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Research Interests

- Terrestrial carbon cycle
- Representation of natural wetland methane emission in land system models
- Using remote sensing and eddy flux data with data-model fusion to advance global estimates of wetland methane emissions
- Regional and global budget of natural sources of methane

Education

Ph.D. Biological Sciences, 2019, Center for Ecosystem Science and Society, Northern Arizona University, US.

M.S. Plant Physiological Ecology, 2015, University of Chinese Academy of Sciences, China.

B.S. Biological Sciences, 2012. Sichuan Agricultural University, China

Professional Experience

2020 – present: JPL Postdoctoral Scholar

2017 - 2019: Research Assistant (Dr. Yiqi Luo), Northern Arizona University

2018 Spring: Teaching Assistant (Dr. Emma Lou Benenati, BIO 182), Northern Arizona University

2018 Fall: Research Assistant (Dr. Yiqi Luo), Northern Arizona University

2015 - 2017: Research Assistant (Dr. Yiqi Luo), University of Oklahoma

Community Service

2020-2022 Global Change Biology Editorial Advisory Board

First-author Publications

Ma, S., Wilson, R., Chanton, J., Niu, S., Brigham, S., Ricciuto, D., Hanson, J., Luo, Y. et al. “Linear thermal acclimation in photosynthesis, respirations, and methane production in a northern peatland after 4 years of warming treatments.” *In prep.*

Ma, S., Wilson, R., Chanton, J., Niu, S., Brigham, S., Iversen, C., Malhotra, A., Jiang, J., Lu, X., Keller, J., Xu, X., Ricciuto, D., Hanson, J., Luo, Y. “Climate warming stimulates methane emission by increasing methane production and reducing methane oxidation: Results from data-model fusion.” *Under review.*

Ma, S., Jiang, J., Huang, Y., Shi, Z., Wilson, R.M., Ricciuto, D., Sebestyen, S.D., Hanson, P.J. and Luo, Y., 2017. Data-constrained projections of methane fluxes in a northern Minnesota peatland in response to elevated CO₂ and warming. *Journal of Geophysical Research: Biogeosciences*, 122(11), pp.2841-2861.

Ma, S., Zhu, X., Zhang, J., Zhang, L., Che, R., Wang, F., Liu, H., Niu, H., Wang, S. and Cui, X., 2015. Warming decreased and grazing increased plant uptake of amino acids in an alpine meadow. *Ecology and evolution*, 5(18), pp.3995-4005.

Ma, S., Han, C. and Wang, J., 2011. The Complementary DNA Segment Cloning and Bioinformatics Analysis of INTS2 Gene in Goose. In *International Conference on Computer Technology and Development, 3rd (ICCTD 2011)*. ASME Press.

Co-author Publications

Tao, F., Zhou, Z., Huang, Y., Li, Q., Lu, X., **Ma, S.**, Huang, H., Liang, Y., Hugelius, G., Jiang, L., Doughty, R., Ren, Z., and Luo, Y. Deep learning optimizes data-driven representation of soil organic carbon in Earth system model over the conterminous United States. *Under review*.

Tao, X., Feng, J., Fan, F., Ning, D., **Ma, S.**, Bates, C., Liang, J., Wu, L., Schuur, E.A.G., Bracho, R., Luo, Y., Konstantinidis, K., Tiedje, J.M., Yang, Y., and Zhou, J. The activity of microbial decomposers underlies the slow C vulnerability of Alaska soils upon warming. *Under review*.

Stuble, K.L., **Ma, S.**, Liang, J., Luo, Y., Classen, A.T. and Souza, L., 2019. Long-term impacts of warming drive decomposition and accelerate the turnover of labile, not recalcitrant, carbon. *Ecosphere*, 10(5), p.e02715.

Liang, J., Xia, J., Shi, Z., Jiang, L., **Ma, S.**, Lu, X., Mauritz, M., Natali, S.M., Pegoraro, E., Penton, C.R. and Plaza, C., 2018. Biotic responses buffer warming-induced soil organic carbon loss in Arctic tundra. *Global change biology*, 24(10), pp.4946-4959.

Huang, Y., Stacy, M., Jiang, J., Sundi, N., **Ma, S.**, Saruta, V., Jung, C.G., Shi, Z., Xia, J., Hanson, P.J. and Ricciuto, D., 2019. Realized ecological forecast through an interactive Ecological Platform for Assimilating Data (EcoPAD, v1. 0) into models. *Geoscientific Model Development (Online)*, 12(3).

Jiang, J., Huang, Y., **Ma, S.**, Stacy, M., Shi, Z., Ricciuto, D.M., Hanson, P.J. and Luo, Y., 2018. Forecasting responses of a northern peatland carbon cycle to elevated CO₂ and a gradient of experimental warming. *Journal of Geophysical Research: Biogeosciences*, 123(3), pp.1057-1071.

