, Combined AFT, AHe, <sup>4</sup>He/<sup>3</sup>He thermochronologic data indicate carving of westernmost Grand Canyon in the last 6 Ma: Geological Society of America Abstracts with Programs, vol. 48, no. 7, p. 147.

492. Thomas, Graham; Grulke, Tanner; Crossey, Laura; Karlstrom, Karl; Blomgren, Laura; Smith, Jared, 2016, Hydrochemistry of Sulphur and Alamo Creek, Valles Caldera: Effect of geothermal systems on surface water quality of the Jemez River., in: New Mexico Geological Society, Annual Spring Meeting, April 28, 2016, Macey Center, New Mexico Institute Mining Technology, Socorro, NM, p. 65.

493. Anderson, Jordan Curtis; Karlstrom, Karl; Crossey, Laura, 2016, Testing a marine signature for the Neoproterozoic Chuar Group of Grand Canyon Using Sr Isotopic Data, in: New Mexico Geological Society, Annual Spring Meeting, April 28, 2016, Macey Center, New Mexico Institute Mining Technology, Socorro, NM, p. 8.

494. Smith, Jared R.; Crossey, Laura J.; Karlstrom, Karl E.; Fischer, Tobias P.; Lee, Hyunwoo; McGibbon, Christopher, 2016, Degassing of CO<sub>2</sub> along fault networks from the Valles Caldera and into the Albuquerque Basin: Central Rio Grande rift, New Mexico, in: New Mexico Geological Society, Annual Spring Meeting, April 28, 2016, Macey Center, New Mexico Institute Mining Technology, Socorro, NM, p. 62.

495. Repasch, Marisa Nicole; Karlstrom, Karl; Heizler, Matt, 2016, Unraveling the 5 Ma birth and young evolution of the Rio Grande fluvial system, in: New Mexico Geological Society, Annual Spring Meeting, April 28, 2016, Macey Center, New Mexico Institute Mining Technology, Socorro, NM, p. 54.

496. McGibbon, Chris; Crossey, Laura; Karlstrom, Karl, 2016, Carbonic springs as distal manifestations of the Jemez geothermal system, San Ysidro, New Mexico, highlighting the importance of fault pathways and hydrochemical mixing, in: New Mexico Geological Society, Annual Spring Meeting, April 28, 2016, Macey Center, New Mexico Institute Mining Technology, Socorro, NM, p. 48.

497. Grulke, Tanner K.; Crossey, Laura; Blomgren, Valerrie; Karlstrom, Karl; Polyak, Victor; Asmerom, Yemane, 2016, Using multiple geochemical tracers to examine potential low temperature geothermal reservoirs in New Mexico, in: New Mexico Geological Society, Annual Spring Meeting, April 28, 2016, Macey Center, New Mexico Institute Mining Technology, Socorro, NM, p. 25.

498. Thacker, J.O., Karlstrom, K.E., Kendall J., Kelley, S., Crow, R., and Schmandt, B., 2017, Elucidating the regional spatiotemporal characteristics of the Laramide deformation through low-temperature thermochronology: Geological Society of America Abstracts with Programs, v. p.

499. Thacker, J.O., Cassidy, C.E., Karlstrom, K.E., Crossey, L.C., Crow, R., Beard, L.S. and Dorsey, R., 2017, Post- Miocene distributed deformation of the lower Colorado River region: Implications for structure, tectonics, and evolution of the Colorado River system: Geological Society of America Abstracts with Programs, v. p.

500. Aslan, A., Borass-Connors, M., Sprinkel, D.A., Becker, T., Lynds, R., Karlstrom, K.E., Heiller, M., 2017, Cenozoic collapse of the eastern Uinta Mountains and drainage evolution of the Uinta Mountain region: Geological Society of America Abstracts with Programs, v. p.

501. Eyster, A.E., Weiss B.P., Karlstrom, K.E., Kramers, J., and McDonald, F.A., 2017, Riddle of Rodinia: Paleomagnetism of the Chuar Group and evaluation of the 780-720 Ma Laurentian apparent polar wander path: Geological Society of America Abstracts with Programs, v. p.

502. Lamb, M.A., Beard, L.S., Gragos, M., Hanson, A.D., Hickson, T.A., Umhoeffer, P. Karlstrom, K.E., Sitton, M.E., Dunbar, N., and MacIntosh, W., 2017, Provenance and paleogeography of the Rainbow Garden Formation and coeval deposits: stratigraphic evidence for tectonic activity at ~ 19 Ma and internal drainage instead of throughgoing paleorivers on the southwestern Colorado Plateau: Geological Society of America Abstracts with Programs, v. p.

503. Lathrop, E.C., Dehler, C.M., Anderson, J.C., Karlstrom, K.E., Hagadorn, J.W., Pulsipher, M.A., Cossey, L.J., Timmons, J.M., Newell, D.L., 2017, Not-so-boring Bass: C-isotope stratigraphy and facies analysis of the Mesoproterozoic Bass Formation, Grand Canyon, AZ., Geological Society of America Abstracts with Programs, v. p.

504. Holland, M.E., Karlstrom, K.E., Gehrels, G.E., Pecha, M., 2017, Paired U-Pb and Lu-Hf isotope analysis of detrital and plutonic zircon track basin formation and subsequent cratonization in the Paleoproterozoic Mojave province of southwestern Laurentia: Geological Society of America Abstracts with Programs, v. p.

505. Holland, M.E., Heizler, M., Amato, J.M., and Karlstrom, K.E., 2017, Maximizing the thermochronologic potential of muscovite through multiple diffusion domain modeling episodic  $^{40}\text{Ar}^*$  loss in the Burro Mountains, southern New Mexico: Geological Society of America Abstracts with Programs, v. p.

506. Ferguson, C., Crossey, L.J., Karlstrom, K.E., Spilde, M., 2017, Geochemical characterization of Bouse carbonates; towards an understanding of Bouse diagenesis: ECSZ Does It, Revisiting the Eastern California shear zone, Robert E. Reynolds, editor, p. 182.

507. McGibbon, C., Crossey, L.J., and Karlstrom, K.E., 2018, Hydrologic monitoring of springs along the Nacimiento fault: New Mexico Geological Society 2018 Annual Spring Meeting, p. 53.

508. Holland, M.E., and Karlstrom, K.E., 2018, The origin and evolution of the Mojave province, Geological Society of America Abstracts With Programs, v. 50, no. 5.

509. Golla, J.K., and Crossey, L.J., 2018, Major-solute observations of geothermal salinization of the Jemez Watershed, New Mexico: Geological Society of America Abstracts with Programs, v. 50, no. 5.

510. Young, D. J., Karlstrom, K. E., Heizler, M. T., 2018, Distinguishing the Mazatzal and Picuris Orogenies in polydeformed metasediments and a regional compilation of the 1.4 Ga Picuris Orogeny, Geological Society of America Abstracts with Programs, v. 50, no. 5.

511. Ferguson, C. L., Crossey, L.J., Karlstrom, K.E., and Anderson, J., 2018, Geochemical characterization of Bouse carbonates: Toward an understanding of diagenesis of Bouse carbonates: Geological Society of America Abstracts with Programs, v. 50, no. 5.

512. Crossey, L.J., K, K.E. and McGibbon, C., 2018, Application of multiple geochemical tracers for understanding anthropogenic influences on groundwater flow to Grand Canyon springs, Grand Canyon National Park: Geological Society of America Abstracts with Programs, v. 50, no. 5.

