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Wenguang Sun

Present position

Research Scientist at Natural Resource Ecology Laboratory at Colorado State University

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Google scholar: https://scholar.google.com/citations?user=cBIbcWwAAAAJ&hl=en&oi=ao

Education

- Ph.D (August 2015 -- December 2019) Agroecology and Sustainable Agriculture, School of Plant Environmental and Soil Science, Louisiana State University, USA
- M.S. (September 2012 -- July 2015) Environmental Science, Chinese Academy of Science, China
- B.S. (September 2008 -- July 2012) Agronomy, China Agricultural University, China

Professional Experience

- Research Scientist (September 2023 – Present) Natural Resource Ecology Laboratory at Colorado State University
- Postdoc Research Associate (March 2020 – August 2023) USDA-ARS Adaptive Cropping Systems Laboratory, Beltsville, MD
- Teaching and Research Assistant (August 2015 -- December 2019) School of Plant Environmental and Soil Science, Louisiana State University, Baton Rouge, LA

Honors and Awards

- Lee & Fran Mason Scholarship, Louisiana State University (2018)
- Eunice M & D L Fontenot Scholarship, Louisiana State University (2016)
- National Scholarship for Graduate (2014)
- Excellent Leader Award of the University Chinese Academy of Sciences (2013)
- Excellent Student Award of the University Chinese Academy of Sciences (2013,2014)
- Scholarship for Outstanding Academic Achievement, Chinese Academy of Sciences (2012)
- Excellent Graduation Thesis of the China Agricultural University (2012)
- Research Scholarship of the China Agricultural University (2011)

Research Fields

- **Crop modeling and climate change**

Research interests includes: *i*) developing process based mathematical models to describe crop growth, development, yield as well as soil processes in soil-plant-atmospheric system; ii) assessing impacts of climate change and abiotic constraints (e.g. rainfall, soil quality, land use) on food security issues using geospatially referenced data and modeling tools; iii) combining remote sensing data into crop computational models, machine learning approaches to address the impacts of climate change on agroecosystem.

Peer-Reviewed Publications

Submitted:

- **Wenguang Sun**, David Fleisher, Dennis Timlin, Chittaranjan Ray, and Vangimalla Reddy. 2023. Simulating climate change effects on soil carbon dynamics in a soybean–maize ecosystem: Using improved CO_2 emission and transport Models. (Submitted).

2023:

[36] **Wenguang Sun**, David Fleisher, Dennis Timlin, Chittaranjan Ray, Zhuangji Wang and Vangimalla Reddy. 2023. Does drought stress eliminate the benefit of elevated CO_2 on soybean yield? Using an improved model to link crop and soil water relations. Agricultural and Forest Meteorology. https://doi.org/10.1016/j.agrformet.2023.109747

[35] **Wenguang Sun**, David Fleisher, Dennis Timlin, Chittaranjan Ray, Zhuangji Wang and Vangimalla Reddy. 2023. Projected long-term climate trends reveal the critical role of vapor pressure deficit for soybean production in the US Midwest. *Science of the Total Environment.* 878, 162960.

[34] Sahila Beegum, Dennis Timlin, Kambham Raja Reddy, Vangimalla Reddy, **Wenguang Sun**, Zhuangji Wang, David Fleisher & Chittaranjan Ray. 2023. Improving the cotton simulation model, GOSSYM, for soil, photosynthesis, and transpiration processes. *Sci Rep* 13, 7314.

[33] Zhuangji Wang, Shan Hua, Dennis Timlin, Yuki Kojima, Songtao Lu, **Wenguang Sun**, David Fleisher, Robert Horton, Vangimalla R. Reddy, Katherine Tully. 2023. Time Domain Reflectometry Waveform Interpretation With Convolutional Neural Networks. *Water Resource Research*. 59 (2), e2022WR033895.

