

Zelalem A. Mekonnen

Lawrence Berkeley National Laboratory
Climate and Ecosystem Sciences Division
One Cyclotron Road, MS 74R316C
Berkeley CA 94720
Phone: 510-486-7072
E-mail: zmekonnen@lbl.gov

Biography

My primary research interest is terrestrial ecosystem modeling at site, regional and global scales. I am particularly interested in studying soil-plant-atmosphere interactions to understand ecosystem responses to changes in environmental conditions. My current project include examining the underlying ecosystem processes that control changes in plant functional types and associated feedbacks to the climate system, studying the effects of warming, plant and microbial water stress, and disturbance (e.g. fire) on nutrient cycling and land-atmosphere carbon and energy exchanges under past and future climates.

Research Interests

- ✓ Process based ecosystem modeling, soil-plant-atmosphere interactions, examining changes in permafrost and landscape hydrology, understanding the impacts of changes in climates and disturbance on nutrient cycling and land-atmosphere carbon and energy exchanges, studying changes in ecosystem productivity using eddy covariance flux towers and remote sensing.

Education

- ✓ **Ph.D.** Department of Renewable Resources, University of Alberta (2011 - 2015)
- ✓ **M.Sc.** Department of Earth Sciences, Addis Ababa University (2005 - 2007)
- ✓ **B.Sc.** Department of Forestry and Natural Resources, Hawassa University (2000 - 2004)

Experience

- ✓ **Research Scientist**, Lawrence Berkeley National Laboratory (2019 – Present)
- ✓ **Postdoctoral Fellow**, Lawrence Berkeley National Laboratory (2016 – 2019)

- ✓ **Postdoctoral Fellow**, University of Alberta (2015 - 2016)
- ✓ **Teaching and Research Assistant**, University of Alberta (2011 – 2015)
- ✓ **Geospatial Analyst**, GIZ (2009 - 2010)

Awards and scholarships

- ✓ North American Carbon program (NACP) travel award (2015)
- ✓ Queen Elizabeth II Graduate Doctoral Scholarship (2014)
- ✓ ESRI Canada young scholar award (2012)
- ✓ ESRI Canada GIS Scholarship (2011)

Professional membership

- ✓ The American Geophysical Union (AGU)
- ✓ The European Geosciences Union (EGU)
- ✓ Ecological Society of America (ESA)

Journal Reviewer

- ✓ Journal of Geophysical Research-Biogeosciences, Agricultural and Forest Meteorology, Ecological Modelling, Nature Geosciences, Nature Climate Change

Publications

1. Bouskill, N. J., Riley, W. J., Zhu, Q., Mekonnen, Z. A., and Grant, R. F.: Inconsistent short-term and centennial high-latitude carbon cycle responses, in revision, Nature Communications.
2. Woo, D. K., Riley, W.J., Paez-Garcia, A., Marklein, A.R., Mekonnen, Z. A., Liu, X., Ma, X., Blancaflor, E., Wu, Y.: Impoverishing, Not Enriching, Roots will Improve Winter Wheat Crop Yield and Profitability, in revision, Agricultural Systems.
3. Mekonnen, Z.A., Riley, W.J., Randerson, J.T., Grant, R.F, and Rogers, B., 2019: Expansion of high-latitude deciduous forests driven by interactions between climate warming and fire. Nature Plants, 1-7.
4. Grant, R.F., Mekonnen, Z.A. and Riley, W.J., 2019a. Modelling climate change impacts on an Arctic polygonal tundra. Part 1: Rates of permafrost thaw depend on changes in vegetation and drainage. Journal of Geophysical Research: Biogeosciences:

doi.org/10.1029/2018JG004644.