513. Burch, S.J., Gonzales, D.A., Holt, B.D., Crossey, L.J., Whyte, C., Karlstrom, K., and Darrah, T., 2018, A comparison of geochemical and helium isotope signature of thermal fluids, Rico and Dunton springs, San Juan Mountains, Colorado: Geological Society of America Abstracts with Programs, v. 50, no. 5.

514. Karlstrom, K.E., Crossey, L.J., Heizler, M., Thacker, J., and Ferguson, C., 2018, The Bouse Formation: Persistent controversies and progress towards potential resolutions: Geological Society of America Abstracts with Programs, v. 50, no. 5.

515. Karlstrom, K.E., Liu, L. Aslan, A., Quan, Z., and Heizler, M., 2018, Ongoing mantle-driven uplift of the Colorado Plateau- Rocky Mountain region: Geological Society of America Abstracts with Programs, v. 50, no. 5.

516. Winn, C., Karlstrom, K.E., Kelley, S. Timing and geometry of the 'Great Denudation' of the Grand Staircase of the southern Colorado Plateau from combined geologic and apatite thermochronologic data: Geological Society of America Abstracts with Programs, v. 50, no. 5

517. Thacker, Jacob O., Karlstrom, K.E., Kelley, S.A., Kendall, J., Crow, R.S., 2018, Southern Laramide deformation timing (Arizona-New Mexico) constrained by integrated geology and thermochronology: Implications for Cretaceous-Paleogene tectonic processes: 2018 GSA Rocky Mountain 70th/Cordilleran 114th joint section meeting, Flagstaff, AZ. v. 50, no. 5

518. Thacker, Jacob O., Karlstrom, K.E., Crossey, L.J., Crow, R.S., Cassidy, C.E., Beard, L.S., 2018, Syn- and post-6 Ma deformation of the Bouse Formation: Implications for lower Colorado River tectonism and Bouse deposition: 2018 GSA Rocky Mountain 70th/Cordilleran 114th joint section meeting, Flagstaff, AZ. v. 50, no. 5

519. Hrncir, J., and Karlstrom, K.E., 2018, Assembly of the Kaapvaal and Wyoming cratons into the Superia supercontinent: Key evidence from the Black Hills of South Dakota and Wyoming: Geological Society of America Abstracts with Programs, v. 50, no. 5

520. Walk, C., Karlstrom, K., Crow, R., Heizler, M., 2018, Birth and Evolution of the Virgin River: Post 5 Ma uplift of the western Colorado Plateau: Geological Society of America Abstracts with Programs, v. 50, no. 5

521. Aslan, A., Heizler, M.T., Kirby, E., Granger, D.E.m, Hanson, P.R., Feathers, J.K., and Maan, S.A., 2018, Controls on patterns of upper Colorado River bedrock incision: Geological Society of America Abstracts with Programs, v. 50, no. 5.

522, Anderson\*, J.C., Karlstrom, K.E., Crossey, L.J., Heizler, M.T., and Scuderi, L.A., 2018, Drainage reversal and incisional history of the Salt River: Geological Society of America Abstracts With Programs, v. 50, no. 5, ISSN 0016-7592, doi: 10.1130/abs/2018RM-313757.

524. Robertson, J., and Karlstrom, K.E., 2018, The Surprise Valley landslide complex: 3 million years of rotational bedrock landsliding and river diversions in the central Grand Canyon: Geological Society of America Abstracts With Programs, v. 50, no. 5.

525. Holt, B.D., Karlstrom, K.E., Crossey, L.J., Darrah, T.H., Whyte, C., and Gonzales, D.A., 2018, Mantle-to-surface neotectonic connections in the San Juan Mountains documented by  $^{3}\text{He}/^{4}\text{He}$ ,  $\text{CO}_2$  flux measurements, and hydrochemical analyses of the geothermal system: Geological Society of America Abstracts with Programs, v. 50, no. 5.

526. Albonico\*, M., Karlstrom, K.E., Heizler, M.T., Aslan A., and Gillam, M.L., 2019, Birth and evolution of the San Juan River in the past 5 Ma: Geological Society of America Abstracts with Programs, v. 51, no. 5, ISSN 0016-7592

527. Bright, J., Cohen, A., Cassidy, C., Crossey, L.J., Crow, R., Dorsey, R.J., Gootee, B.F., House, P.K., Karlstrom, K.E., and Pearthree, P.A., 2019, Towards developing a lower Colorado River corridor coring (locoring) project: what subsurface Bouse Formation sediments can tell us about late Miocene (?) and early Pliocene tectonics and paleoclimate in the southwestern US: Geological Society of America Abstracts with Programs, v. 51, no. 5.

529. Crow, R., Schwing, J., Karlstrom, K.E., Heizler, M., Pearthree, P. A., Houses, P.K., Dulin, S., Stelten, M., and Crossey, L., 2019, Redefining the age of the Colorado River: Geological Society of America Abstracts with Programs, v. 51, no. 5.

530. Ferguson, C. L., Crossey, L.J., Karlstrom, K.E., and Anderson, J., 2018, Geochemical characterization of Bouse carbonates: Toward an understanding of diagenesis of Bouse carbonates: Geological Society of America Abstracts with Programs, Flagstaff regional meeting.

531. Albonico\*, M., Karlstrom, K.E., Heizler, M.T., Aslan A., and Gillam, M.L., 2019, Birth and evolution of the San Juan River in the past 5 Ma: Geological Society of America Abstracts with Programs, v. 51, no. 5, ISSN 0016-7592

532. Anderson\*, J.C., Karlstrom, K.E., Crossey, L.J., 2019, Drainage reversal and southern Colorado Plateau uplift in the Salt River area: Geological Society of America Abstracts with Programs, v. 51, no. 5

533. Aslan, A., Heizler, M., Karlstrom, K.E., Granger, D., and Martin, E., 2019, Detrital sanidine and cosmogenic burial age constraints support post-2 Ma integration of the upper Green River across the Uinta Mountains: Geological Society of America Abstracts with Programs, v. 51, no. 5

534. Bright, J., Cohen, A., Cassidy, C., Crossey, L.J., Crow, R., Dorsey, R.J., Gootee, B.F., House, P.K., Karlstrom, K.E., and Pearthree, P.A., 2019, Towards developing a lower Colorado River corridor coring (locoring) project: what subsurface Bouse Formation sediments can tell us about late Miocene (?) and early Pliocene tectonics and paleoclimate in the southwestern US: Geological Society of America Abstracts with Programs, v. 51, no. 5.

535. Crossey, L., Karlstrom, K.E., Springer, A.E., Tobin, B., and Huntoon, P., 2019, Hydrochemistry at Grand Canyon: Who knew groundwater hydrology could be so complicated?: Geological Society of America Abstracts with Programs, v. 51, no. 5.

536. Crossey, L., 2019, Redefining the age of the Colorado River: Geological Society of America Abstracts with Programs, v. 51, no. 5.

537. Crow, R. Schwing, J., Karlstrom, K.E., Heizler, M., Pearthree, P. A., Houses, P.K., Dulin, S., Stelten, M., and Crossey, L., 2019, Redefining the age of the Colorado River: Geological Society of America Abstracts with Programs, v. 51, no. 5.

538. Dehler, C.M., Schmitz, M. D., Bullard, A., R., Blakey, R., Karlstrom, K.E., and Timmons, J.M., 2019, Late Tonian paleogeography of southwestern North America: Geological Society of America Abstracts with Programs, v. 51, no. 5.

