

Gregory E. Maurer

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Jornada Basin LTER
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Research and professional interests

I am a broadly trained ecologist with well-developed quantitative and informatics skills. As a scientist I investigate terrestrial biogeochemistry and ecohydrology, particularly the effects of climate, global change, and disturbance on vegetation and soil systems. As a data analyst and data manager I'm competent using a wide variety of methods and technologies to create, communicate, and publish impactful research under an open-science philosophy. My chief professional aims are to understand, and raise awareness of, the earth and its ecosystems, and to inform critical resource management and conservation efforts.

Academic positions

Data Scientist and LTER Information Manager **May 2019–present**

Jornada Basin Long-term Ecological Research Program, New Mexico State University, Las Cruces, NM

Postdoctoral Scientist: **September 2016–May 2019**

Dept. of Environmental Science, Policy, and Management, University of California, Berkeley, CA

Postdoctoral Scientist: **August 2014–September 2016**

Department of Biology, University of New Mexico, Albuquerque, NM

Education

Ph.D., Biology, University of Utah, May 2014

B.S., cum laude, Biological Sciences, University of Alaska Fairbanks, 2001

Certifications

The Carpentries Instructor Certification, 2021

Certificate in Applied Geographic Information Science, University of Utah, 2007

Selected coursework:

Advanced Topics in Deep Learning for Image Processing, New Mexico State University/USDA ARS, 2021

Introduction to Image Processing, Classical Machine Learning, and Deep Learning, New Mexico State University/USDA ARS, 2021

Ameriflux Data and Tech Workshop, Lawrence Berkeley National Lab, 2015

Radiocarbon in Ecology and Earth System Science, University of California, Irvine, 2008

Peer-reviewed publications

(see also <http://greg.pronghorns.net/publications.html>)

- Maurer, G.E.**, A.J. Hallmark, R.F. Brown, S.L. Collins, O.E. Sala. Sensitivity of primary production to precipitation across the United States. *Ecology Letters*. <https://dx.doi.org/10.1111/ele.13455>
- Oerter, E.J., J.V. Mills, **G.E. Maurer**, L.N. Lammers, R.G. Amundson. 2018. Greenhouse gas production and transport in desert soils of the southwestern USA. *Global Biogeochemical Cycles*. <https://doi.org/10.1029/2018GB006035>
- Rudgers, J.A., Y.A. Chung, **G.E. Maurer**, D.I. Moore, E.H. Muldavin, Collins, S.L. 2018. Climate sensitivity functions and net primary production: A framework for incorporating changes in climate mean and variability. *Ecology*. <https://doi.org/10.1002/ecy.2136>
- Morillas, L., R.E. Pangle, **G.E. Maurer**, W.T. Pockman, N.G. McDowell, C-W Huang, D.J. Krofcheck, A.M. Fox, R.L. Sinsabaugh, T.A. Rahn, M.E. Litvak. 2017. Tree mortality decreases water availability and ecosystem resilience to drought in piñon-juniper woodlands in the southwestern U.S. *JGR Biogeosciences*. <https://doi.org/10.1002/2017JG004095>
- Biederman, J.A., R.L. Scott, T. Bell, D.R. Bowling, S. Dore, J. Garatuza-Payan, T.E. Kolb, P. Krishnan, D.J. Krofcheck, M.E. Litvak, **G.E. Maurer**, T.P. Meyers, W.C. Oechel, S.A. Papuga, G.E. Ponce-Campos, J.C. Rodriguez, W.K. Smith, R. Vargas, C.J. Watts, E.A. Yepez, M.L. Goulden. 2017. CO₂ exchange and evapotranspiration across dryland ecosystems of southwestern North America. *Global Change Biology*. <https://doi.org/10.1111/gcb.13686>
- Maurer, G.E.**, A.M. Chan, N.A. Trahan, D.J.P. Moore, and D.R. Bowling. 2016. Carbon isotopic composition of forest soil respiration in the decade following bark beetle and stem girdling disturbances in the Rocky Mountains. *Plant, Cell, & Environment*, 39: 1513–1523. <https://doi.org/10.1111/pce.12716>
- Biederman, J.A., R.L. Scott, M.L. Goulden, R. Vargas, M.E. Litvak, T.E. Kolb, E.A. Yepez, W. C. Oechel, P.D. Blanken, T.W. Bell, J. Garatuza-Payan, **G.E. Maurer**, S. Dore, S.P. Burns. 2016. Terrestrial carbon balance in a drier world: the effects of water availability in southwestern North America. *Global Change Biology*. <https://doi.org/10.1111/gcb.13222>
- Maurer, G.E.**, and D.R. Bowling. 2014. Dust effects on snowpack melt and related ecosystem processes are secondary to those of forest canopy structure and interannual snowpack variability, *Ecohydrology*, 8: 1005–1023. <https://doi.org/10.1002/eco.1558>
- Hall, S.J., **G.E. Maurer**, S.W. Hoch, R. Taylor, D.R. Bowling. 2014. Impacts of anthropogenic emissions and cold air pools on urban to montane gradients of snowpack ion concentrations in the Wasatch Mountains, Utah. *Atmospheric Environment*, 98: 231–241. <https://doi.org/10.1016/j.atmosenv.2014.08.076>
- Maurer, G.E.** and D.R. Bowling. 2014. Seasonal snowpack characteristics influence soil temperature and water content at multiple scales in interior western U.S. mountain ecosystems, *Water Resources Research*, 50: 5216–5234. <https://doi.org/10.1002/2013WR014452>
- Ruess, R.W., R.L. Hendrick, A.J. Burton, K. S. Pregitzer, B. Sveinbjornsson, M.F. Allen, **G.E. Maurer**. 2003. Coupling fine root dynamics with ecosystem carbon cycling in black spruce forests of interior Alaska, *Ecological Monographs*, 74: 643–662. <https://doi.org/10.1890/02-4032>

