

# Junjie Liu

## Professional experience

- Research Scientist, Feb 2011-: Jet Propulsion Laboratory, Caltech
- Assistant Researcher, Feb 2010-Feb2011: University of California, Berkeley
- Research associate, Feb 2008-Feb 2010: University of California, Berkeley
- Research associate, Dec 2007-Feb 2008: University of Maryland-College Park

## Education

- Ph. D, December 2007: University of Maryland-College Park.
- M. S., Spring 2003: Nanjing Institute of Meteorology, China
- B. S., 2000: Nanjing Institute of Meteorology, China.

## Honors and Awards

- NASA Exceptional Achievement medal (2018)
- JPL Ed Stone Award (2018)
- JPL Voyager Award (2017)
- NASA early career achievement award (2015)
- NASA Group Achievement Award, Carbon Monitoring System Flux Pilot Project Team (2013)
- Best Ph. D thesis award in Atmospheric and Oceanic Science department, University of Maryland, 2007
- Second place student paper award for “Application of Local Ensemble Transform Kalman Filter: Perfect model experiments with NASA fvGCM” in AMS 86<sup>th</sup> annual meeting held in Atlanta, GA, Jan. 28-Feb. 3, 2006

## Selected Publications

### 2019

Philip, S., et al. (including **J. Liu**), 2019, Prior biosphere model impact on global terrestrial CO<sub>2</sub> fluxes estimated from OCO-2 retrievals. *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2018-1095>, in review, 2019.

Yi, Y. et al. (including **J. Liu**), 2019, Fire decline increases the global land carbon sink in the 21st century, in review

Shi, M., **J. Liu**, J. R. Worden, A. A. Bloom, S. Wong, R. Fu, 2019, The 2005 Amazon drought legacy effect delayed the 2006 wet season onset. *Geophysical Research Letters*, 46, 9082–9090. <https://doi.org/10.1029/2019GL083776>

Crowell, S., Baker, D., Schuh, A., Basu, S., Jacobson, A. R., Chevallier, F., **Liu, J.**, Deng, F., Feng, L., Chatterjee, A., Crisp, D., Eldering, A., Jones, D. B., McKain, K., Miller, J., Nassar, R., Oda, T., O'Dell, C., Palmer, P. I., Schimel, D., Stephens, B., and Sweeney, C.: The 2015–2016 Carbon Cycle As Seen from OCO-2 and the Global *In Situ* Network, *Atmos. Atmos. Chem. Phys.*, 19, 9797–9831, <https://doi.org/10.5194/acp-19-9797-2019>, 2019

Konings, A. G., Bloom, A. A., Liu, J., Parazoo, N. C., Schimel, D. S., and Bowman, K. W.: Global satellite-driven estimates of heterotrophic respiration, *Biogeosciences*, 16, 2269–2284, <https://doi.org/10.5194/bg-16-2269-2019>, 2019.

Schuh, A., A. R. Jacobson, S. Basu, B. Weir, D. Baker, K. Bowman, F. Chevallier, S. Crowell, K. Davis, F. Deng, S. Denning, L. Feng, D. Jones, **J. Liu**, and P. Palmer, 2019, Quantifying the impact of atmospheric transport uncertainty on CO<sub>2</sub> surface flux estimates. *Global Biogeochemical Cycles*, 33, 484–500.

## 2018

Hedelius, J. K., **Liu, J.**, Oda, T., Maksyutov, S., Roehl, C. M., Iraci, L. T., Podolske, J. R., Hillyard, P. W., Liang, J., Gurney, K. R., Wunch, D., and Wennberg, P. O.: Southern California megacity CO<sub>2</sub>, CH<sub>4</sub>, and CO flux estimates using ground- and space-based remote sensing and a Lagrangian model, *Atmos. Chem. Phys.*, 18, 16271-16291, <https://doi.org/10.5194/acp-18-16271-2018>, 2018.

**Liu, J.**, et al., 2018, Detecting drought impact on terrestrial biosphere carbon fluxes over contiguous US with satellite observations, *Environmental Research Letters*, vol 13, 095003.

