

Curriculum Vitae

QING ZHU

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EDUCATION:

Ph.D. 2014 Earth, Atmospheric and Planetary Sciences, Purdue University
B.S. 2009 Atmospheric Science, Nanjing University

PROFESSIONAL EXPERIENCES:

2017- **Research Scientist** Climate Science, Lawrence Berkeley National Lab
2014-2017 **Postdoc** Climate Science, Lawrence Berkeley National Lab
2009-2014 **RA** Ecosystems & Biogeochemical Dynamics Laboratory
2008-2009 **RA** Education Ministry Key Laboratory of Meso-scale Severe Weather

HONORS AND AWARDS:

2017 AGU Soptlights Research
2016 INTERFACE grant
2013 Bilsland Dissertation fellowship
2010 Purdue graduate school incentive grant
2008 A first prize of Scientific and technological innovation Scholarship
2007 A third prize of People scholarship

PUBLICATION

- Zhu, Q.,** W. J. Riley, J. Tang (2017) A new theory of plant-microbe nutrient competition resolves inconsistencies between observations and model predictions. *Ecological Applications*. DOI:10.1002/eap.1490.
- Zhu, Q.,** C. M. Iversen, W. J. Riley, I. J. Slette, and H. M. Vander Stel (2016), Root traits explain observed tundra vegetation nitrogen uptake patterns: Implications for trait-based land models, *JGR-B.*, 121, doi:10.1002/2016JG003554.
- Zhu, Q.,** W. Riley, J. Tang, and C. Koven (2016): Multiple soil nutrient competition between plants, microbes, and mineral surfaces: model development, parameterization, and example applications in several tropical forests, *Biogeosciences*, 13, 341-363.
- Zhu, Q.,** and W. Riley (2015): Improved modelling of soil nitrogen losses. *Nature Climate Change*, 5, 705–706 doi:10.1038/nclimate2696.
- Hao, G., Q. Zhuang, **Q. Zhu**, Y. He, Z. Jin, and W. Shen (2015): Quantifying microbial ecophysiological effects on the carbon fluxes of forest ecosystems over the conterminous United States. *Climatic Changes*. doi: 10.1007/s10584-015-1490-3.
- Zhu, Q.,** and Q. Zhuang (2015): Ecosystem biogeochemistry model parameterization: Do more flux data result in a better model in predicting carbon flux? *Ecosphere*. 6(art283), <http://dx.doi.org/10.1890/ES15>

- Liu, Y., Q. Zhuang, D. Miralles, Z. Pan, D. Kicklighter, **Q. Zhu**, Y. He, J. Chem, N. Tchebakova, A. Sirin; D. Niyogi, and J. Melillo (2015): Evapotranspiration in Northern Eurasia: Impact of forcing uncertainties on terrestrial ecosystem model estimates. *J. Geophys. Res.-Atm.*. DOI: 10.1002/2014JD022531.
- He, Y., J. Yang, Q. Zhuang, A. D. McGuire, **Q. Zhu**, Y. Liu, and R. Teskey (2014): Uncertainty in the fate of soil organic carbon: A comparison of three conceptually different decomposition models at a larch plantation. *J. Geophys. Res.-Biogeo.*, 119, doi:10.1002/2014JG002701.
- Zhu, Q.**, and Q. Zhuang (2014): Parameterization and Sensitivity Analysis of a Process-Based Terrestrial Ecosystem Model with Adjoint Method, *J. Adv. Model. Earth Syst.*, 6, 315–331, doi:10.1002/2013MS000241.
- Zhu, Q.**, and Q. Zhuang (2013): Modeling the effects of organic nitrogen uptake by plants on the carbon and nitrogen cycling of boreal ecosystems, *Biogeosciences*, 10, 7943–7955.
- Zhu, Q.**, and Q. Zhuang (2013): Improving the quantification of terrestrial ecosystem carbon dynamics over the conterminous U.S. using an adjoint method, *Ecosphere-data assimilation special feature*, 4:118. <http://dx.doi.org/10.1890/ES13-00058.1>.

Under review

- Liu L., Q. Zhuang, and **Q. Zhu**. Global Soil Uptake of Atmospheric Carbon Monoxide: An Analysis Using a Process-Based Biogeochemistry Model. *Chemosphere*.
- Hao G., H. Wei, W. Zhou, **Q. Zhu**, W. Shen. Apparent activation energy of soil organic carbon decomposition decreases with increasing soil moisture for lower-subtropical forests. *Applied Soil Ecology*.

