

Curriculum Vitae

Michael Elliot Smith

Professional address

School of Earth Sciences and Environmental Sustainability
Northern Arizona University
602 S Humphreys
Flagstaff, AZ 86011

Education

B.A. Geology, Carleton College, Northfield, MN [1999]
Field Camp, University of Wisconsin-Madison [1999]
M.S. Geology, University of Wisconsin-Madison [2002]
Ph.D. Geology, University of Wisconsin-Madison [2007]
Advisors: Alan R. Carroll and Brad S. Singer - Minor: Geography

Appointments

Assistant Professor, Northern Arizona University, Flagstaff, AZ [2014-present]
Associate Professor, Sonoma State University, Rohnert Park, CA [2013-2014]
Assistant Professor, Sonoma State University, Rohnert Park, CA [2007-2013]
Visiting Professor, University of Montana, Missoula, MT [2006-2007]
Visiting Instructor, Carleton College, Northfield, MN [Fall 2004]

Service

Search Chair, Natural Disasters Lecturer, Northern Arizona University (current)
Geology Graduate Committee, Northern Arizona University [2015-2017]
Chair, Sonoma State University General Education Subcommittee [2010-2014]
International Limnogeology Congress [2015-present]
Field trip leader: International Limnogeology Congress [Summer 2015]

Teaching

Northern Arizona University: 4 courses per year, including Sedimentology and Stratigraphy, Depositional Systems, Sedimentary Petrology, Basin Analysis, and both junior and senior-level Field Mapping courses.

Sonoma State University: 6 courses per year, including Sedimentary Geology, Field Mapping courses, Geology of Climate Change, Geologic Appl. of GIS, Introductory Geology, Disasters.

University of Montana: 4 courses per year, including Mineralogy-Petrology, Geomorphology, Geologic Appl. of GIS.

Carleton College: Sedimentary Geology.

Research Students

Northern Arizona University: (graduate students): Sam Werner, Rachel Krueger, Elizabeth Johnson, Katie Chapman, Greg Burr; (undergraduate students): Carolyn Box, Kai Smith-Crain, Kiley Sheehan.

Sonoma State University: (undergraduate students): Jason Hoefler, Sam Werner, Rebekah Cesmat, Tracy Riedel, Devon Jorgenson, Carley Dunleavy, Russel DiFiori, Chris Davidson, Chase Glenister, Natalia Chavez, Andrew Canada, Emily White, Erin Hoxsie.

Publications

2017

- Lowenstein, T.K., Jagniecki, E.A., Carroll, A.R., Smith, M.E., Renaut, R.W., Owen, R.B. (in review) The Green River salt mystery: What was the source of the hyperalkaline lake waters? *Earth Science Reviews*.
- Smith, M.E., Finnegan, N.J., Mueller, E.R., and Best, R.J. (in review) Terrestrial bedrock controls submarine canyon occurrence: *Nature*.
- Smith, M.E., Cassel, E.J., Jicha, B.J., Singer, B.S., Canada, A. (in review) Hinterland drainage closure and lake formation in response to middle Eocene Farallon slab removal, Nevada, U.S.A., *Earth and Planetary Science Letters*.
- Leary, R., Umhoefer, P.J., Smith, M.E., Riggs, N.R. (in revision) A three-sided orogen: a new tectonic model for Ancestral Rocky Mountain uplift and basin development, *Geology*.

2016

- Mueller, E.M., Smith, M.E., and Pitlick, J., 2016, Lithology-controlled evolution of stream bed sediment and basin-scale sediment yields in adjacent mountain watersheds, Idaho, USA: *Earth Surface Processes and Landforms*, v. 41, p. 1869-1883.

