Xiangzhong (Remi) Luo

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Research Interests

As a climate change ecologist, my work centers on examining the impacts of climate variability and long-term trend on terrestrial ecosystems. I am particularly interested in studying the dynamics of the terrestrial carbon cycle, which plays a significant role in mitigating climate change by taking up about 1/3 of anthropogenic CO_2 emissions. I use data from several networks of ecological observations (i.e. Fluxnet), state-of-the-art Earth System Models and remote sensing, with results from field experiments to gain a mechanistic understanding of the physical and biological processes that regulate the terrestrial carbon cycle.

Education

Ph.D. Physical Geography, University of Toronto 2013.09 - 2017.11

Dissertation: Estimation of global land surface evapotranspiration with the consideration of vegetation structural and physiological status from remote sensing (Copyright @ 2018.03)

Thesis advisor: Dr. Jing M. Chen

M.Sc. Physical Geography, Peking University 2010.09 - 2013.06

B.Sc. Environment and Resource Management (GIS & Remote sensing). Wuhan University 2006.09 - 2010.06

Research and Teaching Experience

Postdoctoral Researcher. Lawrence Berkeley National Laboratory & UC Berkeley, 2017.11 to now

Research advisor: Dr. Trevor F. Keenan

Projects I participate in:

1. Merging top-down and bottom-up approaches to partition carbon and water fluxes between the atmosphere and biosphere.
2. Predicting maximum carboxylation rate of vegetation over large scales.

Teaching Assistant. University of Toronto, 2013.09-2017.06

Courses:

Geographic Information and Technology I (4 yrs)
Climate Biosphere Interactions (2 yrs)
Introduction to Hydrology (1 yr)
Environmental Remote Sensing (undergraduate & graduate level; 4 yrs)

Sole Responsibility Course Instructor. University of Toronto, 2017.09-12 (declined the offer due to a time conflict)

Course: Environmental Remote Sensing

Publications

12. **Luo, X.**, Croft, H., Chen, J.M., He, L. & Keenan, T.F. (2019). Improved estimates of global photosynthesis using information on leaf chlorophyll content. ***Global Change Biology***, 10.1111/gcb.14624.

11. **Luo, X.**, Keenan, T.F., Fisher, J.B., Jiménez, J., Chen, J.M., Jiang, C., Ju, W., Perakalapudi, N., Ryu, Y. & Tadić, J.M. (2018). The impact of the 2015-2016 El Niño on global photosynthesis using satellite remote sensing. ***Philosophical Transactions of the Royal Society B***, 373, 20170409.

10. **Luo, X.**, Croft, H., Chen, J.M., Bartlett, P., Staebler, R. & Froelich, N. (2018). Incorporating leaf chlorophyll content as a proxy for photosynthetic parameters for estimating carbon and water fluxes at a forest site. ***Agricultural and Forest Meteorology***, 248, 156-168.

9. He, L., Chen, J.M., Gonsamo, A., **Luo, X.**, Wang, R., Liu, Y. & Liu, R. (2018) Changes in the shadow: the shifting role of shaded leaves in global carbon and water cycles under climate change. ***Geophysical Research Letters***, 10.1029/2018GL077560.

8. **Luo, X.**, Chen, J.M., Liu, J., Black, T.A., Croft, H., Staebler, R., He, L., Arain, M.A., Chen, B., Mo, G., Gonsamo, A. & McCaughey, H. (2018). Comparison of big-leaf, two-big-leaf and two-leaf upscaling schemes for evapotranspiration estimation using coupled carbon-water modelling. ***Journal of Geophysical Research - Biogeoscience***, 10.1002/2017JG003978.

7. He, L., Chen, J.M., Croft, H., Gonsamo, A., **Luo, X.**, Liu, J., Zheng, T., Liu, R. & Liu, Y. (2017). Nitrogen availability dampens the positive impacts of CO_2 fertilization on terrestrial ecosystem carbon and water cycles. ***Geophysical Research Letters***, 44 (22).

6. Croft, H., Chen, J.M., **Luo, X.**, Bartlett, P., Chen, B. & Staebler, R. (2017). Leaf chlorophyll content as a proxy for leaf photosynthetic capacity. ***Global Change Biology***, 10.1111/gcb.13599.

5. He, L., Chen, J.M., Liu, J., Bélair, S. & **Luo, X.** (2017). Assessment of SMAP soil moisture for global simulation of gross primary production. ***Journal of Geophysical Research - Biogeoscience***, 10.1002/2016JG003603.

4. Chen, B., Liu, J., Chen, J.M., Croft, H., Gonsamo, A., He, L. & **Luo, X.** (2016). Assessment of foliage clumping effects on evapotranspiration estimates in forested ecosystems, ***Agricultural and Forest Meteorology***, 216, 82-92.

3. **Luo, X.**, Chen, X., Wang, L., Xu, L. & Tian, Y. (2014). Modeling and predicting spring land surface phenology of the Deciduous Broadleaf Forest in northern China, ***Agricultural and Forest Meteorology***, 198-199, 33-41.