539. Doe, M.F., Daniel, C.G., Jones, III, J.V., Karlstrom, K.E., and Holland, M.E., 2019, Tracing Proterozoic basin evolution across Arizona utilizing multidimensional scaling to evaluate relative provenance patterns: Geological Society of America Abstracts with Programs, v. 51, no. 5.

540. Foster, J., Sundberg, F. A., Karlstrom, K. E., Schmitz, M., Mohr, M., and Hagadorn, J., 2019, Long-distance lateral variability in biotas and lithologies of the Cambrian Bright Angel Formation (Tonto Group), Grand Canyon, USA: Geological Society of America Abstracts with Programs, v. 51, no. 5.

541. Heizler, M., Karlstrom, K.E., Aslan, A., Zimmerer, M., Ross, J., Crow, R., and Crossey, L., 2019, Detrital sanidine geochronology: Linking volcanic sources to sedimentary sinks with high age precision, compositional fingerprints and improved maximum deposition ages: Geological Society of America Abstracts with Programs, v. 51, no. 5.

542. Holland\*, M. E., Karlstrom, K.E., Doe, M.F., Jones III, J. V., and Daniel, C.G., 2019, Proterozoic accretionary tectonic history of southwestern Laurentia: Multiple hypotheses, and the search for analogues: Geological Society of America Abstracts with Programs, v. 51, no. 5.

543. Karlstrom, Karl, 2019, Grand Canyon Geology and Geoscience Education Public Symposium (April 18-20, 2019): final program and abstracts, v3, University of New Mexico, Dataset, <https://doi.org/10.5061/dryad.9s4mw6mbz>. This publication contains 8 abstracts authored by KEK, LJC, and students.

544. Karlstrom, K.E., Heizler, M.T., Schmitz, M., Mohr, M., Crossey, L.J., Dehler, C.M., Timmons, J.M., Hagadorn, J., 2019, Parsing Grand Canyon's Great Unconformity-- Composite erosion surface from at least three episodes between 1,350 and 508 Ma: Geological Society of America Abstracts with Programs, v. 51, no. 5.

545. Karlstrom, K.E., Crossey, L.J., Semken, S., Crow, R., and Williams, M.L., 2019, The Grand Canyon Trail of Time provides linkages between research advances and international geoscience education: Geological Society of America Abstracts with Programs, v. 51, no. 5.

546. Karlstrom, K.E., Crossey, L.J., Humphreys, E., Shuster, D., and Whipple, K., 2019, Age and carving of Grand Canyon: Towards a resolution of 150 years of debate: Geological Society of America Abstracts with Programs, v. 51, no. 5.

547. Kirby, E., Furlong, K.P., Aslan, A., Karlstrom, K. E., Granger D. E., 2019, Timing and duration of incision along the Colorado River near Rifle, CO suggest a tectonic driver for post-10 Ma landscape evolution: Geological Society of America Abstracts with Programs v. 51, no. 5.

548. Klemperer, S.L., Zhao, P., Crossey, L.J., Karlstrom, K.E., Darrah, T., Winn, C., Liu, T., Wang, S., Xiong, Z., Guo, X. and Zeng, D., 2019, December. Torn Subducting Cratonic Lithosphere Shown by

Mantle Fluids: India Does Not Underplate the Lhasa Terrane West of 82° or East of 88° E, and Does Not Underplate the Qiangtang Terrane. In AGU Fall Meeting 2019. AGU.

549. Klemperer, S.L., Zhao, P., Shi, D., Crossey, L.J., Karlstrom, K.E., Winn, C.L., Liu, T., Xiong, Z., Guo, X., Zeng, D. and Wang, S., 2019. Detection of a widespread mantle component of 3He in thermal springs of Lhasa Block and Tethyan Himalaya, eastern Tibet: evidence for roll-back of the Indian-Asian mantle suture south of the Yarlung suture zone, and asthenospheric upwelling beneath the Lhasa block. *Acta Geologica Sinica-English Edition*, 93, p. 56-57.

550. Person, M., Owens, L.B., Witcher, J., Kelley, S.A., Crossey, L.J., Karlstrom, K.E., Phillips, F.M. and Timmons, S., 2019, September. Using Temperature Profiles, Isotopic Tracers, Groundwater Residence Times, And Audio Magnetotelluric Data To Constrain Fault & Crustal Permeability Within The Socorro Geothermal System, New Mexico. In GSA Annual Meeting in Phoenix, Arizona, USA-2019. GSA.

551. Schmitz, M.D., Trayler, R.B., Mohr, M., Dehler, C.M., Karlstrom, K.E., Crossey, L.J., Hagadorn, J.W., and Timmons, J.M., 2019, Bayesian age modeling and integrative chronostratigraphy of the Chuar and Tonto Groups of the Grand Canyon: Geological Society of America Abstracts with Programs, v. 51, no. 5.

552. Semken, S., Bruce, G., Ruberto, T, Mead, C., Buzner, S., Anbar, A., Crossey, L.J. and Karlstrom, K.E., 2019, The future of geoscience education at Grand Canyon: More—and more diverse—learners will experience it by place-based and digital means: Geological Society of America Abstracts with Programs, v. 51, no. 5.

553. Thacker\*, J.O., Kelley, S., Karlstrom, K.E., Kendall, J., and Crow, R., 2019, Regional timing of Laramide deformation onset, interior western USA: Geological Society of America Abstracts with Programs, v. 51, no. 5.

554. Timmons, J.M., Karlstrom, K.E., Lathrop, E., Mohr, M., Schmitz, M., Dehler, C., Anderson, J., and Crossey, L., 2019, A glimpse within the Great Unconformity: Parsing the Mesoproterozoic record of erosion, sedimentation and deformation preserved in the Grand Canyon Unkar Group: Geological Society of America Abstracts with Programs, v. 51, no. 5.

555. Winn\*, C., Karlstrom, K.E., Kelley, S.A., and Heizler, M.T., 2019, Tracing ancient landscapes using thermochronology and detrital zircon and sanidine studies of paleorivers on the southern Colorado Plateau: Geological Society of America Abstracts with Programs, v. 51, no. 5.

556. Young\*, D., Karlstrom, K.E., Heizler, M.T., and Williams, M.L., 2019, Middle crustal cross-sections and geochronologic insights on polyphase tectonism in the Proterozoic of New Mexico: 1.5 to 1.3 Ga formation and demise of an orogenic plateau: Geological Society of America Abstracts with Programs, v. 51, no. 5.

557. Abdel Mawgoud [Mohammed](#), Mohamed O. Ebraheem, Laura J. Crossey, Karl E. Karlstrom, Thomas H. Darrah, 2022, Recent Dakhla Natural thermal volatile emissions: sources and implications, Western Desert, Egypt: 11TH International Conference on the Geology of Africa: Assiut University, Nov. 8-10, 2022.

558. Condit, C., Bonamici, C., Guevara, V., Williams, M.L., Karlstrom, K.e., Aikin, N., Regan, S., Roberts, N. , 2022, How to build the mid-crustal strength beam: the role of melt emplacement in the Upper Granite Gorge, Grand Canyon: Geological Society of America *Abstracts with Programs*. Vol. 54, No. 5, doi: 10.1130/abs/2022AM-381150.

559. Thurston, O., Guenthner, W., Karlstrom, K.E., Heizler, M., Ricketts, J., 2022, Combined Zhe and Ar-Ar MDD thermochronometers for understanding the deep-time (>1 Ga) thermal history of the Grand Canyon: Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 doi: 10.1130/abs/2022AM-379531.