Reports and white papers

- Gries, C., S. Beaulieu, R.F. Brown, S. Elmendorf, H. Garritt, G. Gastil-Buhl, H. Hsieh, L. Kui, M. Martin, G. Maurer, A.T. Nguyen, J.H. Porter, A. Sapp, M. Servilla, and T.L. Whiteaker. 2021. Data Package Design for Special Cases ver 1. Environmental Data Initiative. <https://doi.org/10.6073/pasta/9d4c803578c3fbc45fc23f13124d052>

Publications in preparation or review

- Maurer, G.E., J.V. Mills, E.J. Oerter, R.G. Amundson, L.N. Lammers. Measured and modeled soil carbon cycling in the Mojave desert: toward projected regional greenhouse gas budgets. (in prep)
- Maurer, G.E., J.V. Mills, R.G. Amundson, L.N. Lammers. Contrasting climate responses of ecosystem carbon uptake and efflux along seasonal and topographic gradients in the Mojave Desert (in prep)
- Maurer, G.E. and D.R. Bowling. Forest soil carbon stocks and isotopic composition along mountain climate gradients of the interior western United States. (in prep for *Ecosystems*)

Grants and fellowships

- UU Graduate School and Dept. of Biology travel funding (AGU Fall meeting), 2012
- ASUU and Dept. of Biology travel funding (AGU Fall Meeting), 2011
- UU Global Change and Sustainability Center Research Grant, 2011
- NSF Research Experience for Undergraduates (publication above), 1999

Conference activity

Presentations and posters

- ESA Annual Meeting 2020 – Systematic variations in the contribution of rainfall-driven soil respiration pulses to soil carbon cycling in North American deserts (Poster)
- AGU Fall Meeting 2018 – The contribution of ephemeral, moisture-driven soil respiration pulses to soil carbon cycling in the Mojave Desert (Poster)
- AGU Fall Meeting 2017 – Sensitivity and asymmetry of NPP in response to climate variability across the conterminous United States (Talk)
- AGU Fall Meeting 2017 – Modeled and measured carbon cycling in Mojave Desert soils: toward present and projected greenhouse gas budgets for arid regions (Poster)
- AGU Fall Meeting 2015 – Seasonal precipitation and deep soil moisture recharge as competing drivers of carbon and water fluxes across a gradient of semi-arid ecosystems. (Poster)
- AmeriFlux Principal Investigators Meeting 2015 – Seasonal and interannual variability in available water and coupled CO₂, H₂O, and energy fluxes along the New Mexico Elevation Gradient. (Poster)
- AGU Fall Meeting 2014 – Soil carbon cycle ¹³C responses in the decade following bark beetle and stem girdling forest disturbance. (Poster)
- AGU Fall Meeting 2013 – Dust and canopy effects on snowpack melt and ecosystem processes in a Utah subalpine forest. (Poster)
- Fusion seminar (UU Biology Dept. Fall 2012) – The Weather Underground: The influence of seasonal snowcover on soil temperature and water content in the western U.S. (Talk)
- AGU Fall Meeting 2012 – Sensitivity of soil temperature and soil moisture to seasonal snowpack variability in western U.S. mountain ecosystems. (Talk)
- AGU Fall Meeting 2011 – Sources of variability in winter soil temperature moderation by mountain snowpacks. (Poster)
- AGU Fall Meeting 2010 – Influence of dust deposition on snowpack melt rate and ecohydrological processes in a subalpine forest. (Talk)

Sessions organized

Emerging best-practices for publishing non-tabular, complex, and special-case ecological datasets. ESIP Summer Meeting 2021. Co-organized with Renée Brown and Corinna Gries.