5. Grant, R.F., Mekonnen, Z.A., Riley, W.J., Arora, B. and Torn, M.S., 2019b. Modelling climate change impacts on an Arctic polygonal tundra. Part 2: Changes in CO₂ and CH₄ exchange depend on rates of permafrost thaw as affected by changes in vegetation and drainage. *Journal of Geophysical Research: Biogeosciences*: doi.org/10.1029/2018JG004645.
6. Mekonnen, Z.A., Riley, W.J. and Grant, R.F., 2018a. Accelerated nutrient cycling and increased light competition will lead to 21st century shrub expansion in North American Arctic tundra. *Journal of Geophysical Research: Biogeosciences* 123, 1683-1701 (2018).
7. Mekonnen, Z.A., Riley, W.J. and Grant, R.F., 2018b. 21st century tundra shrubification could enhance net carbon uptake of North America Arctic tundra under an RCP8.5 climate trajectory. *Environmental Research Letters*, 13(5): 054029.
8. Mekonnen, Z.A., Grant, R.F. and Schwalm, C., 2018c. Modelling impacts of recent warming on seasonal carbon exchange in higher latitudes of North America. *Arctic Science* 4, 471-484.
9. Grant, R.F., Mekonnen, Z.A., Riley, W.J., Arora, B. and Torn, M.S., 2017a. 2. Microtopography Determines How CO₂ and CH₄ Exchange Responds to Changes in Temperature and Precipitation at an Arctic Polygonal Tundra Site: Mathematical Modelling with Ecosys. *Journal of Geophysical Research: Biogeosciences* 122, 3174-3187, doi:10.1002/2017JG004037.
10. Grant, R.F. et al., 2017b. I: Microtopography Determines How Active Layer Depths Respond to Changes in Temperature and Precipitation at an Arctic Polygonal Tundra Site: Mathematical Modelling with Ecosys. *Journal of Geophysical Research: Biogeosciences*, 3161-3173, doi:10.1002/2017JG004035.
11. Mekonnen, Z.A., Grant, R.F. and Schwalm, C., 2017. Carbon sources and sinks of North America as affected by major drought events during the past 30 years. *Agricultural and Forest Meteorology*, 244: 42-56.
12. Mekonnen, Z.A., Grant, R.F. and Schwalm, C., 2016a. Contrasting changes in gross primary productivity of different regions of North America as affected by warming in recent decades. *Agricultural and Forest Meteorology*, 218–219: 50-64.
13. Mekonnen, Z.A., Grant, R.F. and Schwalm, C., 2016b. Sensitivity of modeled NEP to

climate forcing and soil at site and regional scales: Implications for upscaling ecosystem models. *Ecol. Model.*, 320: 241-257.

Conference presentations

- ✓ Mekonnen, Z.A., W.J. Riley, R.F. Grant. (2019) Accelerated nutrient cycling and increased light competition will lead to 21st century shrub expansion in North American arctic tundra, Ecological Society of America Annual Meeting, Louisville, KY, August, Invited.
- ✓ Mekonnen, Z.A., W.J. Riley, J.T. Randerson, Grant, R.F., Rogers, B. (2019) Interactions between climate warming and fire will drive expansion of high-latitude deciduous vegetation, ESS PI Meeting, Washington DC, May.
- ✓ Mekonnen, Z.A., W.J. Riley, J.T. Randerson, Grant, R.F. (2018) Fire driven vegetation dynamics and rapid carbon turnover cause a decline in high-latitude soil carbon stocks under future climate, American Geophysical Union Annual Meeting, Washington DC, December.
- ✓ Riley, W.J., Z.A. Mekonnen, R.F. Grant, Tang, J. Y., Bouskill, N. J., Zhu, Q., (2018) Non-growing season plant nitrogen uptake affects losses and carbon budgets in tundra and boreal systems, American Geophysical Union Annual Meeting, Washington DC, December.
- ✓ Arora, B., E. Brodie, Z.A. Mekonnen, T. K. Tokunaga, J. Wan., H. Steltzer, Y. Wu, C.I. Steefel (2018) Linking Snowmelt and Nitrogen Cycling to Vegetation Community Dynamics along a Hillslope Transect, American Geophysical Union Annual Meeting, Washington DC, December.
- ✓ Mekonnen, Z.A., W.J. Riley, R.F. Grant (2017) Modeling shrub expansion under changing climate across Arctic tundra of North America, Ameriflux Annual Meeting, Bethesda, MD, March.
- ✓ Bouskill, N.J., W.J. Riley, Z.A. Mekonnen, R.F. Grant (2017) Sensitivity of soil permafrost to winter warming: Modeled impacts of climate change, American Geophysical Union Annual Meeting, San Francisco, CA, December.
- ✓ Mekonnen, Z.A., W.J. Riley, R.F. Grant (2017) Modeling shrub expansion under changing climate across Arctic tundra of North America, American Geophysical Union Annual Meeting, San Francisco, CA, December.