560. Karlstrom, K., Heizler, MT, Williams, M.L., Hillenbrand, I., Roberts, N., Condit, C., 2022, Demise of Grand Canyon's Vishnu Mountains and formation of the Great Unconformity; data from  $^{40}\text{Ar}/^{39}\text{Ar}$  and U-Th-Pb xenotime dating: Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 doi: 10.1130/abs/2022AM-379905.

561. Townsend, K., Crossey, L., Karlstrom, K.E., Griego, B., and Crowley, L., 2022, Hydrochemistry of an alpine karst system, northern New Mexico: Las Huertas: Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 doi: 10.1130/abs/2022AM-378537.

562. Weller, L., Aslan, A., Heizler, MT, Karlstrom, KE, Granger, D., Mahan, S., 2022, Fluvio-glacial terraces of the upper Green River basin spanning the past ~2 Ma: new detrital-sanidine, cosmogenic-burial, and luminescence age constraints: Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 doi: 10.1130/abs/2022AM-381310.

563. Crow, R., Karlstrom, K., Timmons, JM, Ranney, W., Kaplinski, M., Billingsley, G., Gushue, T., 2022, Refining and seamlessly compiling the next generation of Grand Canyon geologic maps: Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 doi: 10.1130/abs/2022AM-380586.

564. Hillenbrand, I., Williams, ML, Karlstrom, KE, Jercinovic, MJ, Gilmer, A, Lowers, H., Suarez, K., and Souders, K., 2022, Three Proterozoic metamorphic episodes and 1.70-1.65 Ga age of the Uncompahgre Formation constrained by monazite and xenotime petrochronology, Needle Mountains, Colorado: Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 doi: 10.1130/abs/2022AM-379992.

565. Gehrz, J., Heizler, M., Karlstrom, K., Zimmerer, M., and Hobbs, K., 2022,  $^{40}\text{Ar}/^{39}\text{Ar}$  detrital sanidine and basalt geochronology constraints for the birth and evolution of the Rio Grande river: Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 doi: 10.1130/abs/2022AM-383531.

566. Aslan, A., Karlstrom, K, Heizler, M., Kirby, E, 2022, Late Miocene birth of the upper Colorado and Green River systems: Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 doi: 10.1130/abs/2022AM-381184.

567. Reed, C., Karlstrom, K., Heizler, M., Gillam, M., Aslan, A., Ricci, Julia, Rodriguez, B, Crossey, L., 2022, QGG Donald R., Coates award: Resolving differential incision rates to test landscape evolution models: integrating new  $^{40}\text{Ar}/^{39}\text{Ar}$  detrital sanidine dating with published data on Lava Creek B ash terraces in the Rocky Mountain region: Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 doi: 10.1130/abs/2022AM-378321.

568. Kirby, E, Furlong, K, Aslan, A, Karlstrom, K, 2022, Late Miocene onset of incision along the upper Colorado River near Rifle, Co: Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 doi: 10.1130/abs/2022AM-379965.

569. Crow, R, Pearthree, P, House, PK, Heizler, M, Dulin, S, Bright, J, Gootee, Brian<sup>2</sup>, Schwing, J, Karlstrom, K, Janecke, S, 2022, Further support for a revised age of Colorado River integration: Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 doi: 10.1130/abs/2022AM-380556.

570. Karlstrom, K., Albonico, M., Heizler, M., Aslan, Andres, Gillam, M., Crossey, L., Crow, Ryan, Klema, N., Karlstrom, L., 2022, Detrital sanidine dating of terraces of the Colorado River: testing models for the Lees Ferry knickzone and for surface uplift in the past 5 Ma: Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 doi: 10.1130/abs/2022AM-378350.

571. Holland, M., Mohr, M., Schmitz, M., Madronich, Karlstrom, K., 2022, Source-to-sink tandem geochronology provides new opportunities for reconstructing ancient paleogeography and paleotopography: an example from the transcontinental arch of Laurentia: Geological Society of America *Abstracts with Programs*. Vol 54, No. 5 doi: 10.1130/abs/2022AM-379523

572. Mohammed, A.M., Ebraheem, M.O., Crossey, L.J., Karlstrom, K.E., and Darrah, T.H., 2022, Recent Dakhla natural thermal volatile emissions: Sources and implications, western Desert, Egypt: Eleventh International Conference on the Geology of Africa (IGCA-2022). Assuit University, Egypt.

573. Reed, C.C., Karlstrom, K.E., Heizler, M., Rodriguez, B., Ricci, J., and Crossey, L., 2023, Tectonic geomorphology of the Jemez system: Resolving Quaternary river response to dynamic landscapes using 40Ar/39Ar geochronology: Geological Society of America *Abstracts with Programs*, v. p.

574. Christie- Blick, N., Karlstrom, K.E., Sundberg, F., Schmitz, M., Farrell, T., Hagadorn, J., Kominz, M., Sharma, J., and Giles, S., 2023, Tectonic subsidence of the early Paleozoic passive continental margin in southwestern Laurentia re-evaluated in light of changes to the geologic timescale: Geological Society of America *Abstracts with Programs*, v. p.

575. Williams, M.L., Hillenbrand, I., and Karlstrom, K.E., 2023, Full-crustal (P-T-t-D-Z) Tectonics: Combining metamorphic P-T paths, in-situ petrochronology (t) and mohometry (Z) to reveal the evolution of ancient mountain belts: Geological Society of America *Abstracts with Programs*, v. p.

576. Bailey, J., Karlstrom, K.E., Heizler, M., and Williams, M.L., 2023, Investigating high- and low-Temperature shear zones in the western Grand Canyon: Geological Society of America *Abstracts with Programs*, v. p.

577. Hillenbrand, I., Willimas, M.L., Gilmer, A., and Karlstrom, K.E., 2023, Constraining the roles of lithospheric foundering and underplating in the rise and fall of orogenic plateaux: Geological Society of America *Abstracts with Programs*, v. p.

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## STUDENT THESES AND MENTORING

### BS Senior Honors Theses Supervised

1. Raszewski, Doug, 1999. Polyphase tectonics and metamorphism and their relation to movement on the Monte Largo shear zone in the Manzana Mountains, Central New Mexico (co-supervised with Jane Selverstone).
2. Stickland, Diana, 2000. Proterozoic evolution of the Zuni Mountains. New Mexico: Peridotites, granites, rhyolites, shear zones, and a reactivation history through the present (co-supervised with Jane Selverstone). Current position: USGS, Menlo Park.
3. Ray, Jason, 2000. Analysis of the Cabin Canyon shear zone in the Virgin Mountains: Implications for an early accretionary province boundary and a later transpressional zone.
4. Rogers, Steve, 2001, New structural interpretation, microstructural analysis, and preliminary monazite geochronology of Proterozoic rocks in the central Manzano Mountains, New Mexico.
5. Doran, Linda, 2002, Banded metarhyolites in Trigo Canyon: The story they tell about the Proterozoic deformational history of the Manzano Mountains.
6. Abrams, David, 2005, New Mexico Trail of Time: Conceptual Development of a Geoscience Education Exhibit at the University of New Mexico Main Campus. *cum laude*
7. Rose-Coss, Dylan, 2008, Terrace mapping of the Rio Salado and compilation of Quaternary incision rates in northern New Mexico; Current position: MS Program at NM Tech.
8. Thomas Sowers, 2008, Incision History of the Rio Salado and Implications for Uplift History of the Jemez Mountains. Current position: Mine geologist, Nevada
9. Brandon Dixon, expected 2012, Precambrian Basement of the Defiance Uplift: Possible Correlation to the Uncompahgre Quartzite and Influences of Basement Fabric on Later Tectonism
10. Kolomaznik, Miela, 2013, U-series dating and stable isotope analysis of Quaternary travertine's with implications for incision rates in western Rio Grande rift, Carrizo Arroyo, New Mexico: BS thesis (co-supervised with Laura Crossey)
11. Mike Channer, 2014, Using the Longitudinal River Profile of the Rio San Jose and  $^{40}\text{Ar}/^{39}\text{Ar}$  Dating of Late-Cenozoic Basalts to Test Models for Mantle-Driven Uplift Across the Jemez Lineament, New Mexico. Current position: PhD Program at USU.
12. Racheal Price, 2014, Detrital zircon of the Crooked Ridge paleoriver; Current position: MS program at UNM
13. Tyler Grambling, 2016, A Geochronologic view of the Yavapai-Mazatzal transition zone: Evidence of multiple orogenies and ongoing crustal mixing from the Proterozoic rocks of north-central New Mexico: PhD Program U Tennessee.
14. Anderson, Jordan, 2016, Marine signature of the Neoproterozoic upper Chuar Group based on Sr isotopic data: MS Program at UNM
15. Rodriguez, Benjamin, 2023, Detrital sanidine dating of river incision of the Jemez River