**Liu J.**, et al., 2018, Response to Comment on “Contrasting carbon cycle responses of tropical continents to 2015-2016 El Nino”, Vol. 362, Issue 6418, eaat1211. DOI: 10.1126/science.aat1211

Souri, A. H., Choi, Y., Pan, S., Curci, G., Nowlan, C. R., Janz, S. J., M. K. Kowalewski,

**J. Liu** et al.(2018). First Top-Down Estimates of Anthropogenic NO<sub>x</sub> Emissions

Using High-Resolution Airborne Remote Sensing Observations. *Journal of*

*Geophysical Research: Atmospheres*, 123. <https://doi.org/10.1002/2017JD028009>

Sellers, P. J., D. S. Schimel, B. Moore, **J. Liu**, and A. Eldering, Observing Carbon Cycle-climate feedbacks from space, Proceedings of the National Academy of Sciences Jul 2018, 115 (31) 7860-7868; DOI: 10.1073/pnas.1716613115

Parazoo NC, Arneeth A, Pugh TAM, et al (including **Liu, J.**). 2018, Spring photosynthetic onset and net CO<sub>2</sub> uptake in Alaska triggered by landscape thawing. *Glob Change Biol.* 2018;24:3416–3435. <https://doi.org/10.1111/gcb.14283>

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## 2017

**Liu, J.** et al 2017 Contrasting carbon cycle responses of the tropical continents to the 2015–2016 El Nino Science **358** eaam5690

Eldering, A., Wennberg, P. O., Crisp, D., Schimel, D. S., Gunson, M. R., Chatterjee,

A.,**J. Liu**, et al.(2017). The Orbiting Carbon Observatory-2 early science investigations of regional carbon dioxide fluxes. Science, 358, eaam5745.

Shi, M., **Liu, J.**, Zhao, M., Yu, Y., & Saatchi, S. (2017). Mechanistic processes controlling persistent changes of forest canopy structure after 2005 Amazon drought. *Journal of Geophysical Research: Biogeosciences*, 122, 3378–3390.

<https://doi.org/10.1002/2017JG003966>

Mueller, K.J., **J. Liu**, W. McCarty, and R. Gelaro, 2017: An Adjoint-Based Forecast Impact from Assimilating MISR Winds into the GEOS-5 Data Assimilation and Forecasting System. *Mon. Wea. Rev.*, **145**, 4937–4947, <https://doi.org/10.1175/MWR-D-17-0047.1>

- Bowman, K. W., **Liu, J.**, Bloom, A. A., Parazoo, N. C., Lee, M., Jiang, Z., ... Wunch, D. (2017). Global and Brazilian carbon response to El Niño Modoki 2011–2010. *Earth and Space Science*, 4, 637–660. <https://doi.org/10.1002/2016EA000204>
- Basu, S., Baker, D. F., Chevallier, F., Patra, P. K., **Liu, J.**, and Miller, J. B.: The Impact of Transport Model Differences on CO<sub>2</sub> Surface Flux Estimates from OCO-2 Retrievals of Column Average CO<sub>2</sub>, *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2017-1158>, in review, 2017.
- Byrne, B., D. B. A. Jones, K. Strong, Z.-C. Zeng, F. Deng, and J. Liu (2017), Sensitivity of CO<sub>2</sub> surface flux constraints to observational coverage, *J. Geophys. Res. Atmos.*, 122, 6672–6694, doi:[10.1002/2016JD026164](https://doi.org/10.1002/2016JD026164).
- Fischer, M. L., N. Parazoo, K. Brophy, X Cui, S. Jeong, **J. Liu** et al. (2017), Simulating estimation of California fossil fuel and biosphere carbon dioxide exchanges combining in situ tower and satellite column observations, *J. Geophys. Res. Atmos.*, 122, doi:10.1002/2016JD025617.

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- Liu, J.**, K. W. Bowman, and M. Lee (2016), Comparison between the Local Ensemble Transform Kalman Filter (LETKF) and 4D-Var in atmospheric CO<sub>2</sub> flux inversion with the Goddard Earth Observing System-Chem model and the observation impact diagnostics from the LETKF, *J. Geophys. Res. Atmos.*, 121, 13,066–13,087, doi:[10.1002/2016JD025100](https://doi.org/10.1002/2016JD025100).
- Liu, J.**, and K. Bowman (2016), A method for independent validation of surface fluxes from atmospheric inversion: Application to CO<sub>2</sub>, *Geophys. Res. Lett.*, 43, doi:[10.1002/2016GL067828](https://doi.org/10.1002/2016GL067828).
- Liu, J.**, K. W. Bowman, and D. K. Henze (2015), Source-receptor relationships of column-average CO<sub>2</sub> and implications for the impact of observations on flux inversions. *J. Geophys. Res. Atmos.*, 120, 5214–5236. doi: 10.1002/2014JD022914.
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- Miller, S. M., Hayek, M. N., Andrews, A. E., Fung, I., and **Liu, J.**: Biases in atmospheric CO<sub>2</sub> estimates from correlated meteorology modeling errors, *Atmos. Chem. Phys.*,