2015

- Smith, M.E. and Carroll, A.R., 2015, Introduction to the Green River Formation, in Smith, M.E. and Carroll, A.R., eds., *Stratigraphy and Paleolimnology of the Green River Formation, Western USA*: Springer, p. 1-12.
- Norsted, B.A., Carroll, A.R., and Smith, M.E., 2015, Initiation of Eocene lacustrine sedimentation in the Greater Green River Basin: Luman Member of the Green River Formation, in Smith, M.E. and Carroll, A.R., eds., *Stratigraphy and Paleolimnology of the Green River Formation, Western USA*: Springer, p. 13-30.
- Graf, J.W., Carroll, A.R., Smith, M.E., 2015, Lacustrine sedimentology, stratigraphy and stable isotope geochemistry of the Tipton Member of the Green River Formation, in Smith, M.E. and Carroll, A.R., eds., *Stratigraphy and Paleolimnology of the Green River Formation, Western USA*: Springer, p. 31-60.
- Smith, M.E., Carroll, A.R., Scott, J.J., 2015, Stratigraphic expression of climate, tectonism, and geomorphic forcing in an underfilled lake basin: Wilkins Peak Member of the Green River Formation, in Smith, M.E. and Carroll, A.R., eds., *Stratigraphy and Paleolimnology of the Green River Formation, Western USA*: Springer, p. 61-102.
- Scott, J.J., Smith, M.E., 2015, Trace fossils of the Eocene Green River lake basins, Wyoming, Utah, and Colorado, in Smith, M.E. and Carroll, A.R., eds., *Stratigraphy and Paleolimnology of the Green River Formation, Western USA*: Springer, p. 311-348.
- Smith, M.E., Jicha, B.R., Carroll, A.R., Cassel, E.J., and Scott, J.J., 2015, Paleogeographic record of Eocene Farallon slab rollback beneath western North America: Reply to Discussion: *Geology*, v. 43, p. e364.

2014

- Smith, M.E., Jicha, B.R., Carroll, A.R., Cassel, E.J., and Scott, J.J., 2014, Paleogeographic record of Eocene Farallon slab rollback beneath western North America: *Geology*, v. 42, p. 1039-1042.
- Smith, M.E., Carroll, A. R., Scott, J.J., and Singer, B.S., 2014, Early Eocene carbon isotope excursions and landscape destabilization at eccentricity minima: Green River Formation of Wyoming: *Earth and Planetary Science Letters*, v. 403, p. 393-406.

2013

- Aswasereelert, W., Meyers, S.R., Carroll, A.R., Peters, S.E., Smith, M.E., and Feigl, K.L., 2013, Integrated macrostratigraphy and cyclostratigraphy of Eocene lacustrine strata, Wilkins Peak Member of the Green River Formation, Wyoming: *Geological Society of America Bulletin*, v. 125, p. 216-228.

2011

- Smith, M.E., Singer, B.S., Simo, T., 2011, A time like our own? Radioisotopic calibration of the Ordovician greenhouse to icehouse transition: *Earth and Planetary Science Letters*, v. 311, p. 364-374.

2010

- Smith, M.E., Chamberlain, K.R., Singer, B.S., and Carroll, A.R., 2010, Eocene clocks agree: Coeval $^{40}\text{Ar}/^{39}\text{Ar}$, U-Pb, and astronomical ages from the Green River Formation: *Geology*, v. 38, p. 527-530.
- Carroll, A.R., Graham, S.A., Smith, M.E., 2010, Walled sedimentary basins of China: *Basin Research*, v. 22, p. 17-32.

2008

- Smith, M.E., Carroll, A.R., and Mueller, E.R., 2008, Elevated weathering rates in the Rocky Mountains during the Early Eocene Climatic Optimum: *Nature-Geoscience*, v. 1, p. 370-374.
- Smith, M.E., Singer, B.S., Carroll, A.R., and Fournelle, J.H., 2008, Precise dating of biotite in distal volcanic ash: isolating subtle alteration using $^{40}\text{Ar}/^{39}\text{Ar}$ laser incremental heating and electron microprobe techniques: *American Mineralogist*, v. 93, p. 784-795.
- Smith, M.E., Carroll, A.R., and Singer, B.S., 2008, Synoptic reconstruction of a major ancient lake system: Eocene Green River Formation, Western United States: *Geological Society of America Bulletin*, v. 12, p. 54-84.
- Carroll, A.R., Doebbert, A.C., Booth, A.L., Chamberlain, C.P., Rhodes-Carson, M.K., Smith, M.E., Johnson, C.M., Beard, B.L., 2008, Capture of high-altitude precipitation by a low-altitude Eocene lake, western U.S., *Geology*, v. 36, p. 791-794.

