

# Junjie Liu

## Professional experience

- Acting Science Team Lead for Orbiting Carbon Observatory -2/3, Jan 2022-
- Visiting Associate, Aug 2018-, Caltech
- 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

### Year 2021 and 2022

Friedlingstein, P., et al. (including **J. Liu**): Global Carbon Budget 2021, *Earth Syst. Sci. Data*, 14, 1917–2005, <https://doi.org/10.5194/essd-14-1917-2022>, 2022.

Laughner, Joshua L, Jessica L Neu, David Schimel, Paul O Wennberg, Kelley Barsanti, Kevin W Bowman, Abhishek Chatterjee, et al. 2021. “Societal Shifts Due to COVID-19 Reveal Large-Scale Complexities and Feedbacks between Atmospheric Chemistry and Climate Change.” *Proceedings of the National Academy of Sciences* 118 (46). <https://doi.org/10.1073/pnas.2109481118>.

Barkhordarian, Armineh, Kevin W Bowman, Noel Cressie, Jeffrey Jewell, and Junjie Liu. 2021. “Emergent Constraints on Tropical Atmospheric Aridity{ \textendash}carbon Feedbacks and the Future of Carbon Sequestration,” October. <https://doi.org/10.1088/1748-9326/ac2ce8>.

- Byrne, B, J Liu, M Lee, Y Yin, K W Bowman, K Miyazaki, A J Norton, et al. 2021. “The Carbon Cycle of Southeast Australia During 2019–2020: Drought, Fires, and Subsequent Recovery.” *AGU Advances* 2 (4): e2021AV000469. <https://doi.org/https://doi.org/10.1029/2021AV000469>.
- He, Wei, Fei Jiang, Mousong Wu, Weimin Ju, Marko Scholze, Zhi Chen, Brendan Byrne, et al. n.d. “China’s Terrestrial Carbon Sink over 2010–2015 Constrained by Satellite Observations of Atmospheric CO<sub>2</sub> and Land Surface Variables.” *Journal of Geophysical Research: Biogeosciences* n/a (n/a): e2021JG006644. <https://doi.org/https://doi.org/10.1029/2021JG006644>.
- Zhang, Li, Kenneth J Davis, Andrew E Schuh, Andrew R Jacobson, Sandip Pal, Yu Yan Cui, David Baker, et al. 2022. “Multi-Season Evaluation of CO<sub>2</sub> Weather in OCO-2 MIP Models.” *Journal of Geophysical Research: Atmospheres* 127 (2): e2021JD035457. <https://doi.org/https://doi.org/10.1029/2021JD035457>.
- Parazoo, Nicholas C, Kevin W Bowman, Bianca C Baier, Junjie Liu, Meemong Lee, Le Kuai, Yoichi Shiga, et al. 2021. “Covariation of Airborne Biogenic Tracers (CO<sub>2</sub>, COS, and CO) Supports Stronger Than Expected Growing Season Photosynthetic Uptake in the Southeastern US.” *Global Biogeochemical Cycles* 35 (10): e2021GB006956. <https://doi.org/https://doi.org/10.1029/2021GB006956>.
- Park, Chaerin, Sujong Jeong, Hoonyoung Park, Jeongmin Yun, and Junjie Liu. 2021. “Evaluation of the Potential Use of Satellite-Derived XCO<sub>2</sub> in Detecting CO<sub>2</sub> Enhancement in Megacities with Limited Ground Observations: A Case Study in Seoul Using Orbiting Carbon Observatory-2.” *Asia-Pacific Journal of Atmospheric Sciences* 57 (2): 289–99. <https://doi.org/10.1007/s13143-020-00202-5>.
- Peiro, H, S Crowell, A Schuh, D F Baker, C O’Dell, A R Jacobson, F Chevallier, et al. 2021. “Four Years of Global Carbon Cycle Observed from OCO-2 Version 9 and *in Situ* Data, and Comparison to OCO-2 V7.” *Atmospheric Chemistry and Physics Discussions* 2021: 1–50. <https://doi.org/10.5194/acp-2021-373>.
- Liao, E., Resplandy, L., Liu, J., & Bowman, K. W. (2021). Future weakening of the ENSO ocean carbon buffer under anthropogenic forcing. *Geophysical Research Letters*, 48, e2021GL094021. <https://doi.org/10.1029/2021GL094021>
- Worden, S., Fu, R., Chakraborty, S., Liu, J., & Worden, J. (2021). Where does moisture come from over the Congo Basin? *Journal of Geophysical Research: Biogeosciences*, 126, e2020JG006024. <https://doi.org/10.1029/2020JG006024>
- Chen, Z., Huntzinger, D. N., Liu, J., ..., and Miller, S. M.: Five years of variability in the global carbon cycle: comparing an estimate from the Orbiting Carbon Observatory-2 and process-based models, *Environ. Res. Lett.* **16** 054041