### **Masters Theses Supervised (\* = Co-advisor)**

1. Argenbright, Dean N., 1986. Geology and Structure of Proterozoic Rocks of the Yavapai Supergroup in Crazy Basin, Central Arizona, 81 p. (also Arizona Geological Survey Contributed Map Series 91-D). Current position: Geologist with North Carolina Dept of Transportation
2. Puls, Davis D., 1986. Geometric and Kinematic Analysis of a Proterozoic Foreland Thrust Belt, Northern Mazatzal Mountains, Central Arizona, 102 p. (also Arizona Geological Survey Contributed Map Series 91-B). Current position: Exxon senior management.
3. Sherlock, Sean M., 1986. Structure and Stratigraphy of Early Proterozoic Rocks, McDonald Mountain-Breadpan Mountain Area, Northern Sierra Anchas, Gila County, Arizona, 81 p. (Also Arizona Geological Survey Contributed Map Series 91-C).
4. Brady, Timothy B., 1987. Early Proterozoic Structure and Deformational History of the Sheep Basin Mountain Area, Northern Sierra Anchas, Gila County, Arizona, 122 p. (Also Arizona Geological Survey Contributed Map Series 91-E).
5. Roller, Julie A., 1987. Geometric and Kinematic Analysis of the Proterozoic Upper Alder Group and the Slate Creek Movement Zone, Central Mazatzal Mountains, Central Arizona, 105 p. (Also Arizona Geological Survey Contributed Map Series 91-F).
6. Darrach, Mark E., 1988. A Kinematic and Geometric Structural Analysis of an Early Proterozoic Crustal-Scale Shear Zone: the Evolution of the Shylock Fault Zone, Central Arizona, 82 p. (Also Arizona Geological Survey Contributed Map Series 91-G).
7. Fletcher, John M., 1989. Late Cretaceous Ductile Deformation, Metamorphism and Plutonism in the Piute Mountains, Eastern Mojave Desert, 89 p.; Current position: Professor at CICESE Research Institute, Mexico.
8. Wessels, Rick L., 1990. Re-Evaluation of the Slate Creek Shear Zone: Structure of Early Proterozoic Rocks, Northern Sierra Anchas, Gila County, Arizona 80 p. (Also Arizona Geological Survey Contributed Map Series 91-I). Current position: USGS, Anchorage
9. Nicholson, H.Tim, 1990. Structural Analysis of the Mesozoic Scanlan Shear Zone, California, 79 p.
10. Rothstein, David, 1990. Geology of the Scanlan Shear Zone, Central Old Woman Mountains, Southeastern California, 65 p. (co-supervised with T. Hoisch).
11. Burke, Kelley J., 1991. Tertiary Extensional Tectonism in the Northern Chief and Southernmost Highland Ranges, Lincoln County, Nevada 91 p. (co-supervised with G. Axen).
12. Kelly, Michael M., 1991. Geometric and Kinematic Structural Analysis of Late Cretaceous Ductile Thrust Zones in the Old Woman Mountains Region, Southeastern California, 128 p.
13. Labrenze, Mark, 1991. Structure of Early Proterozoic Rocks and Emplacement of the Young Granite, Pleasant Valley Area, Northern Sierra Anchas, Gila County, Arizona, 91 p. (Also Arizona Geological Survey Contributed Map Series 91-H).
14. Albin, Alton, L., 1991. Geology and Structure of the Gneiss Canyon Shear Zone in the Peacock Mountains and Southern Grand Wash Cliffs, Northwestern Arizona, 74 p. (Also Arizona Geological Survey contributed Map Series 91-K). Current position: Geologist with U.S. Bureau of Reclamation

15. Doe, Michael F., 1991. Structural Geology of a Proterozoic Foreland Thrust-System in the Vicinity of Barnhardt Canyon, Central Mazatzal Mountains, Central Arizona, 91 p. (Also Arizona Geological Survey Contributed Map Series 91-J). Current position: PhD from Colorado School of Mines, now a consulting geologist.
16. Hoyt, C.R., 1992. Geology of the Cowpie Peak and Mercury Mountain areas, Northern Old Woman Mountains, Southeastern California, (co-supervised with T. Hoisch).
17. Ilg, Brad R., 1992. Early Proterozoic Structural Geology of the Upper Granite Gorge, Grand Canyon, Arizona, 54 p fo. Now the Science Advisor to the Prime Minister of New Zealand
18. Villalobos, Anita, 1993. Structural Analysis of the Northern Shylock Shear Zone, Central Arizona, p.
19. Owens, Matt., 1993. Structural Analysis of the Southwestern Scanlan Shear Zone, Old Woman Mountains, Southeastern California, 93 p.
20. Ring, Thomas, 1993. Geologic Evolution of Early Proterozoic Rocks, Piute Mountains, Southeastern California, 125 p.
21. Kirby, Eric, 1994. Tectonic setting of the Sandia pluton: an orogenic 1.4 Ga granite in New Mexico, 54 p.; current position: Professor at Oregon State University.
22. Hutchison, Jimmie, 1996. Relative timing of porphyroblast growth and peak metamorphism in the Lower Granite Gorge, Grand Canyon, Arizona, 59 p.
23. Read, Adam, 1997. A Mid-Crustal Cross Section From the Rincon Range, Northern New Mexico: Evidence for 1.68 Ga Pluton-Influenced Tectonism and 1.42 Ga Regional Metamorphism, p. 46. Current position: GIS specialist for New Mexico Bureau of Mines.
24. Timmons, J. Michael, 1998. Proterozoic multistage (~1.1 and ~0.8 Ga) extension in the Grand Canyon Supergroup and establishment of northwest and north-south tectonic grains in the southwestern US. Current position: Director of NM Statemap Program at New Mexico Bureau of Mines and NM Tech.
25. Brown, Cynthia L., 1998. Paleoproterozoic deformation, metamorphism, and  $^{40}\text{Ar}/^{39}\text{Ar}$  thermal history of the 1.65 Ga Manzanita Pluton, Manzanita Mountains, New Mexico.
26. Simmons, M.C., 1998. Quartz-kyanite pods in Proterozoic rocks in northern New Mexico: Shear zone formation along an older hydrothermal alteration horizon.
27. McCoy, Annie, M., 2001, The Proterozoic ancestry of the Colorado Mineral Belt: ca. 1.4 Ga shear zone system in central Colorado, 140 p.; Current position: Senior Hydrogeologist, John Shoemaker & Associates, Inc
28. Tyson, Amanda, 2002, Proterozoic Farwell Mountain-Lester Mountain suture zone, northern Colorado: subduction flip and progressive assembly of arcs: MS thesis (with distinction), University of New Mexico, 144 p.
29. Quigley, Mark C., 2002, Tectonic development of Proterozoic structures and their influence on Laramide and Miocene deformation, north Virgin Mountains, SE Nevada and NW Arizona, 194 p.; Current position: Professor and Senior Lecturer in Active Tectonics and Geomorphology University of Melbourne.