[32] Sahila Beegum, **Wenguang Sun**, Dennis Timlin, Zhuangji Wang, David H Fleisher, Vangimalla Reddy, Chittaranjan Ray. Incorporation of Carbon Dioxide Production and Transport Module into a Soil-Plant-Atmosphere Continuum Model. *Geoderma*. https://doi.org/10.1016/j.geoderma.2023.116586

2022:

[31] **Wenguang Sun**, David Fleisher, Dennis Timlin, Sanai Li, Zhuangji Wang and Vangimalla Reddy. 2022. Evaluation of models for simulating soybean growth and climate sensitivity in the US Mississippi Delta. *European Journal of Agronomy* 140, 126610.

[30] **Wenguang Sun**, Maria B Villamil, Gevan D Behnke, Andrew J Margenot. 2022. Long-term effects of crop rotation and nitrogen fertilization on phosphorus cycling and balances in loess-derived Mollisols. *Geoderma* 420, 115829.

[29] Zhuangji Wang, Dennis Timlin, David Fleisher, **Wenguang Sun**, Sahila Beegum, Sanai Li, Yan Chen, Vangimalla R. Reddy, Katherine Tully, Robert Horton. 2022. Modeling vapor transfer in soil water and heat simulations: A modularized, partially-coupled approach. *Journal of Hydrology*. 608, 127541.

[28] Li, S, Fleisher, D.H., Timlin, D.; Barnaby, J.; **Sun, W.;** Wang, Z.; Reddy, V.R. Improving Simulations of Rice in Response to Temperature and CO_2. *Agronomy* 2022, 12, 2927. https://doi.org/10.3390/agronomy12122927

2021:

[27] **Wenguang Sun**, David Fleisher, Dennis Timlin, Sanai Li, Zhuangji Wang and Vangimalla Reddy. 2021. Effects of Elevated CO_2 and Temperature on Soybean Growth and Gas Exchange Rates: A Modified GLYCIM Model. *Agricultural and Forest Meteorology* 312, 108700.

[26] Zhuangji Wang, Resham Thapa, Dennis Timlin, Sanai Li, **Wenguang Sun**, Sahila Beegum, David Fleisher, Steven Mirsky, Miguel Cabrera, Thomas Sauer, Vangimalla R. Reddy, Robert Horton, Katherine Tully. Simulations of Water and Thermal Dynamics for Soil Surfaces With Residue Mulch and Surface Runoff. *Water Resource Research*. 57 (11). e2021WR030431

2020:

[25] **Wenguang Sun**, H. Magdi Selim. 2020. Fate and Transport of Molybdenum in Soils: Kinetic Modeling. *Advances in Agronomy*, 166, 51-91.

[24] **Wenguang Sun**, H. Magdi Selim. 2020. Kinetic Modeling of Molybdenum Sorption and Transport in Soils. *Environmental Science and Pollution Research* 27 (16), 20227-20234.

2019:

[23] **Wenguang Sun**, H. Magdi Selim. 2019. A General Stirred-Flow Model for Time-dependent Adsorption and Desorption of Heavy Metal in Soils. *Geoderma* 347: 25-31.

[22] **Wenguang Sun**, H. Magdi Selim. 2019. Kinetic Modeling of pH-dependent Molybdenum(VI) Adsorption and Desorption on Iron Oxide-Coated Sand. *Soil Sci. Soc. Am. J.*

[21] **Wenguang Sun**, Xueping Li, Josh. Padilla, Tamer. A. Elbana, and H. Magdi Selim. 2019. The Influence of Phosphate on the Adsorption-Desorption Kinetics of Vanadium in an Acidic Soil. *J. Environ. Qual*. doi: 10.2134/jeq2018.08.0316

[20] **Wenguang Sun**, H. Magdi Selim. 2019. Transport and Retention of Molybdenum (VI) on Iron Oxide-Coated Sand: A Modified Multi-Reaction Model. *Applied Geochemistry*, 104387.

[19] **Wenguang Sun**, H. Magdi Selim. 2019. Residence Time Effects on Molybdenum Adsorption on Soils: Elucidation by Multi-reaction Modeling and XANES Spectroscopy. *Soil System*. 3(3), 55.

2018:

[18] **Wenguang Sun**, H. Magdi Selim. 2018.Transport and Retention of Molybdenum (VI) in Soils: Kinetic Modeling. *Soil Sci. Soc. Am. J. 83:86-96.*

[17] **Wenguang Sun**, H. Magdi Selim. 2018. Kinetics of Molybdenum Adsorption-Desorption in Soils. *J. Environ. Qual*. 47(3):504-512. doi: 10.2134/jeq2018.01.0013.