Worden, J., Saatchi, S., Keller, M., Bloom, A., **Liu, J.**, Parazoo, N., et al. (2021). Satellite observations of the tropical terrestrial carbon balance and interactions with the water cycle during the 21st century. *Reviews of Geophysics*, 59, e2020RG000711. <https://doi.org/10.1029/2020RG000711>

Chen, Z., **Liu, J.**, Henze, D. K., Huntzinger, D. N., Wells, K. C., and Miller, S. M.: Linking global terrestrial CO<sub>2</sub> fluxes and environmental drivers using OCO-2 and a geostatistical inverse model, *Atmos. Chem. Phys.*, 21, 6663–6680, <https://doi.org/10.5194/acp-21-6663-2021>, 2021.

## 2020

**Liu, J.**, Baskaran, L., Bowman, K., Schimel, D., Bloom, A. A., Parazoo, N. C., Oda, T., Carroll, D., Menemenlis, D., Joiner, J., Commane, R., Daube, B., Gatti, L. V., McKain, K., Miller, J., Stephens, B. B., Sweeney, C., and Wofsy, S.: Carbon Monitoring System Flux Net Biosphere Exchange 2020 (CMS-Flux NBE 2020), *Earth Syst. Sci. Data*, 13, 299–330, <https://doi.org/10.5194/essd-13-299-2021>, 2021.

**Liu, J.**, Wennberg, P. O., Parazoo, N. C., Yin, Y., & Frankenberg, C. (2020). Observational constraints on the response of high-latitude northern forests to warming. *AGU Advances*, 1, e2020AV000228. <https://doi.org/10.1029/2020AV000228>

Carroll, D., Menemenlis, D., et al. (including **J. Liu**), (2020). The ECCO-Darwin data-assimilative global ocean biogeochemistry model: Estimates of seasonal to multidecadal surface ocean pCO<sub>2</sub> and air-sea CO<sub>2</sub> flux. *Journal of Advances in Modeling Earth Systems*, 12, e2019MS001888. <https://doi.org/10.1029/2019MS001888>

Liao, E., Resplandy, L., Liu, J., & Bowman, K. W. (2020). Amplification of the ocean carbon sink during El Niños: Role of poleward Ekman transport and influence on atmospheric CO<sub>2</sub>. *Global Biogeochemical Cycles*, 34, e2020GB006574. <https://doi.org/10.1029/2020GB006574>

Yin, Y. et al. (including **J. Liu**), 2020, Fire decline in dry tropical ecosystems enhances decadal land carbon sink. *Nat Commun* 11, 1900 (2020). <https://doi.org/10.1038/s41467-020-15852-2>

Yi, Y., Kimball, J. S., Watts, J. D., Natali, S. M., Zona, D., **Liu, J.**, Ueyama, M., Kobayashi, H., Oechel, W., and Miller, C. E.: Investigating the sensitivity of soil heterotrophic respiration to recent snow cover changes in Alaska using a satellite-based permafrost carbon model, *Biogeosciences*, 17, 5861–5882, <https://doi.org/10.5194/bg-17-5861-2020>, 2020.

Byrne, B.\* , **Liu, J.**, Bloom, A. A., Bowman, K. W., Butterfield, Z., Joiner, J., et al. (2020). Contrasting regional carbon cycle responses to seasonal climate anomalies across

the east-west divide of temperate North America. *Global Biogeochemical Cycles*, 34, e2020GB006598. <https://doi.org/10.1029/2020GB006598>

Byrne, B. \*, Liu, J., Lee, M., Baker, I., Bowman, K. W., Deutscher, N. M., et al. (2020). Improved constraints on northern extratropical CO<sub>2</sub> fluxes obtained by combining surface-based and space-based atmospheric CO<sub>2</sub> measurements. *Journal of Geophysical Research: Atmospheres*, 125, e2019JD032029. <https://doi.org/10.1029/2019JD032029>

Butler, M. P., Lauvaux, T., Feng, S., **Liu, J.**, Bowman, K. W., & Davis, K. J. (2020). Atmospheric simulations of total column CO<sub>2</sub> mole fractions from global to mesoscale within the carbon monitoring system flux inversion framework. *Atmosphere*, 11(8), 787.

Bloom, A. A., Bowman, K. W., **Liu, J.**, Konings, A. G., Worden, J. R., Parazoo, N. C., Meyer, V., Reager, J. T., Worden, H. M., Jiang, Z., Quetin, G. R., Smallman, T. L., Exbrayat, J.-F., Yin, Y., Saatchi, S. S., Williams, M., and Schimel, D. S.: Lagged effects regulate the inter-annual variability of the tropical carbon balance, *Biogeosciences*, 17, 6393–6422, <https://doi.org/10.5194/bg-17-6393-2020>, 2020.