30. Jessup, Mica H., 2003, A tectonic history of the Proterozoic rocks in the Black Canyon of the Gunnison, Colorado, 143 p.; Current position: Professor at University of Tennessee.
31. Baer, Sunny., 2004, Geologic and tectonic evolution of the Manzano Peak Quadrangle, Manzano Mountains, New Mexico: defended May, 2004.
32. Luther, Amy, 2006, History and timing of polyphase Proterozoic deformation in the Manzano thrust belt, central New Mexico; PhD from NMT, current position: Assistant Professor and Fieldcamp Director, Lousianna State University.
33. Zinsser, Austin, 2006, New stratigraphy, polyphase deformational history, and basement- involved thrust model for the Proterozoic Vallecito Conglomerate and Uncompahgre Group of the Needle Mountains of Colorado.
34. Sandoval, Magdalena, 2007, Quaternary incision history of the Black Canyon of the Gunnison, Colorado, 96 p., Current position: PhD student at UNM.
35. Crow, Ryan, 2008, Quaternary basalts and incision history of western Grand Canyon. Current position: Mendenhal post-doc at USGS in Flagstaff.
36. Darling, Andy, 2010, Evaluating Neogene uplift and denudational history of the Colorado Rockies using river profiles and incision records. Current position: PhD program at ASU.
37. Shufeldt, Owen, 2010, Crystal shear zone of Grand Canyon and detrital zircons of the turbidites in Grand Canyon. Current position: Senior Structural Geologist, Rio Tinto Iron Ore, Perth Australia.
38. McDermott, Jake, 2011, Microstructural, geochronological, and thermochronological evidence for both Paleo and Mesoproterozoic displacement across the Gniess Canyon shear zone, Lower granite Gorge, Grand Canyon, Arizona. Current position: Evironmental firm in New Jersey.
39. Nereson, Alex, 2012, Dynamic topography of the western Great Plains: Geomorphic and 40Ar/39Ar evidence for mantle-driven uplift associated with the Jemez lineament of NE New Mexico and SE Colorado Current position: PhD program at UC Davis.
40. Robertson, Jesse, 2014, Geomorphology of the Surprise Valley Landslide in Grand Canyon
41. Holland, Mark, 2015, An imbricate mid crustal suture zone: the Mojave-Yavapai province boundary in Grand Canyon, Arizona: UNM MS thesis, 2014, now in PhD program at UNM
42. Warnecke, Nadine, 2015, Timing of erosional episodes in the Marble Canyon and Vermillion Cliffs region from apatite (U-Th)/He thermochronology, UNM MS thesis 2015, now working for consulting company Sundance consulting.
43. Repasche, Marissa, 2016, Differential incision and neotectonic faulting along the Rio Grande, New Mexico, 2016.
44. Hrncir, Jeffrey, expected 2019, Gold deposits and crustal evolution of the Black Hills orogeny
45. Walk, Cory, 2018, Birth and Evolution of ther Virgin River
46. Holt, Benjamin, 2019, Geothermal potential of the Rico area, SW Colorado

47. Anderson, Jordan, 2020, Birth and Evolution of the Salt River, Arizona
48. Ferguson\*, Christina, 2019, Geochemistry of the Bouse Formation
49. Young, Daniel, 2019, mapping the Mazatzal- Picuris orogeny unconformity
50. Micael Albonico, 2021, Birth and Evolution of the San Juan River
51. Cameron Reed, expected 2023
52. John Bailey, 2024, Proterozoic Tectonic Evolution of the Lower Granite Gorge, Grand Canyon, Arizona: a middle crustal record of multiple orogenic pulses:
53. Jason Boryzewski, 2026, Tectonic sliver of the 1.84 Ga Elves Chasm Gneiss assembled during 1.73 Ga suturing in the Grand Canyon.

## **Ph.D. Dissertations supervised (\* = Co-advisor)**

1. Ilg, Brad R., 1996. Tectonic evolution of Paleoproterozoic rocks in the Grand Canyon: Insights into middle crustal processes, 101 p. Current position: Science Advisor to the Prime Minister of New Zealand
2. Pedrick, Jane N., 1996. Polyphase Proterozoic tectonometamorphic history of the Taos Range, northern New Mexico (co-supervised with Jeff Grambling), 146 p. Current position: Instructor at University of Iowa.
3. Thompson, Amy 1996, Deformational and metamorphic history around the 1.4 Ga Priest pluton, Manzano Mountains, New Mexico (co-supervised with Jeff Grambling).
4. Shaw, Colin, 2001, Genesis and evolution of Proterozoic crustal boundaries in the southern Rocky Mountains. Current position: Research Professor and Geology Field Camp Director, Department of Earth Sciences, Montana State University, Director, Office of Undergraduate Research, Montana State University
5. Timmons, J. Michael, 2004, Mesoproterozoic tectonic evolution of southwestern North America: protracted intracratonic deformation, sedimentation, and differential exhumation in Grand Canyon and the Rocky Mountain region. Current position: Director of NM Statemap Program, Assistant Director of the New Mexico Bureau of Geology, and Associate Professor at NM Tech.
6. Salem, Tony, 2009, Tectonics and structural geology of the Big Maria Mountains, southern California. Current position: Shell Exploration & Production Company
7. Crow, Ryan, 2012, Neotectonic evolution of Grand Canyon: Interaction between volcanism, river incision, epeirogenic uplift, and faulting; Current position: Mendenhal post-doc at USGS in Flagstaff.
8. Ricketts, Jason, 2014, Updated models on the evolution of the Rio Grande rift: Embryonic core complexes, fluid-enhanced Quaternary extension, and apatite (U-Th)/He constraints for large magnitude 18-15 Ma fault slip. Current position: Research Professor at University of Texas El Paso.
9. Doe\*, Michael, 2014, Reassessment of Paleo- and Mesoproterozoic basin sediments of Arizona: Implications for tectonic growth of southern Laurentia and global tectonic configurations: Colorado School of Mines PhD, co-supervised by KEK. Now a consultant.
10. Donahue, Magdalena Sandoval, 2016, Multi-stage uplift of the Rocky Mountains: new age constraints on the Telluride Conglomerate and regional compilation of apatite fission track ages;
11. Mulder\*, Jacob, 2017, visiting scholar from Tasmania on Endeavor Scholarship: Correlating Tasmanian and western US Mesoproterozoic successions
12. Holland, Mark, PhD 2018, Hf isotopes of Grand Canyon and Death Valley.
13. Winn, Carmen – PhD 2019, Thermochronology of the Grand Staircase, expected 2018.
14. Thacker, Jacob, PhD 2020, Laramide orogeny, time and space progression and implications for mechanisms.
15. Reed, Cameron, PhD expected 2026,