- ✓ Morin T.H., Rey-Sanchez A.C., Bohrer G., Riley W.J., Angle J., Grant R.F., Mekonnen Z.A., Stefanik K.C., Wrighton K.C. (2017) Utilizing patch and site level greenhouse-gas concentration measurements in tandem with the prognostic model ecosys, American Geophysical Union Annual Meeting, San Francisco, CA, December.
- ✓ Riley, W.J., Grant, R.F., Bouskill, N.J., Dafflon, B., Graham, D., Mekonnen, Z. Moon, J., Tang, J.Y., Torn, M.S., Wainwright, H.M. (2017) Early and late season warming affects nitrogen dynamics in a polygonal tundra landscape: Analyses using ecosys and NGEE-Arctic observations in Barrow, Alaska, American Geophysical Union Annual Meeting, San Francisco, CA, December.
- ✓ Mekonnen, Z.A., Grant, R.F., Schwalm C., (2015) Carbon sources and sinks of North America as affected by major drought events during the past 30 years. American Geophysical Union (AGU) Fall Meeting, San Francisco, California, December.
- ✓ Mekonnen, Z.A. and Grant, R.F., (2015) Sensitivity of modeled NEP to climate forcing and soil at site and regional scales: implications for upscaling ecosystem models. 5th North America Carbon Program (NACP) All-Investigators Meeting. Washington D.C. January
- ✓ Mekonnen, Z.A., Grant, R.F., Schwalm C., (2014) Modeling the impacts of long-term warming trends on gross primary productivity across North America. American Geophysical Union (AGU) Fall Meeting, San Francisco, California, December.
- ✓ Mekonnen, Z.A. and Grant, R.F., (2014) Modeling the impacts warming in recent decades on ecosystem productivity and active layer depth in Canadian Arctic. The tenth ArcticNet's Annual Scientific (ASM2014) Meeting, Ottawa, Ontario, December.
- ✓ Mekonnen, Z.A. and Grant, R.F., (2014) Impacts of long-term warming on ecosystem carbon exchange in higher latitudes of North America. European Geosciences Union General Assembly, Vienna, Austria, April.
- ✓ Mekonnen, Z.A. and Grant, R.F., (2013). Modelling the impacts of long-term warming trends on ecosystem productivity across North America. GIS Day, University of Alberta, Edmonton, Alberta, November, Invited.
- ✓ Mekonnen, Z.A. and Grant, R.F., (2013) Modelling the impacts of long-term warming trends on ecosystem productivity across North America. 4th North America Carbon Program (NACP) All-Investigators Meeting, Albuquerque, New Mexico, February.

- ✓ Mekonnen, Z.A. and Grant, R.F., (2012) Impacts of amplified Arctic warming on ecosystem productivity. The eighth ArcticNet's Annual Scientific (ASM2012) Meeting, Vancouver, British Columbia, December.
- ✓ Mekonnen, Z.A. and Grant, R.F., (2012) Spatial and temporal patterns of carbon dynamics across North America. ESRI International User Conference, San Diego, California, July. Invited.