Jones, S., Rowland, L., Cox, P., Hemming, D., Wiltshire, A., Williams, K., Parazoo, N. C., **Liu, J.**, da Costa, A. C. L., Meir, P., Mencuccini, M., and Harper, A. B.: The impact of a simple representation of non-structural carbohydrates on the simulated response of tropical forests to drought, *Biogeosciences*, 17, 3589–3612, <https://doi.org/10.5194/bg-17-3589-2020>, 2020.

Yun et al., (including **Liu, J.**), Enhanced regional terrestrial carbon uptake over Korea revealed by atmospheric CO<sub>2</sub> measurements from 1999 to 2017, *Global Change Biology*, 2020, DOI: 10.1111/gcb.15.061

Yin, Y., Byrne, B., **Liu, J.**, Wennberg, P., Davis, K. J., Magney, T., et al. (2020). Cropland carbon uptake delayed and reduced by 2019 Midwest floods. *AGU Advances*, 1, e2019AV000140. <https://doi.org/10.1029/2019AV000140>

## **Year 2019**

Feng, S., T. Lauvaux, K. Davis, K. Keller, Y. Zhou, C. Williams, A. Schuh, **J. Liu**, I. Baker, 2019: Seasonal characteristics of model uncertainties from biogenic fluxes, transport, and large-scale boundary inflow in atmospheric CO<sub>2</sub> simulations over North America. *J. Geophys. Res.-Atmos.*, <https://doi.org/10.1029/2019JD031165>

Shi, M., **Liu, J.**, Worden, J. R., Bloom, A. A., Wong, S., & Fu, R. (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., McKain, K., Chatterjee, A., Miller, J. B., Stephens, B. B., Eldering, A., Crisp, D., Schimel, D., Nassar, R., O'Dell, C. W., Oda, T., Sweeney, C., Palmer, P. I., and Jones, D. B. A.: The 2015–2016 carbon cycle as seen from OCO-2 and the global in situ network, *Atmos. Chem. Phys.*, 19, 9797–9831, <https://doi.org/10.5194/acp-19-9797-2019>, 2019.

Philip, S., Johnson, M. S., Potter, C., Genovesse, V., Baker, D. F., Haynes, K. D., Henze, D. K., **Liu, J.**, and Poulter, B.: Prior biosphere model impact on global terrestrial CO<sub>2</sub> fluxes estimated from OCO-2 retrievals, *Atmos. Chem. Phys.*, 19, 13267–13287, <https://doi.org/10.5194/acp-19-13267-2019>, 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.

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## **Prior 2019**

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.*, 18, 7189–7215, <https://doi.org/10.5194/acp-18-7189-2018>, 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, Arneth 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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**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>

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](https://doi.org/10.1002/2016JD025617).

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Fisher, J.B., Sikka, M., Huntzinger, D.N., Schwalm, C., **Liu, J.**, 2016. 3-hourly temporal downscaling of monthly global terrestrial biosphere model net ecosystem exchange. *Biogeosciences* 13(14): 4271-4277.