**Post-Doctoral students supervised**

1. Dr. Stephan Bergh— 1991-1993, Current position: professor at the University of Tromso, Norway, Professor at University of Tromso
2. Dr. Mathew Nyman- 1994-95, UNM, Current position: Faculty at Oregon State University
3. Dr. Steven Whitmeyer 2004-2006, Current position: Professor at James Madison University
4. Dr. Moustafa Selmi- 2012; Current position: Lecturer/ professor at University of Suez Canal in Egypt.
5. Dr. Ryan Crow- 2012-2014, Current position: Mendenhall post-doc with USGS (2014-2016)

## **COURSES REGULARLY TAUGHT AT UNM**

EPS 101 Physical Geology (once per year in Fall and part of the freshman Learning Communities Program )  
EPS 310 New Mexico Field Geology (once per year in Fall)  
EPS 307 and 307L Structural Geology and Lab (once per year in Spring)  
EPS 523 Topics in Tectonics—(every other year in Fall)  
EPS 526 Advanced Structural Geology (every other year in Spring)  
EPS 420/520 Advanced Field Geology (most summers).

## **PROFESSIONAL SERVICE**

Member of Editorial Board for PRECAMBRIAN RESEARCH, 1-90 to present  
Member New Mexico Geologic Mapping Advisory Board, 1995-present  
Steering Committee and workshop coordinator for U.S. Array (1999- 2002)  
Science editor for GSA Today, January 2000-2003  
Member Canadian Pan-Lithoprobe subcommittee (2000-2003)  
Member Earthscope Science and Education Committee (2002 – 2005)  
Compiler of southern Laurentia map for IGCP 440- Rodinia map project  
Australian Research Council (ARC) “expert of international standing”  
Science editor for GSA Bulletin, July 2004- December 2008  
Co-organizer of first EarthScope National meeting, March 29-32, 2005, Santa Ana Pueblo  
Trustee of the International Basement Tectonics Association, 2005 to 2009  
Distinguished Service Award from Geological Society of America (October, 2009)  
Fellow of the Geological Society of America, 2010- present  
Recipient of the 2011National Association for Interpretation Media Awards Competition—Ist place  
award for Wayside Exhibits: Grand Canyon’s Trail of Time Geoscience Exhibition  
Member of Nominating Committee for EarthScope Science Committee (2010-2013)  
Member of EarthScope USArray Advisory Committee (USAAC) (2010- 2014)  
Member of GSA Penrose metal nominating committee (2011-2014)  
Guest Associate Editor for Geosphere Themed Issue: CRevolution 2: Origin and Evolution of the  
Colorado River System (2012-2014)

Regular review of articles for numerous journals-3-10 per year  
Regular review of NSF proposals- 2-5 per year  
Served on numerous NSF panels  
Frequent GSA and AGU session chair

## **UNIVERSITY SERVICE**

Served on UNM Research Policy Committee  
Served on A&S Senior Promotion and Tenure Committee  
Served on A&S Curriculum Committee

## **DEPARTMENTAL SERVICE**

Served on and acted as chair of Graduate admission committee  
Served on Undergraduate committee  
Served on Alumni Relations Committee  
Served as Saw Room coordinator  
Served as Vehicle coordinator  
Co-Chair of Geophysics Search committee

## OUTREACH ACTIVITIES AND BROADER IMPACTS

2005 BBC series on Grand Canyon by Jonathan Fildes:

domestic versions at BBC World Service:

<http://www.bbc.co.uk/radio4/science/earthmadeforlife.shtml>

<http://www.bbc.co.uk/cgi-bin/worldservice/psims/ScheduleSDT.cgi>

web broadcasts: <http://www.bbc.co.uk/worldservice/programmes/discovery.shtml>

<http://www.bbc.co.uk/radio4/science/madeforlife.shtml>

The program “Pick of the Week” selected the Karlstrom-Timmons interview as one of the week’s highlights of BBC Radio from among 8 BBC stations available in the UK

2007 Discovery Channel- Fearless Planet- Grand Canyon (filming in October 07 for release in December 07.

2008-[Naked Science: Grand Canyon \[TV-G Ratings N/A\]](#)

<http://channel.nationalgeographic.com/channel/ET/popup/200802112000.html>

<http://channel.nationalgeographic.com/channel/ET/popup/200802112000.html>

filming in June 07 for release on Feb 11, 2008). *The Grand Canyon: Its one of the most famous natural wonders of the world, yet little is known about how it came to be. Now, NGC opens windows to the past to unearth some of this natural phenomena's secrets. Join experts as they uncover theories about the canyons iconic rock layers, and go back in time to relive the first expedition to its floor. Naked Science: Grand Canyon goes beyond a guided tour to explore the history and formation of this extraordinary place.*

2008 [Naked Science: The Rockies \[TV-G Ratings N/A\]](#) filming in Aug/Sept 07 for release on February 12,

2008).<http://channel.nationalgeographic.com/channel/ET/popup/200802112100.html>  
<http://channel.nationalgeographic.com/channel/ET/popup/200802112100.html>

*The Rocky Mountain range is the backbone of our continent, yet the forces that created it remain the cause of debate. Did the American Rockies rise at a faster rate than their Canadian counterpart? New evidence may suggest just that. And is glacier melt in the Canadian Rockies occurring at a faster rate than ever before? Naked Science: The Rockies meets with top scientists and examines a radical new theory to shed light on the mysteries of these ancient mountains.*

2010—Karlstrom and Crossey were PIs for the Trail of Time Exhibition Grand Canyon National Park, which opened October 13-11, 2010. This project helped convey connections between uplift of the Rockies and history of the Colorado River, was the culmination of 15 years of work, benefitted from advocacy from the Continental Dynamics Program, and now reaches about 5 million annual Park visitors with hands on informal geoscience education. The Exhibition won the 2011 award for “best wayside exhibit” from the National Association for Interpretation.

2010- Karlstrom was filmed for the geologic component of the Grand Canyon National Park Visitor Center Movie which now is shown every 30 minutes at the Visitor Center.

2010 Initiated at the 2010 Flagstaff workshop held at USGS, we are working on a Geosphere Special Volume entitled: "CRevolution 2: Origin and Evolution of the Colorado River System". Dennis Harry is acting as main Geosphere editor; Guest Associate Editors are Karl Karlstrom, Sue Beard, Dick Young, and Andres Aslan. So far there have been about 8 manuscript submittals and about 4 accepted papers, and we anticipate a nice volume of about 15-20 papers (deadline for submission is December 2012). We hope this volume will be as successful at promoting scientific dialog and

new advances as the Young and Spamer (2001) volume that summarized the 2000 Grand Canyon workshop, also held in Flagstaff.

2012 “KNME Connect” PBS TV filming in Albuquerque about Grand Canyon and the Rio Grande rift, with Karl Karlstrom and Laura Crossey, March, 2012, <http://www.newmexicopbs.org/connect/>, now broadcast several times on public television and available through their website.

2012 GSA Rocky Mountain section meeting—LJC was meeting chair, KEK was technical program chairman and fieldtrip leader. We held a session related to this grant entitled: T9. Cenozoic Landscape Evolution in the Rocky Mountains and Colorado Plateau: Deciphering the Interplay between Mantle Buoyancy and Surface Processes (GSA Geophysics Division; GSA Quaternary Geology & Geomorphology Division; GSA Sedimentary Geology Division; GSA Structural Geology & Tectonics Division). Conveners were Richard A. Young, Andres Aslan, Karl E. Karlstrom and Eric Kirby.