PATENT

Software application, 2013. patent # CN103293084 A. Sea fog all-time all-weather inversion method based on multispectral weather satellite information.

PRESENTATION

- Zhu, Q., (Invited) (2017):** Global carbon cycle: a multi-scale perspective. Nanjing University Foreign Scholar Research Forum. May 27-28. Nanjing, Jiangsu, China
- Zhu, Q., W. J Riley, J. Tang (2017):** Modeling nitrogen and phosphorus cycles and their impacts on the carbon cycle. CESM Land Model Working group meeting. Feb 28-March 2, Boulder, CO.
- Zhu, Q., W. J Riley, J. Tang, F. M. Hoffman, M. Mu and J. Randerson (2016):** Representing carbon, nitrogen, and phosphorus interaction in the ACME Land Model v1: model development and global benchmarking. AGU annual meeting, December 12-16, San. Francisco, CA.
- Chen, J., **Q. Zhu**, W. J Riley, M. S Torn, Y. He and J. Randerson (2016): Towards Improved Predictions of Global Radiocarbon ($\Delta 14C$) Through Comparison Between Site Observations and Climate Model Outputs. AGU annual meeting, December 12-16, San. Francisco, CA.
- Zhu, Q., William J. Riley, Jinyun Tang, Forrest Hoffman, Gautam Bisht, Xiaojuan Yang, Mingquan Mu, James T. Randerson (2016):** Towards a robust representation of

- multi-nutrient limitations on the terrestrial carbon cycle in ALMv1: Model development and global benchmarking. ACME meeting, Nov 9-11.
- Zhu, Q. (Invited)**, W. Riley, J. Tang, and C. Koven (2016): Soil nutrient partitioning among plants, microbes, mineral surfaces: existing theories, observational support and model benchmarking. Workshop: Nutrient limitation on land: how accurate are our global land models. June 15-17th, Yangling, Shaanxi, China.
- Zhu, Q. (Invited)**, W. Riley, J. Tang, and C. Koven (2016): Terrestrial ecosystem nitrogen/phosphorus competition. Workshop: Phosphorus Cycling in Terrestrial Ecosystems. May 23-25, Townsend, TN.
- Zhu, Q.**, Colleen M. Iversen, William J. Riley, Ingrid J. Slette, Holly M. Vander Stel (2016): Linkage between root competitive traits and tundra nitrogen uptake patterns, Environmental System Science PI Meeting, April 26-27, Potomac, MD
- Zhu, Q.**, W. Riley, J. Tang, and C. Koven (2016): Soil nutrient competition: observations, theories, and implementation in earth system land models, CESM LMWG meeting, Feb 8-11, Boulder, CO
- Zhu, Q.**, W. Riley, J. Tang, and C. Koven (2015): Soil nutrient competition in earth system models: an important but underappreciated driver of plant responses to nutrient fertilization, AGU annual meeting, December 14-18, San. Francisco, CA.
- Riley, W., D. Dwivedi, B. Ghimire, F. Hoffman, G. Pau, J. Randerson, C. Shen, J. Tang, **Q. Zhu** (2015): Improving predictions of large scale soil carbon dynamics: Integration of fine-scale hydrological and biogeochemical processes, scaling, and benchmarking, AGU annual meeting, December 14-18, San. Francisco, CA.
- Zhu, Q.**, (2015): Plant-soil nutrient competition under N/P fertilized condition: a case study at tropical forests, 1st NGEE-TROPICS annual meeting, Aug 8-10th, Baltimore, MD.
- Riley, W., **Q. Zhu**, J. Y. Tang (2015): Implementing ECA Kinetics and Advection Improves N loss Predictions, 20th CESM workshop, June 15-18th, Breckenridge, CO.
- Tang, J. Y., W. Riley, **Q. Zhu** (2015): Representing substrate competition in biogeochemical networks using the ECA kinetics, ACME Project ALL-Hands Meeting, May 5th, Tysons, VA.
- Riley, W., **Q. Zhu**, J. Y. Tang, C. Koven (2015): New theory for ecosystem nutrient competition, representation of plant traits, and improved advective solution improves ALM simulations, ACME Project ALL-Hands Meeting, May 5th, Tysons, VA. (Invited)
- Holm, J., R. Knox, W. Riley, C. Koven, J. Y. Tang, **Q. Zhu**, B. Ghimire, R. Fisher, J. Chambers (2015): Traits and Trait Filtering from the Soil to Canopy, ACME Project ALL-Hands Meeting, May 5th, Tysons, VA.
- Zhu, Q.** (2015): Soil nitrogen and phosphorus competition among roots, microbes and abiotic consumer. Land Modeling Meeting, Feb 5th, Lawrence Berkeley National Lab, Berkeley, CA
- Zhu, Q.**, W. Riley, J. Chambers, and J. Tang (2014): Modeling plant, microorganisms, and mineral surface competition for soil nitrogen and phosphorus: Competition representations and ecological significance, AGU annual meeting, December 15-19, San. Francisco, CA.