2006

- Smith, M.E., Singer, B.S., Carroll, A.R., and Fournelle, J.H., 2006, High-resolution calibration of Eocene timescales: $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology of biotite in the Eocene Green River Formation: *Geology*, v. 34, p. 393-396.
- Secord, R., Gingerich, P.D., Smith, M.E., and Wilf, P., Singer, B.S., 2006, Geochronology and mammalian biostratigraphy of middle and upper Paleocene continental strata, Bighorn Basin, Wyoming: *American Journal of Science*, v. 306, p. 211-245.
- Carroll, A.R., Chetel, L., and Smith, M.E., 2006, Feast to Famine: Sediment Supply Control on Laramide Basin Fill: *Geology*, v. 34, p. 197-200.

2005

- Wilf, P., Johnson, K. Cuneo, N.R., Smith, M.E., Singer, B.S., and Gandolfo, M.A., 2005, Eocene Plant Diversity at Laguna del Hunco and Rio Pichileufu, Patagonia, Argentina: *The American Naturalist*, v. 165, p. 634-650.

2004

- Smith, M.E., Singer, B.S., Carroll, A.R., 2004, Reply: $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology of the Green River Formation, Wyoming: *Geological Society of America Bulletin*, v. 116, no. 1, p. 253-256.

2003

- Smith, M.E., Singer, B.S., Carroll, A.R., 2003, $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology of the Green River Formation, Wyoming: *Geological Society of America Bulletin*, v. 115, p. 549-565.
- Pietras, J.T., Carroll, A.R., Singer, B.S., and Smith, M.E., 2003, 10 k.y. depositional cyclicity in the early Eocene: Stratigraphic and $^{40}\text{Ar}/^{39}\text{Ar}$ evidence from the lacustrine Green River Formation: *Geology*, v. 31, p. 593-596.

Grant Funding

- Funded National Science Foundation-Tectonics proposal [2013-16] Collaborative Research: Paleogeographic record of contractional to extensional tectonics in the Cordilleran hinterland, Nevada.
- Funded NSF proposal [2002-2006] Quantifying the temporal evolution of Eocene Lake Gosiute: Primary graduate proposal author & student researcher with PIs Dr. Brad Singer & Alan Carroll.
- Northern Arizona Faculty Grants Program Recipient [2015]
- GSA Research Grant [2002]
- AAPG Research Grant [2001]
- GSA Research Grant [2000]
- Sigma Xi Research Grant [2000]

Honors & Awards

Sonoma State University Summer Research Fellowship [2011, 2013]
Baily Distinguished Graduate Student Fellowship [2005-2006]
UW-Madison Geology and Geophysics Best Student Paper Award [2003, 2008]
N.A.G.T. Summer Field Training Program, Nominated [1999]
National Merit Scholarship, Carleton College [1995-1999]

Invited Talks

Loma Linda University, 2016; International Limnogeology Congress, 2015; University of Idaho, 2015; Oregon State University, 2014; Northern Arizona University, 2014; University of California, Santa Cruz, 2013; Stanford University, 2009; Sonoma State University, 2006; Chico State University, 2006