[16] Zhang, Liyun; Gaston, Lewis A.; **Sun, Wenguang**; Selim, H. Magdi. 2018. Transport of Cationic Silver in Soils Miscible Displacement Experiments and Nonlinear Modeling. Soil Science 183(1): p 11-21.

[15] **Wenguang Sun,** Zhigao Sun, Xiaojie Mou et al., 2018. Short-Term Study on Variations of Carbon Dioxide and Methane Emissions from Intertidal Zone of the Yellow River Estuary during Autumn and Winter. *Wetlands,* 38(2):1-20.

2017:

[14] **Wenguang Sun**, H. Magdi Selim. 2017. Molybdenum-Phosphate Retention and Transport in soils. *Geoderma.* 308(15):60-68. (Soil Science, 4/145; CiteScore, 11.1; Acceptance Rate, 16%)

[13] **Wenguang Sun,** Zhigao Sun, Xiaojie Mou et al., 2017. Nitrous Oxide Emissions from Intertidal Zone of the Yellow River Estuary in Autumn and Winter During 2011-2012. *Estuaries and Coasts*, 40: 145-159.

2016 or before:

[12] Zhigao Sun, **Wenguang Sun**, et al., 2015. China's coastal wetlands: conservation history, implementation efforts, existing issues and strategies for future improvement. Environment International, 79:25-41.

[11] Zhigao Sun, Xiaojie Mou, Chuan Tong, Chuanyuan Wang, Zhenglei Xie, Hongli Song, **Wenguang Sun**, Yingchun Lv. 2015. Spatial variations and bioaccumulation of heavy metals in intertidal zone of the Yellow River estuary, China. *CATENA.* 126, 43-52.

[10] Zhigao Sun, Hongli Song, **Wenguang Sun**, Jingkuan Sun. 2014. Effects of continual burial by sediment on morphological traits and dry mass allocation of Suaeda salsa seedlings in the Yellow River estuary: An experimental study. *Ecological Engineering*. 68, 176-183.

[9] Zhigao Sun, Hongli Song, **Wenguang Sun**, Jingkuan Sun. 2014. Effects of continual burial by sediment on seedling emergence and morphology of Suaeda salsa in the coastal marsh of the Yellow River estuary, China. *Journal of Environmental Management.* 135, 27-35

[8] Zhigao Sun, Linus Zhang, **Wenguang Sun,** Huanhuan Jiang, Xiaojie Mou, Wanlong Sun, Hongli Song. China's wetlands conservation: achievements in the eleventh 5-year plan (2006-2010) and challenges in the twelfth 5-year plan (2011-2015). *Environmental Engineering & Management Journal (EEMJ),* 13*,* 2.

[7] Zhigao Sun, Xiaojie Mou, Hanqin Tian, Hongli Song, Huanhuan Jiang, Jinyong Zhao, Wanlong

Sun & **Wenguang Sun**. 2013. Phosphorus biological cycle in the different Suaeda salsa marshes of the Yellow River estuary, China. *Environ Earth Sci* 69, 2595–2608.

[6] Zhigao Sun, Xiaojie Mou, Jingkuan Sun, Hongli Song, Xiang Yu, Lingling Wang, Huanhuan Jiang, Wanlong Sun & **Wenguang Sun**. 2012. Nitrogen biological cycle characteristics of seepweed (Suaeda salsa) wetland in intertidal zone of Huanghe (Yellow) River estuary. Chin. *Geogr. Sci*. 22, 15–28.

[5] **Sun W G**, Zhao H, Yan H X, et al., 2012. Pyrolytic characteristics and kinetics of Jerusalem artichoke stalk. *Energy Sources, Part A*, 34:626–635.