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- Zhu, Q. (2014):** From site-level to sub-continental scale: modeling terrestrial ecosystem carbon budget, Land Modeling Meeting, July 3rd, Lawrence Berkeley National Lab, Berkeley, CA
- Zhu, Q. (2014):** Improving the predictability of global terrestrial ecosystem carbon budget using in situ and satellite observational data, departmental seminar, January 28th, Purdue University, West Lafayette, IN.
- Zhu, Q. (2013):** Revisit Terrestrial Ecosystem Model (TEM) parameterization techniques, NSF-CDI-Type II project meeting, November 7th, Purdue University, West Lafayette, IN.
- Zhu, Q., and Q. Zhuang (2013):** Modeling the effects of organic nitrogen uptake by plants on the carbon cycling of boreal ecosystems, the 2013 4th NACP All-Investigators Meeting, Hyatt Regency, Albuquerque, New Mexico.
- Zhu, Q., and Q. Zhuang (2013):** Influence of data length and data coverage on model parameterization and in situ, regional quantifications of terrestrial ecosystem carbon dynamics, AGU annual meeting, December 9-14, San. Francisco, CA.
- Zhuang, Q., Q. Zhu, M. Chen, J. Tang, X. Lu, and Y. Jiang (2012):** Constrained terrestrial ecosystem carbon fluxes of North America with eddy flux and satellite data during the MODIS era, AGU Annual Conference, December 2-8, San Francisco, CA.
- Zhu, Q., and Q. Zhuang (2011):** Evaluating the role of organic N uptake in carbon dynamics of boreal terrestrial ecosystems, AGU annual meeting, December 5-9, San. Francisco, CA.
- Zhu, Q., and Q. Zhuang, (2011):** Atmospheric CO₂ signals response to terrestrial ecosystem organic nitrogen uptake dynamics at Northern high latitude region, 5th International GEOS-Chem meeting, May 5-9, Cambridge, MA.

TEACHING

- Zhu, Q. 2012,** Parameterization of TEM by using adjoint technique, Guest Lecture, EAS 59230, November 6th, Purdue University, West Lafayette, IN.
- Zhu, Q. 2012,** Modeling the carbon and nitrogen cycles of boreal ecosystems, Guest Lecture, EAS 59230, September 6th, Purdue University, West Lafayette, IN.

Review activity

ADVANCES IN METEOROLOGY
AGRICULTURE, ECOSYSTEMS AND ENVIRONMENT
ATMOSPHERIC CHEMISTRY AND PHYSICS
BIOGEOCHEMISTRY
GLOBAL BIOGEOCHEMICAL CYCLES
GEOSCIENTIFIC MODEL DEVELOPMENT
HYDROLOGY AND EARTH SYSTEM SCIENCES
INTERNATIONAL JOURNAL OF CLIMATOLOGY
REMOTE SENSING
SCIENTIFIC REPORTS

Curriculum Vitae

Service

- 2016 OSPA judge, AGU, Biogeoscience section.
- 2016 NASA Postdoctoral Program review panel.
- 2015 OSPA judge, AGU, Biogeoscience section.
- 2014 Co-convener, AGU, Land-Use and Land-Cover Change: Detecting, Modeling, and Its Effects on Water, Energy, and Biogeochemical Dynamics at Various Temporal and Spatial Scales I.
- 2014 Co-convener, AGU, Land-Use and Land-Cover Change: Detecting, Modeling, and Its Effects on Water, Energy, and Biogeochemical Dynamics at Various Temporal and Spatial Scales II Posters.