2. **Luo, X.**, Chen, X., Xu, L., Myneni, R. B. & Zhu, Z. (2013). Assessing performance of NDVI and NDVI3g in monitoring leaf unfolding dates of the deciduous broadleaf forest in northern China, ***Remote Sensing***, 5, 845-861.

1. Chen, X., **Luo, X.** & Xu, L. (2013). Comparison of spatial patterns of satellite-derived and ground-based phenology for the deciduous broadleaf forest of China. ***Remote Sensing Letters***, 4, 532-541.

Publications in review

13. Croft, H., Chen, J.M., Mo, G., Luo, S., **Luo, X.**, Arabian, J., Zhang, Y., Simic, A., Noland, T.L., He, Y., Homolová, L., Malenovský, Z., Yi, Q., Beringer, J., Amiri, R., Hutley, L., Arellano, P., Stahl, C. & Bonal, D. Global distribution of leaf chlorophyll content.

14. Wang, R., Chen, J.M., **Luo, X.** et al. Improving the estimation of seasonal variations of carbon and water fluxes of evergreen conifer forests using an improved leaf area index product.

15. **Luo, X.**, Keenan, T.F. Long-term tropical water dynamics control the temperature sensitivity of the global carbon cycle.

First-author scientific presentations

9. An assessment of global photosynthesis using multiple remote sensing-based models (**Poster**), Dec 2018, ***American Geophysical Union Annual Meeting***, Washington DC, USA.

8. Assessing the impact of the 2015-2016 El Niño on global photosynthesis using satellite remote sensing (**Talk**), Jun 2018, ***Asia Oceania Geosciences Society Annual Meeting***, Honolulu, Hawaii, USA.

7. Estimation of global land surface evapotranspiration with the consideration of vegetation structural and physiological status from remote sensing (**Talk**), Feb 2017, **Lawrence Berkeley National Lab.**, USA.

6. Estimation of global land surface evapotranspiration with the consideration of vegetation structural and physiological

status from remote sensing (**Talk**), Dec 2017, **UC Berkeley**, USA.

5. Chlorophyll dynamic accounts for spatial and temporal variabilities in terrestrial carbon uptake and evapotranspiration (**Talk**), Dec 2017, ***American Geophysical Union Annual Meeting***, San Francisco, California, USA.

4. Leaf chlorophyll content as a proxy for photosynthetic parameters for estimating carbon and water fluxes at a forest site (**Poster**), Dec 2016, ***American Geophysical Union Annual Meeting***, San Francisco, California, USA.

3. Leaf chlorophyll content as a proxy for photosynthetic parameters for estimating carbon and water fluxes at a forest site **(Talk)**, Jun 2016, ***Canadian Association of Geographers Annual Meeting***, Halifax, Nova Scotia, Canada.

2. Predict satellite-derived phenology of deciduous broadleaf forest with climate phenology model **(Talk)**, April 2013, ***35th International Symposium on Remote Sensing of Environment***, Beijing, China.

1. Spatiotemporal relationships between ground-based and satellite-derived phenology in deciduous broadleaf forest areas of northern China **(Talk)**, September 2012, ***Phenology 2012 Conference***, Milwaukee, Wisconsin, USA.

Academic Service

***Review*:** Global Change Biology, Philosophical Transactions of the Royal Society B, ISPRS Journal of Photogrammetry and Remote Sensing, Remote Sensing, Canadian Journal of Forest Research.

***Review editor*:** Frontiers in Forests and Global Change, section of Tropical Forests

Students mentored:

Ms. Sophia Zamaria, University of Toronto. The Center for Global Change Science undergraduate summer internship. Link.

Mr. Paul Rosane, ENSTA ParisTech. Research Internship program at Berkeley Lab. Link.

Academic Associations:

American Geophysical Union, 2014-now;

Canadian Association of Geographers, 2016-now;

Canadian Remote Sensing Society, 2018-now;

FLUXNET, 2017-now;

USA-National Phenology Network, 2012-now.

Awards

Center for Global Change Science graduate student research award	2016
John D. Barnes Geodetic Sciences Fellowship	2015
Oscar J. Marshall Graduate Fellowship	2014
Vanier Scholarship University-wide nomination	2014

Extracurricular Experience

2016.07 The 9th Annual Fluxcourse, Fluxnet and University of Colorado Boulder.

2014.11-2016.09 Assistant Librarian at the Map & Data Library, University of Toronto.

2014.09-2015.09 Representative of physical geography cohort in Graduate Geography and Planning Student Society.

2011.04-2011.06 Internship in Underwriting Property – Munich Reinsurance Company.

2010.03-2010.05 Assistant Inspector in the 2nd National Land Use Survey and Planning of China.

Skills and Tools

• Spoken languages: English (fluent), Mandarin (native)

- Programming languages: C and C++ (proficient), Java and C# (familiar).
- Analysis software: Matlab, R Statistics, IDL, SQL
- Professional software: ArcGIS, ENVI, ERDAS

Referees

Dr. Jing M. Chen
Fellow of Royal Society of Canada, Tier 1 Canada Research Chair, Professor
Department of Geography and Planning, University of Toronto
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Dr. Trevor F. Keenan
Assistant Professor
Department of Environmental Science, Policy and Management, University of California, Berkeley
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