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- Parazoo, N. C., et al. (including **Liu, J.**) (2013), Interpreting seasonal changes in the carbon balance of southern Amazonia using measurements of XCO<sub>2</sub> and chlorophyll fluorescence from GOSAT, *Geophys. Res. Lett.*, 40, 2829–2833, doi:10.1002/grl.50452.
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- Liu, J.**, I. Fung, E. Kalnay, and J.-S. Kang (2011), CO<sub>2</sub> transport uncertainties from the uncertainties in meteorological fields, *Geophys. Res. Lett.*, 38, L12808, doi:10.1029/2011GL047213.
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- Li, H., **J. Liu**, E. J. Fertig, E. Kalnay, E. Kostelich, and I. Szunyogh (2011), Improved analyses and forecasts with AIRS temperature retrievals using the Local Ensemble Transform Kalman Filter. *J. of Tropical Meteorology*. 17, 43-49.
- Li, H., **J. Liu**, and E. Kalnay, 2010: Correction of ‘Estimating observation impact without adjoint model in an ensemble Kalman filter’. *Quart. J. Roy. Meteor. Soc.* 136, 1652-1654
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- Liu, J.** and E. Kalnay, 2008: Estimating observation impact study without adjoint model in an ensemble Kalman filter. *Quart. J. Roy. Meteor. Soc.*, **134**, 1327-1335.
- Liu, J.**, E. J. Fertig, H. Li, I. Szunyogh, B. Hunt, E. Kalnay, E. J. Kostelich, and R. Todling, 2008: Comparison between Local Ensemble Transform Kalman Filter and PSAS in the NASA finite volume GCM: perfect model experiments. *Nonlin. Processes in Geophys.*, **15**, 645-659.
- Liu, J.** and E. Kalnay, 2007: Simple Doppler Wind Lidar (DWL) adaptive observation experiments with 3D-Var and an ensemble Kalman filter in a global primitive equations model. *Geophys. Res. Lett.*, **34**, L19808, doi: 10.1029/2007GL030707.
- Liu, J.**, Y-H. Ding, and J-H. He, 2003: Analysis of typical Meiyu front structure in 1999. *Acta Meteorological Sinica*. **61**, 291-301.

### Current Funding Support

- NASA IDS program, title: Tropical controls on the atmospheric growth rate and implications for carbon-climate feedbacks. **co-I, 2017-2020**.
- NASA Carbon Cycle Science, title: Changes in the Carbon Cycle Observed in Greenhouse Gas Total Columns – TCCON, **co-I, 2017-2020**
- NASA OCO-2 Science Team, title: Investigating the impact of extreme climate events on terrestrial biosphere carbon flux interannual variability with a regional high-resolution L-4 surface CO<sub>2</sub> product, **PI, 2018-2021**
- NASA OCO-2 Science Team, title: Observing and validating carbon-climate feedbacks with OCO-2, **co-I, 2018-2021**
- NASA OCO-2 Science Team, title: Ocean Processes Controlling Carbon Fluxes during ENSO Constrained by OCO-2 and Oxygen Measurements, **co-I, 2018-2021**
- NASA Carbon Cycle Science, title: Estimating the Impacts of Recent Severe Amazonia Droughts on Forest Carbon Dynamics and Fluxes from Assimilating Satellite Observations in NCAR CESM with Ensemble Kalman Filter, **PI, 2014-2017**
- NASA CMS program, title: A decadal carbon reanalysis from the NASA Carbon Monitoring System Flux (CMS-Flux) project, **co-I, 2018-2021**
- NASA MEASURES program, title: Records of Fused and Assimilated Satellite Carbon Dioxide Observations and Fluxes from Multiple Instruments, **co-I, 2018-2023**

### Community Service

- Reviewer for Nature Plants, Scientific Report, Monthly Weather Review, Quarterly Journal of, Tellus, Climate Dynamics, Journal of Climate, Atmospheric Chemistry and Physics, and Geophysical Model Development
- Reviewer for NASA, NOAA and NSF proposals