Teaching and mentoring

Instructor of record

Microbiology Lab, Biology 2310L, School of Math Science and Engineering, Central New Mexico Community College. Fall 2020 (online/asynchronous).

Biology Lab for Health Science Majors, Biology 1140L, School of Math, Science and Engineering, Central New Mexico Community College. Spring 2020

Microbiology Lab, Biology 2310L, School of Math Science and Engineering, Central New Mexico Community College. Spring 2020 (partial term).

Microbiology Lab, Biology 2192, School of Math Science and Engineering, Central New Mexico Community College. Spring 2019.

Biology Lab for Health Science Majors, Biology 1492, School of Math, Science, and Engineering, Central New Mexico Community College. Fall 2018 (2 sections).

Plant Identification, Red Butte Garden and Arboretum, University of Utah. 2007 & 2008.

Teaching assistant positions at University of Utah, Dept. of Biology:

Evolution and Diversity of Life, Biology 2010, Drs. Lynn Bohs & Franz Goller. Spring 2012

Biophysical Ecology, Biology 5495, Dr. David Bowling. Fall 2011

Ecosystem Ecology, Biology 5490, Dr. David Bowling. Fall 2010

Evolution and Diversity of Life, Biology 2010, Drs. Lynn Bohs & David Carrier. Spring 2010

Comparative Vertebrate Morphology, Biology 3310, Dr. Colleen Farmer. Fall 2009

Evolution and Diversity of Life, Biology 2010, Drs. John Sperry and David Carrier. Spring 2009

Ecosystem Ecology, Biology 5490, Dr. David Bowling. Fall 2008

Plant Ecology, Biology 5460, Dr. James Ehleringer. Fall 2007

Software & Data Carpentry workshops

STEM Advancement Program Python workshop at New Mexico EPSCoR (online). Instructor. June 2022

Data carpentry for environmental scientists at Jornada Basin LTER and NMSU (online). Organizer and instructor. March 2022

Data Carpentry for Ecology at UNM Sevilleta Field Station. Instructor. June 2021 and 2022

Students mentored:

2022: Kyle Gallant (Sevilleta REU), Brianda Hernandez-Rosales (EDI Data fellow)

2013: Lori Long (Undergraduate student, Univ. of Utah)

2012: Tasha Heilweil (High school student, Univ. of Utah)

2011: Richard Malyn, Davis Unruh (high school student, Univ. of Utah)

2010: Raili Taylor (undergraduate at Univ. of Utah)

Service to profession

Co-chair, LTER Network Information Management Executive Committee **2021-present** (member since 2020)

Associate editor for *Ecological Informatics* **2021-present**

Reviewer for: *BioScience* (1), *Global Change Biology* (2), *Climatic Change* (1), *Ecological Applications* (1), *Oecologia* (1), *Plant Ecology* (2), *Trends in Ecology and Evolution* (1)

NSF Panelist

Full academic and research experience

Data Scientist and LTER Information Manager **May 2019–present**

Jornada Basin Long-term Ecological Research Program, New Mexico State University, Las Cruces, NM

- Manage and publish research data collected by the Jornada Basin LTER program, in collaboration with scientists and data managers in the LTER network. Develop and manage a data science program that will generate new ecological research products, enhance existing investigations, and create analytical applications for scientific outreach.

Part-time Instructor of Biology **August 2018–present**

School of Math, Science, and Engineering, Central New Mexico Community College, Albuquerque, NM

- Teach Biology lab classes to first and second year students at a large, open-enrollment community college.

Postdoctoral Scientist **September 2016–May 2019**

Dept. of Environmental Science, Policy, and Management, Univ. of California Berkeley, Berkeley, CA

- Soil biogeochemistry research combining field measurements and ecosystem process modeling to create regional budgets of CO₂ and other soil trace gas fluxes under climate and land-cover change scenarios in the Mojave desert. Field instrumentation, modeling experiments (using DayCent), data QA and analysis, manuscript preparation.

Independent Contractor: **March 2016–June 2016**

U.S.F.S Rocky Mountain Research Station, Albuquerque, NM

- Literature review contributor in the Southwestern Fire-Climate Partnership.