**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).



- Kuai, L., et al. (including **Liu, J**) (2015), Estimate of carbonyl sulfide tropical oceanic surface fluxes using Aura Tropospheric Emission Spectrometer observations, *J. Geophys. Res. Atmos.*, 120, 11,012–11,023, doi:[10.1002/2015JD023493](https://doi.org/10.1002/2015JD023493).
- 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.
- Worden, J. R., Turner, A. J., Bloom, A., Kulawik, S. S., **Liu, J.**, Lee, M., Weidner, R., Bowman, K., Frankenberg, C., Parker, R., and Payne, V. H.: Quantifying lower tropospheric methane concentrations using GOSAT near-IR and TES thermal IR measurements, *Atmos. Meas. Tech.*, 8, 3433-3445, doi:10.5194/amt-8-3433-2015, 2015.
- Bousserez, N., D. K. Henze, A. Perkins, K. W. Bowman, M. Lee, **J. Liu**, D. B. A. Jones, F. Deng (2015), Improved analysis error covariance matrix estimates for variational inverse problems, *Q. J. R. Meteorol. Soc.*, 141: 1906–1921, do:10.1002/qj.2495,
- 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.*, 15, 2903-2914, doi:10.5194/acp-15-2903-2015, 2015.
- Ott, L. E., Steven Pawson, George J. Collatz, Watson W. Gregg, Dimitris Menemenlis, Holger Brix, Cecile S. Rousseaux, Kevin W. Bowman, **Junjie Liu**, Annmarie Eldering, Michael R. Gunson, and Stephan R. Kawa, 2015, Assessing the magnitude of CO<sub>2</sub> flux uncertainty in atmospheric CO<sub>2</sub> records using products from NASA's Carbon Monitoring Flux Pilot Project, *J. Geophys. Res. Atmos.*, 120, doi:10.1002/2014JD022411.
- Kuai, L., J. Worden, S. S. Kulawik, S. A. Montzka, and **J. Liu** (2014): Characterization of aura tropospheric emissions spectrometer carbonyl sulfide retrievals over ocean, *Atmos. Meas. Tech.*, 7, 163-172, doi:10.5194/amt-7-163-2014.
- Liu, J.**, Bowman, K., Lee, M., Henze, D., Bousserez, N., Brix, H., Collatz, G., Menemenlis, D., Ott, L., Pawson, S., Jones, D., Nassar, R.. Carbon monitoring system flux estimation and attribution: impact of ACOS-GOSAT XCO<sub>2</sub> sampling on the inference of terrestrial biospheric sources and sinks. *Tellus B*, North America, 66, may. 2014. Available at: <http://www.tellusb.net/index.php/tellusb/article/view/22486>
- 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.
- Worden, J., et al. (including **Liu, J.**) (2013), El Niño, the 2006 Indonesian peat fires, and the distribution of atmospheric methane, *Geophys. Res. Lett.*, 40, 4938–4943, doi:10.1002/grl.50937
- Liu, J.**, I. Fung, E. Kalnay, J.-S. Kang, E. T. Olsen, and L. Chen (2012), Simultaneous assimilation of AIRS Xco<sub>2</sub> and meteorological observations in a carbon climate model with an ensemble Kalman filter, *J. Geophys. Res.*, 117, D05309, doi:10.1029/2011JD016642.

- Kalnay, E., Y. Ota, T. Miyoshi, **J. Liu** (2012), A simpler formulation of forecast sensitivity to observations: application to ensemble Kalman filters. *Tellus A*.
- Kang, J.-S., E. Kalnay, T. Miyoshi, **J. Liu**, and I. Fung (2012), Estimation of surface carbon fluxes with an advanced data assimilation methodology, *J. Geophys. Res.*, 117, D24101, doi:10.1029/2012JD018259.
- 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.
- Kang, J.-S., E. Kalnay, **J. Liu**, I. Fung, T. Miyoshi, and K. Ide (2011), “Variable localization” in an ensemble Kalman filter: Application to the carbon cycle data assimilation, *J. Geophys. Res.*, 116, D09110, doi:10.1029/2010JD014673.
- 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
- Liu, J.**, E. Kalnay, T. Miyoshi, and C. Cardinali, 2009: Analysis sensitivity calculation within an ensemble Kalman filter. *Quart. J. Roy. Meteor. Soc.* **135**, 1842-1851
- Liu, J.**, H. Li, E. Kalnay, E.J. Kostelich, and I. Szunyogh, 2009: Univariate and Multivariate Assimilation of AIRS Humidity Retrievals with the Local Ensemble Transform Kalman Filter. *Mon. Wea. Rev.*, **137**, 3918–3932.
- Fertig, E. J., S.-J. Baek, B. R. Hunt, E. Ott, I. Szunyogh, J. A. Aravequia, E. Kalnay, H. Li, and **J. Liu**, 2009: Observation bias correction with an ensemble Kalman filter. *Tellus A*, **61**, 210-226.
- 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 OCO Science team, title: Revealing the mystery of African Carbon cycle. PI, 2021-2024
- NASA Carbon Cycle science program, title: Contrasting carbon-climate interactions from interannual to long-term carbon-climate feedbacks across tropical continents. PI, 2021-2024
- NASA CMS program, title: High-Resolution Carbon Monitoring System in East Africa: Unifying Top-Down Atmospheric Inversion and Bottom-Up Next-Generation Vegetation-Soil Models and Observations, **co-I, institutional PI, 2021-2024.**



- NASA CMS program, title: Preparing CMS flux for inventory applications, **co-I, institutional PI, 2021-2024.**
- NASA OCO Science Team, title: Revealing the mystery of African carbon cycle, **PI: 2021-2024.**
- NASA OCO Science Team, title: Diagnosing and attributing Arctic-Boreal carbon fluxes using in situ and satellite CO2 monitoring network. **co-I, institutional PI, 2021-2024.**
- NASA OCO 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 CO2 product, **PI, 2018-2021**
- NASA OCO Science Team, title: Observing and validating carbon-climate feedbacks with OCO-2, **co-I, 2018-2021\**
- NASA OCO Science Team, title: Ocean Processes Controlling Carbon Fluxes during ENSO Constrained by OCO-2 and Oxygen Measurements, **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, Nature communications, Science Advance, 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