Conference Abstracts - student authors underlined

- Smith, M.E., Finnegan, N.J., Mueller, E.R., 2016, Terrestrial geology and catchment slope promote submarine canyon headwall incision. *GSA 2016 Annual Meeting Abstract*.
- Burr, G.L.E., Smith, M.E., Umhoefer, P.J., 2016, Provenance of Desmoinesian to early Wolfcampian strata in the Paradox and Eagle basins, Ancestral Rocky Mountains. *GSA 2016 Annual Meeting Abstract*.
- Johnson, E.A., Gianniny, G.L., Smith, M.E., Umhoefer, P.J., 2016, A photogrammetric reevaluation of shared accommodation caused by bioherm occurrence in the Desmoinesian Hermosa Group, Paradox Basin, Utah. *GSA 2016 Annual Meeting Abstract*.
- Krueger, R., Smith, M.E., 2016, Provenance-calibrated fluvial response to warming during the early Eocene climatic optimum, Bridger basin, Wyoming. *GSA 2016 Annual Meeting Abstract*.
- Cassel, E.J., Smith, M.E., Canada, A.C., Stockli, D.F., 2016, A multi-proxy study of topography and sediment provenance across the Eocene Cordilleran hinterland. *GSA 2016 Annual Meeting Abstract*.
- Werner, S.H., Smith, M.E., 2016, Linking the land to the sea: Tracking fluvial bedload from coastal watersheds to Delgada submarine canyon, northern California. *GSA 2016 Annual Meeting Abstract*.
- Hammond, A.P., Carroll, A.R., Smith, M.E., Lowenstein, T.K., 2016, Was Colorado Mineral Belt volcanism responsible for sodium-carbonate deposits in the Green River Formation? *GSA 2016 Annual Meeting Abstract*.
- Leary, R.J., Umhoefer, P.J., Smith, M.E., Riggs, N.R., 2016, A three-sided orogeny: A new tectonic model for Ancestral Rocky Mountain uplift and basin development. *GSA 2016 Annual Meeting Abstract*.
- Chapman, K., Parnell, R., Smith, M.E., Grams, P.E., Mueller, E.R., 2016, Evaluating the effectiveness and long-term sustainability of experimental floods on the Colorado River in the Marble Canyon reach of Grand Canyon, AZ. *GSA 2016 Annual Meeting Abstract*.
- Canada, A.S., Cassel, E.J., Stockli, D.F., Smith, M.E., Jicha, B.R., Singer, B.S., 2016, Early Cenozoic extension and accommodation in the Basin and Range: Implications from apatite and zircon double dating. *GSA 2016 Annual Meeting Abstract*.
- Carroll, A.R., Smith, M.E., 2016, Lake deposits as archives of continental-scale landscape evolution: Examples from the Eocene Green River Formation. *GSA 2016 Annual Meeting Abstract*.
- Chapman, K., Parnell, R., Smith, M., Grams, P., Mueller, 2015, Use of Composite Fingerprinting Technique to Determine Contribution of Paria River Sediments to Dam-Release Flood Deposits in Marble Canyon, Grand Canyon, AZ. *AGU 2015 Annual Meeting Abstract*.
- Cassel, E.J., Smith, M.E., Canada, A.C., Stockli, D., Brecker, D., 2015, The Paleogene Evolution of the Cordilleran Hinterland. *AGU 2015 Annual Meeting Abstract*.
- Canada, A.C., Cassel, E.J., Smith, M.E., Stockli, D., Jicha, B.J., Singer, B.S., 2015, Insights into the Tectonic Evolution of the North American Cordilleran Hinterland from Detrital Zircon Double Dating of the Eocene Elko Formation. *AGU 2015 Annual Meeting Abstract*.