2012 We submitted an NSF highlight entitled: “Uplift of the Colorado Plateau and the Rockies, and carving of a young Grand Canyon (six million years old) driven by a restless Earth’s mantle” (submitted May, 2012)

2012/ 2013-- KEK, LJC, and Ryan Crow (KEK PhD student) were guest speakers for the March/April 2012 Grand Canyon Guides Training Session, an annual event designed to inform Grand Canyon boatman about current research and aid in their ongoing outreach efforts. KEK and LJC also participated in boatman training on the first half of the GTS training river trip.

2012 Crossey was filmed in a PBS documentary entitled : “Valles Caldera, the Science” that aired in early 2013 on PBS channels and won two Emmy awards; she discussed mantle influences on groundwater chemistry: <http://vallescalderadocumentary.com/part-one-the-science/>

2013 Geo Magazine (Germany) special issue on National Parks of USA, Grand Canyon photos by Karsten Peters, story by Lars Abromeit from our 2012 trip; GEO Special Nr. 1/2013 – National Parks USA, [http://www.geo.de/GEO/heftreihen/geo\\_special/geo-special-nationalparks-usa-74126.html](http://www.geo.de/GEO/heftreihen/geo_special/geo-special-nationalparks-usa-74126.html), and GEO, 2013, v. 11, p. 29-52, Nov 2013 (www.geo.de)

2013 Karlstrom is a collaborator on an NSF- TUES type-2 project (NSF – 1225741) awarded to ASU (PIs Steve Semken and Ariel Anbar) that is creating virtual fieldtrips for use in geoscience education at the 101 Intro level and for open- access use in public interpretation (Bruce et al., 2013); <http://vft.asu.edu/>

2013 co-convenor of a 2-day long GSA special session for Denver 2013 GSA, Oct 28,29, 2013; Title: CRevolution 2: Origin and evolution of the Colorado River system and Cenozoic landscape evolution of the Colorado Plateau-Rocky Mountain region: <http://community.geosociety.org/2013AnnualMeeting/sessions/special>

2013- Karlstrom was filmed for a documentary on the growth and assembly of the North American continent entitled: “North America Inside Out” (Discovery Channel’s Curiosity Series, January 2014).

2014 Feature article about our Colorado River work in Science News by Alexandra Witze: The Long and Winding Colorado: Science News, Jan 25, 2014, p. 22-26: <https://www.sciencenews.org/article/long-and-winding-colorado>

2014 Karlstrom et al., 2014 Nature Geoscience article: *Formation of the Grand Canyon 5 to 6 million years ago through integration of older palaeocanyons*, v. 7, p. 239-244 is in the 99th percentile for “online attention”; it is ranked 205th of the 80,347 tracked articles of a similar age in all

journals (<http://www.nature.com/ngeo/journal/v7/n3/ngeo2065/metrics>) with >40 news postings, including the following links to interviews, press releases, and articles as of May 2014:

Nell Greenfieldboyce- [National Public Radio Morning Edition](#)

<http://www.npr.org/2014/01/27/265437261/grand-canyon-may-be-older-and-younger-than-you-think>

Alendra Witze – Nature News

<http://www.nature.com/news/grand-canyon-is-not-so-ancient-1.14584>

Ashley Yeager- ScienceNews magazine

<https://www.sciencenews.org/blog/science-ticker/grand-canyons-origin-dated-6-million-years-ago>

John Amos- BBC News Science and Environment

<http://www.bbc.co.uk/news/science-environment-25881953>

Joel Achenbach- Washington Post

[http://www.washingtonpost.com/national/health-science/new-research-revives-debate-over-grand-canyons-age/2014/01/26/6da35f32-8539-11e3-9dd4-e7278db80d86\\_story.html](http://www.washingtonpost.com/national/health-science/new-research-revives-debate-over-grand-canyons-age/2014/01/26/6da35f32-8539-11e3-9dd4-e7278db80d86_story.html)

Sid Perkins- National Geographic Daily News

<http://news.nationalgeographic.com/news/2014/01/140126-grand-canyon-american-southwest-erosion-geology-geophysics/>

Richard Kerr- Science AAAS News

<http://news.sciencemag.org/earth/2014/01/grand-canyon-frankenstein>

Becky Oskin – Yahoo News

<http://news.yahoo.com/grand-canyon-39-age-mix-wild-west-180241469.html>

eScience Blurb- e! Science news

<http://esciencenews.com/sources/national.geographic/2014/01/26/unlocking.secrets.grand.canyons.age>

Phys.org Blurb- Phys.org

<http://phys.org/news/2014-01-grand-canyon.html>

Liz Fuller-Wright: Christian Science Monitor

[How old is the Grand Canyon? You might be surprised.](#)

Sarah Pruitt - [History.com](#)

<http://www.history.com/news/how-old-is-the-grand-canyon-thatdepends-scientists-say>

Canadian Broadcast Company, CBC radio with host Bob McDonald—Quirks and Quarks—interview aired on CBC and Serious XM radio February, 22, 2014-- <http://www.cbc.ca/quirks/episode/2014/02/22/february-22-2014/>

Albuquerque Journal Front Page <http://www.abqjournal.com/346998/news/origins-of-the-grand-canyon.html>

History Channel: <https://m.youtube.com/watch?fbclid=IwAR1swvpYWh2QcJOlkukY8chjaRNTb-WwhXO1JBZz18UTsxTelQzoMtIQ4Kc&v=LaxaE7tcwu4&feature=youtu.be>

2015 The Making of North America

2019

February 21-23, 2019 Grand Canyon Historical Society Meeting (gave talk- 150 years of visualizing geology)

February 28-March 1, 2019 Mapping Grand Canyon

March 1-3, 2019 Bouse Fm. drilling workshop for Lower Colorado River age and origin

April 18-20, 2019 Grand Canyon Geology and Geoscience Education Public Symposium 2019

September 14-21, 2019 GSA Thompson Field Forum I- Age and Carving of Grand Canyon- river symposium

September 22-25, 2019, Geological Society of America National Meeting in Phoenix, Pardee and 2 theme sessions

2020

October 11-17, 2020 Virtual Grand Canyon Geology Festival on Facebook (Geofest 2020)

<https://youtube.com/playlist?list=PL34-ozNGa7CTvjiu5-GeYEK5rrv33pDE>

2021

April 3-13, 2021 GC Field Forum II- The Grand Canyon Supergroup

September 11-21, 2021 GC Field Forum III- Vishnu basement rocks of Grand Canyon

November 9, 2021: AGI/NPS webinar speaker: Geoscience Research in National Parks: A Welcome and How-To. We had 310 registrants from higher education, government, consulting, research, and non-profit, and from about 23 countries around the world.

<https://www.americangeosciences.org/webinars/geoscience-research-national-parks>

<https://www.youtube.com/user/AmericanGeosciences/videos>

2022

April 1-11, 2022 GC Field Forum II- The Great Unconformity, Meso, Neoproterozoic and Grand Canyon Geology and Geoscience Education Second Public Symposium at the Park

September, 2022 GC Field Forum IV- Springs and Groundwater of Grand Canyon- river symposium

October 25-30 IUGS 60<sup>th</sup> anniversary meeting in Zumaia Spain: Two Grand Canyon sites approved as IUGS International Geoheritage Sites

Appeared in German TV documentary: <https://www.arte.tv/de/videos/097522-000-A/der-zauber-des-grand-canyon/>

2023