Postdoctoral Scientist: **August 2014–September 2016**

Department of Biology, University of New Mexico, Albuquerque, NM

- Carbon cycle and ecohydrology research in Southwestern U.S. ecosystems using data from the New Mexico Elevation Gradient cluster of 8 AmeriFlux eddy covariance towers. Data analysis, presentations, and manuscript preparation. Data manager and QA/QC lead for this AmeriFlux cluster.

Research Assistant: **July 2012–June 2014**

Department of Biology, University of Utah, Salt Lake City, UT

- Carbon concentration and stable isotope analysis of soil and soil respiration samples, data analysis, and writing for a DOE funded project on belowground carbon cycling in beetle-impacted sub-alpine forest ecosystems.

Research Assistant: **December 2010–June 2011**

Department of Biology, University of Utah, Salt Lake City, UT

- Method development, field collection, and laboratory analysis (major ions in snow) for a study of winter atmospheric deposition in the Salt Lake City area. Study occurred in collaboration with the Persistent Cold Air Pool study by the UU Dept. of Atmospheric Sciences (Winter 2010–11).

Field Botanist: **Summers 2007 & 2008**

Cottonwood Canyons Foundation, Salt Lake City, UT

- Conducted surveys for threatened, endangered, and sensitive plant species in the central Wasatch Mountains. Coordinated efforts with and provided data to the Uinta-Wasatch-Cache National Forest and Utah Native Plant Society. (Summers only)

*Field Botanist: **Summers 2006 & 2007***

Red Butte Garden and Arboretum, Salt Lake City, UT

- Lead collector for Red Butte Garden's team in the Seeds of Success project (BLM/Millennium Seed Bank). Researched native plant species, located populations, then made large seed collections utilizing volunteer assistance. Coordinated efforts with regional botanists and land managers.

*GIS Analyst: **October 2006–May 2007***

DIGIT Lab, Department of Geography, University of Utah, Salt Lake City, UT

- Conducted spatial data analysis, GIS application development, and provided technical support for University of Utah Geography Dept. projects and other public or private sector clients. Maintained the University of Utah Spatial Database.

*Port Sampler: **June 2004–September 2004***

Marine Resources Program, Oregon Department of Fish and Wildlife, Salem, OR

- Ocean Recreational Boat Survey. Conducted boat counts and interviews with returning fishermen to determine fishing effort, target locations and species, catch and release rates. Inspected catches, collecting hatchery tags and biological data/samples from species of interest. Made weekly reports to Newport office.

Internships

The Nature Conservancy, Conservation GIS intern, Salt Lake City, UT, 2006

Alaska Bird Observatory, Nesting field study intern, Fairbanks, AK, 2001

Volunteer

Wasatch Community Gardens, Salt Lake City, UT, 2010–2014

Lowell-Bennion Community Service Center (Univ. of Utah), 2006–2007

Red Butte Garden and Arboretum, Salt Lake City, UT, 2005–2007

Swaner Nature Preserve, Kimball Junction, UT, 2005

Columbia River Estuary Study Taskforce, Astoria, OR, 2004

Computing skills

(**Bold** indicates proficiency)

Applications: **MS Office**, **ArcGIS**, **L^AT_EX**, Qgis, PostgreSQL,

Programming: **Python**, **R**, **MATLAB**, JavaScript

Web: **HTML & CSS**, **GitHub**, WordPress, website administration

Operating systems: **Unix/Linux**, **Windows**, **Mac OSX**

Other: **git**, **mercurial**, **literate programming** (jupyter notebooks, RMarkdown), basic sysadmin skills, basic server/cloud provisioning with ansible

Technical, field, and laboratory skills

Plant/soil/ecosystem CO₂ & H₂O exchange measurements (Li-Cor 6200, 6400, 7000, 7200, 7500)

Eddy covariance instrumentation and data QA/QC

Soil hydrological and ecosystem process modeling with HYDRUS and DayCent

Analysis of gridded climate and carbon cycle modeling products (PRISM, MsTMIP)

Stable isotope and nutrient analysis of plants, soils, waters, and gases

CO₂ to graphite reduction for AMS analysis of ¹⁴C

Major ion analysis of water/snow samples

Datalogger and environmental sensor network design/maintenance (Esp. with Campbell dataloggers)

Weather station setup, maintenance, and quality assurance

Wireless radio and internet networks (Sierra Wireless modems, MaxStream and Digi Xbee radios)

Plant identification in western North America

Avalanche safety (Level 1)

Professional affiliations

Member, American Geophysical Union (AGU)

Member, Ecological Society of America (ESA)