- Smith, M.E., Cassel, E.J., Canada, A.C., Jicha, B.J., Singer, B.S., 2015, A Major Eocene Lake System in the Hinterland of the North American Cordillera Comes into Geochronologic Focus. *AGU 2015 Annual Meeting Abstract*.
- Smith, M.E., Cassel, E.J., Jicha, B.J., Singer, B.S., Carroll, A.R., 2014, Eocene lake basins in Wyoming and Nevada record rollback of the Farallon flat-slab beneath North America. *AGU 2014 Annual Meeting Abstract*.
- Jorgenson, D., Dunleavy, C., Smith, M.E., 2014, Morphology and Sediment Transport Dynamics of a Trough-Blowout Dune, Bodega Marine Reserve, Northern California. *AGU 2014 Annual Meeting Abstract*.
- Smith, M.E., Carroll, A.R., Jicha, B.J., Cassel, E.J., Scott, J.J., Paleogeographic record of Eocene Farallon slab rollback beneath North America. *GSA 2014 Annual Meeting Abstract*.
- Scott, J.J., Dutchak, A.R., Plante, K.E., Maybury, B.R.P., Smith, M. E., 2014, “Algal heads” and travertine on the southern lake margin of the Eocene Green River Formation, Wyoming and Colorado. *GSA 2014 Annual Meeting Abstract*.
- Cassel, E.J., Breeker, D.O., Smith, M.E., Henry, C.D., 2014, Quantifying paleoelevations using hydrated volcanic glass. *GSA 2014 Annual Meeting Abstract*.
- Maybury, B.R.P., Scott, J.J., Plante, K.E., Smith, M. E., 2014, Tuffaceous microbial mat marker bed, Green River Formation, Wildhorse Draw, Wyoming, constrains timing of silicification in spring mound horizon to ~50 Ma. *GSA 2014 Annual Meeting Abstract*.
- Plante, K.E., Scott, J.J., Maybury, B.R.P., Smith, M. E., 2014, Syndepositional doming and development of a large hydrothermal spring deposit in the Green River Formation, Wildhorse Draw, Wyoming. *GSA 2014 Annual Meeting Abstract*.
- Smith, M.E., Carroll, A.R., Scott, J.J., 2013, Eccentricity-driven carbonate-siliciclastic alternation within the Early Eocene Wilkins Peak Member of the Green River Formation in Wyoming. *GSA 2013 Annual Meeting Abstract*.
- Mueller, E.R., Smith, M.E., Pitlick, J., 2012, Using stream sediment lithology to explore the roles of abrasion and channel network structure in shaping downstream sediment yields, *AGU 2013 Annual Meeting Abstract*.
- Cesmat, R., Werner, S., Smith, M.E., Riedel, T., Best, R., Olyarnik, S., 2012, Quantifying the effects of European beach grass on aeolian sand transport over the last century: Bodega Marine Reserve, California, *AGU 2012 Annual Meeting Abstract*.
- Smith, M.E., Singer, B.S., and Simo, T., 2011, Tiered interpolation of radioisotopic and biostratigraphic geochronology resolves the tempo of the Ordovician greenhouse to icehouse transition. *GSA 2011 Annual Meeting Abstract*.
- Davidson, C., DiFiori, R., Smith, M.E., Mueller, E.R., 2011, From Kings Peak to the Delgado submarine canyon: Tracking littoral inputs to the deep sea at the Mendocino Triple Junction, California. *AGU 2011 Annual Meeting Abstract*.
- Smith, M.E., Carroll, A.R., 2011, Resolving tectonic, climatic, and geomorphologic signatures in the Eocene Green River Formation, Western U.S. *AGU 2011 Annual Meeting Abstract*.
- Smith, M.E., Scott, J.J., and Carroll, A.R., 2009, Weathering, springs, and the origin of Na-evaporites in the Early Eocene Green River Formation: *GSA 2009 Annual Meeting Abstract*.
- Smith, M.E., Chamberlain, K., Singer, B.S., and Carroll, A.R., 2009, Coeval $^{40}\text{Ar}/^{39}\text{Ar}$, U-Pb, and astronomical clocks in the Early Eocene: *GSA 2009 Annual Meeting Abstract*.
- Hoefler, J., Smith, M.E., and Mueller, E.R., 2009, Tracking the downstream fate of diverse lithologies in modern fluvial systems, Northern Rocky Mountains, Idaho: *GSA 2009 Annual Meeting*.
- Mueller, E.R., Pitlick, J., and Smith, M.E., 2008, Lithologic and hydraulic controls on network-scale variations in sediment yield: Big Wood and North Fork Big Lost Rivers, Idaho, *AGU Annual Meeting*.
- Smith, M.E., Carroll, A.R., 2007, High denudation rates in the Eocene Rocky Mountains: A record from evaporites and alluvium in the Green River Formation of Wyoming, International Limnogeology Congress Meeting, Barcelona, Spain, July 11th-14th.
- Smith, M.E., Carroll, A.R., 2007, Temporal Evolution of Eocene Paleohydrology in the Laramide Foreland, Western U. S., International Limnogeology Congress, Barcelona, July 11-14.