Che, R.X., Wang, F., Wang, Y.F., Deng, Y.C., Zhang, J., **Ma, S.** and Cui, X.Y., 2016. A review on the methods for measuring total microbial activity in soils. *Acta Entomol Sin*, 36, pp.2103-2112.

Wu, Y.B., Che, R.X., **Ma, S.**, Deng, Y.C., Zhu, M.J. and Cui, X.Y., 2014. Estimation of root production and turnover in an alpine meadow: Comparison of three measurement methods. *Acta Ecologica Sinica*, 34(13), pp.3529-3537.

Xue, J., **Ma, S.**, Deng, X., Li, C., Chen, H. and Wu, Q., 2014. Prokaryotic expression and reverse catalytic activity characterizations of phenylalanine ammonia-lyase gene (FtPAL) from *Fagopyrum tataricum*. *Journal of Agricultural Biotechnology*, 22(1), pp.64-70.

Presentations

Shuang Ma, Rachel M. Wilson, Jeff Chanton, Scott Brigham, Colleen M. Iversen, Avni Malhotra, Jiang Jiang, Xingjie Lu, Jason Keller, Xiaofeng Xu, Daniel Ricciuto, Paul J. Hanson, Shuli Niu, Yiqi Luo. Data-model fusion of methane and carbon cycle at SPRUCE, implications for experimental designs, and the way forward. 2020 SPRUCE Project Methane workshop. (Oral presentation)

Shuang Ma, Wilson, R., Chanton, J., Niu, S., Brigham, S., Ricciuto, D., Hanson, J., Luo, Y. et al. Linear thermal acclimation in photosynthesis, respirations, and methane production in a northern peatland after 4 years of warming treatments. 2019 Carbon Club Seminar, Jet Propulsion Lab, Caltech Institute of Technology. (Oral presentation)

Shuang Ma, Rachel M. Wilson, Jeff Chanton, Scott Brigham, Colleen M. Iversen, Avni Malhotra, Jiang Jiang, Xingjie Lu, Jason Keller, Xiaofeng Xu, Daniel Ricciuto, Paul J. Hanson, Shuli Niu, Yiqi Luo. Constraining methane emission pathways via model structure selection and parameter estimation with flux and concentration data in a northern peatland. 2019 Annual Meeting of American Geophysical Union. (Poster)

Shuang Ma, Rachel M. Wilson, Jeff Chanton, Scott Brigham, Colleen M. Iversen, Avni Malhotra, Jiang Jiang, Xingjie Lu, Jason Keller, Xiaofeng Xu, Daniel Ricciuto, Paul J. Hanson, Shuli Niu, Yiqi Luo. Data assimilation and ecological forecasting applications on methane simulation at an experiment site. 2019 New Advances in Land Carbon Cycle Modeling workshop, Northern Arizona University. (Oral presentation)

Shuang Ma, Yuanyuan Huang, Jiang Jiang, Mark Stacy, Zheng Shi, Daniel Ricciuto, Paul Hanson, Nilutpal Sundi, Yiqi Luo. Eco-PAD, A smart ecological forecasting system linking models with individual experiments. 2019 New Advances in Land Carbon Cycle Modeling workshop, Northern Arizona University. (Oral presentation)

Shuang Ma, Jiang Jiang, Xingjie Lu, Zhenggang Du, Rachel Wilson, Jeff Chanton, Daniel Ricciuto, Paul Hanson, Yiqi Luo. Combining soil flux and soil gas profiles to constrain CH₄ emission pathways in a Northern peatland – a data-model fusion study 2018 Annual Meeting of American Geophysical Union. (Poster)

Shuang Ma, Rachel Wilson, Jiang Jiang, Yuanyuan Huang, Jeff Chanton, Scott Bridgham, Paul Hanson and Yiqi Luo. Vertical Methane concentration profile and carbon dynamics at the SPRUCE site simulated by the process based biogeochemical model. 2018 Spruce and Peatland Responses Under Changing Environments (SPRUCE) Project All-Hands Meeting

Shuang Ma, Jiang Jiang, Yuanyuan Huang, Daniel Ricciuto, Paul Hanson, Yiqi Luo, Acclimation of methane production weakens ecosystem response to climate warming in a northern peatland. 2017 Annual Meeting of American Geophysical Union. (Oral presentation)

Shuang Ma, Jiangjiang, Yuanyuan Huang, Daniel Ricciuto, Paul J. Hanson, Yiqi Luo, Data-constrained projections of methane fluxes in Northern Minnesota Peatland in response to elevated CO₂ and warming. 2016 Annual Meeting of American Geophysical Union. (Poster)

Shuang Ma, Jiangjiang, Yiqi Luo. Impacts of seasonal changes in precipitation on carbon sequestration in a tallgrass prairie. 2016 Annual Meeting of Ecological Society of America. (Poster)