[4] **Sun W G**, Sun Z G, Sun J K, et al. Study on ecological traits of Phragmites australis community in different restoration phases of the Yellow River estuary, China, 2015, Acta Ecologica Sinica.10.5846/stxb201311212788. (Abstract)

[3] **Sun W G**, Sun Z G, Sun W L, et al. Contribution of different processes in wetland soil N2O production in different restoration phases of the Yellow River estuary, China, 2014, Environmental Science, 2014, 8(35):269~238. (Abstract)

[2] **Sun W G**, Gan Z T, Sun Z G, et al. Spatial Distribution Characteristics of Fe and Mn Contents in the New-born Coastal Marshes in the Yellow River Estuary, Environmental Science, 2013, 34(11):4411~4419. (Abstract)

[1] **Sun W G**, Sun W G, Mou X J, et al. Spatial Distribution of Calcium and Magnesium in Different Plant Communities in New-born Wetland of Yellow River Estuary, Chinese Journal of Soil Science, 2013,44(3):628~634. (Abstract)

Book Chapter

- Tamer A Elbana, **Wenguang Sun**, Joshua Padilla, H Magdi Selim. 2022. Vanadium in Soils and Plants. Pages. 49-71. CRC Press Publisher.

Software

- Magdi Selim. 2017.Chem_Transport. Software package version 5.1.

  Wenguang Sun. Responsible for writing code. http://www.spess.lsu.edu/Chem_Transport/

Selected Patent

- Sun Z G, **Sun W G**. A method for estimating the contribution of plant in N_2O production of the Yellow River Estuary. China, 2015.
- Sun Z G, **Sun W G**. A static-chamber base for measuring N_2O fluxes in marsh wetland. China, 2015.

Selected Abstract/Presentation

- **Wenguang Sun.** Inter-Comparison of Different Crop Models for Simulating Soybean Growth and Yield in the US Mississippi Delta. *ASA, CSSA, SSSA International Annual Meeting*, Salt Lake City, UT, USA. 2021. (oral)
- **Wenguang Sun.** Effects of Elevated CO_2 and Temperature on Soybean Growth and Gas Exchange Rates: A Modified GLYCIM Model. *ASA, CSSA, SSSA International Annual Meeting*. Virtual. 2020. (oral)
- **Wenguang Sun.** A General Stirred-Flow Model for Time-dependent Adsorption and Desorption of Heavy Metal in Soils. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX. USA. 2019. (oral)
- **Wenguang Sun.** Kinetic Modeling of Molybdenum Sorption and Transport in Soils. International Conference on Biogeochemistry of Trace Elements, Nanjing, China. 2019. (oral)
- **Wenguang Sun.** Kinetic modeling of pH-dependent molybdenum (VI) adsorption and desorption on iron oxide-coated sand: a novel two-site model. *International Conference on Heavy Metals in the Environment*, Athens, GA. USA. 2018. (oral)
- **Wenguang Sun.** Molybdenum-Phosphate Retention and Transport in soils. *International Conference on Heavy Metals in the Environment*, Athens, GA. USA. 2018. (poster)
- **Wenguang Sun.** Kinetics of Molybdenum Adsorption-Desorption in Soils. *ASA, CSSA and SSSA International Annual Meetings*, Tampa, FL. USA. 2017. (oral and poster)
- **Sun W G**, Sun Z G, Wang C Y, et al. Spatial distribution characteristics of Fe and Mn contents in the new-born coastal marshes in the Yellow River estuary, China, The 6th East Asian Federation of Ecological Societies International Congress, Haikou, 2014, China.

Academic Services:

- **Manuscript reviewer:** Science of The Total Environment, Current Opinion in Environmental Sustainability, Geoderma, Hrdrological Process, Soil System, Environmental Earth Sciences, Soil Science Society of America Journal, Wetlands, Agronomy, Estuarine, Coastal and Shelf

Science, Frontiers in Environmental Science, Frontiers Ecology And Evolution, Frontiers in Marine Science, Land, Processes

- **Editor:** Guest Editor for Frontiers in Ecology and Evolution; Guest Editor for Frontiers in Agronomy,
- **Mentor:** Service as mentor for American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America (ACS) Graduate Student Networking Session

Professional Memberships:

Soil Science Society of America (SSSA) (2017-present)

American Society of Agronomy (ASA) (2020-present)