- Smith, M.E., Carroll, A.R., 2007, Complex High-Resolution Lacustrine Record of Laramide Tectonism: Green River Formation, Wyoming, AAPG Annual Meeting, Long Beach, CA.
- Smith, M.E., Carroll, A.R., Singer, B.S., 2006 High weathering rates and episodic regional deformation in the Eocene Rocky Mountains: A record from evaporites in the Green River Formation of Wyoming, AGU Annual Meeting.
- Smith, M.E., Carroll, A.R., 2005, Fine-scale stratigraphic and temporal calibration of orogenic strata adjacent to the Uinta Uplift using the Wilkins Peak Member of the Green River Formation, *Geological Society of America Abstracts with Programs*, v. 38, No. 5.
- Smith, M.E., Singer, B.S., and Carroll, A.R., 2005, On the $^{40}\text{Ar}/^{39}\text{Ar}$ age of biotite in Green River Formation ash: The advantages of incrementally heating single crystals with a laser: Goldschmidt 2005 Conference in Moscow, ID.
- Carroll, A.R., Graham, S.A., and Smith, M.E., 2005, Aridity and the evolution of closed basins in Asia: *Geological Society of America Abstracts with Programs*, v. 37, No. 5.
- Smith, M.E., Carroll, A.R., Singer, B.S., 2004, 8 m.y. of Eocene Lake Strata Surrounding the Uinta Uplift: $^{40}\text{Ar}/^{39}\text{Ar}$ Temporal Constraints on Uplift, Subsidence, and Paleohydrology in the Laramide Foreland [abs.]: *Eos. Trans. AGU*, 85(47) Fall Meet. Suppl., Abstract T51D-07.
- Carroll, A.R., Graham, S.A., and Smith, M.E., 2004, Walled Sedimentary Basins of China: Perpetrators or Victims of Plateau Growth? [abs.]: *Eos. Trans. AGU*, 85(47) Fall Meet. Suppl., Abstract T31B-1303.
- Smith, M.E., Secord, R., Wilf, P., Gingerich, P.D., and Singer, B.S., 2004, New radioisotopic age control on late Paleocene continental strata: implications for the age of Chron 26N: *Geological Society of America Abstracts with Programs*, v. 36, Paper No. 192-8.
- Smith, M.E., Carroll, A.R., Singer, B., 2003, Correlation of Lacustrine Strata across the Uinta Uplift using $^{40}\text{Ar}/^{39}\text{Ar}$ Geochronology [abs.]: Third International Limogeology Congress (ILIC3), Tuscon, Arizona, March 29 - April 2.
- Pietras, J.T., Smith, M.E., Carroll, A.R., Singer, B.S., 2002, Direct measurement of depositional cyclicity using $^{40}\text{Ar}/^{39}\text{Ar}$ dating; a 430 thousand year record from Eocene Lake Gosiute: *Geological Society of America Abstracts with Programs*, v. 34, no. 6, p. 479.
- Carroll, A.R., Smith, M.E., Pietras, J.T., Rhodes, M.K., Singer, B.S., 2002, Accumulation rates in ancient lakes; relationship to lake type evolution of the Green River Formation, Wyoming: *Geological Society of America Abstracts with Programs*, v. 34, no. 6, p. 479.
- Bohacs, K.M., Carroll, A.R., Pietras, J.T., Rhodes, M.K., Smith, M.E., 2002, Evolution of the Great Lakes system of the Green River Formation; tectonically & topographically conditioned records of climate change, *Geological Society of America Abstracts with Programs*, v. 34, no. 6, p 478-479.
- Carroll, A.R., Smith, M.E., Singer, B.S., Pietras, J.T., 2001, Laser Fusion $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology and cyclostratigraphy of the Green River Formation: Testing micro- and meso- scale climate forcing [abs.]: *Eos. Trans. AGU*, 82(47), Fall Meet. Suppl., Abstract T21D-08.
- Smith, M.E., Singer, B.S., Carroll, A.R., 2001, Precise $^{40}\text{Ar}/^{39}\text{Ar}$ laser fusion geochronology of the Green River Formation, Wyoming: *Geological Society of America Abstracts with Programs*, v. 33, no. 6, p. 79.
- Carroll, A.R., Smith, M.E., Singer, B.S., Pietras, J.T., 2000, Deposition, alteration and crystallinity of Eocene tuffs of the Green River Formation, Wyoming and Utah: *Geological Society of America Abstracts with Programs*, v. 32, no. 7, p. 459.