ANDREW SCHUH

Contact Information

Academic Address

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Employment History

Colorado State University

2015- present: Research Scientist III, Cooperative Institute for Research in the Atmosphere

2012- 2015: Research Scientist II, Cooperative Institute for Research in the Atmosphere

2009-2012: Research Scientist I, Dept. of Atmospheric Sciences

2000-2008: Environmental Statistician, Neptune and Company, Los Alamos, NM

Education and Training

B.S., Mathematics, Portland State University, 1995

M.A., Mathematics, University of Montana, 1998

Ph.D. Ecology, Colorado State University, 2008

Professional Experience

Andrew Schuh is a mathematical statistician and quantitative ecologist with broad interests in environmental statistics, transport modeling, stochastic simulation, carbon science, and climate change. He has spent the last decade involved in atmospheric CO_2 trace gas flux inversions, from regional to global scales. He is on the Science Team for OCO-2/OCO-3.

Recent Funding

- OCO-2 Science Team member funding (2014, 2017, 2020, 2023) for various CO2 flux inversion projects
- Funding from NASA 2020 Carbon Cycle Program, SIF/Dryland Agriculture ($920K)
- Funding from NASA Carbon Monitoring System (2023) for multi-scale Brazilian flux inversion system

Synergistic Activities

- Lead for NASA GHG Center funded trace gas inversion workshops in Fort Collins (2024, 2026)
- Convener of an annual AGU session on Biospheric Exchange of GHGs (2009-2023)
- PhD student committees (Colorado State University, Penn State University, University of Reims Champagne-Ardenne)
- Serving on the GEOS-Chem Steering Committee and lead for Transport Working Group

Selected Publications

Danjou, A., Broquet, G., Schuh, A., Bréon, F.-M., and Lauvaux, T.: Optimal selection of satellite XCO2 images over cities for urban CO2 emission monitoring using a global adaptive-mesh model, Atmos. Meas. Tech. Discuss. [preprint], https://doi.org/10.5194/amt-2023-199, in review, 2023.

B Gaubert, …, **Schuh, A. E.** Neutral Tropical African CO2 Exchange Estimated From Aircraft and Satellite Observations, 2023, Global Biogeochemical Cycles 37 (12), e2023GB007804

Michael Bertolacci, Andrew Zammit-Mangion, **Andrew Schuh**, et al (2023) Inferring changes to the global carbon cycle with WOMBAT v2.0, a hierarchical flux-inversion framework, Annals of Applied Statistics, *accepted with minor revisions*

Schuh, A. E. and Jacobson, A. R.: Uncertainty in parameterized convection remains a key obstacle for estimating surface fluxes of carbon dioxide, Atmos. Chem. Phys., 23, 6285–6297, https://doi.org/10.5194/acp-23-6285-2023, 2023

Wang, Y., Tian, X., Chevallier, F.,… ,**Schuh, A.E.** (2022). Constraining China's land carbon sink from emerging satellite CO2observations: Progress and challenges. Global Change Biology, 28, 6838–6846. https://doi.org/10.1111/gcb.16412

Brendan Byrne, …, **Andrew Schuh**, et al. (2022) National CO_2 budgets (2015–2020) inferred from atmospheric CO_2 observations in support of the Global Stocktake, submitted to ESSD

Yu Yan Cui, …, **Andrew Schuh**, et al. (2022) Evaluating global atmospheric inversions of terrestrial net ecosystem exchange CO_2 over North America on seasonal and sub-continental scales, GRL, 49, e2022GL100147, https://doi.org/10.1029/2022GL100147

Yilong Wang **, … Andrew Schuh,** et al. (2022), Constraining China's land carbon sink from emerging satellite CO_2 observations: progress and challenges, Global Change Biology, https://doi.org/10.1111/gcb.16412

Peiro, H., Crowell, S., **Schuh, A.**, et al (2022): Four years of global carbon cycle observed from OCO-2 version 9 and *in situ* data, and comparison to OCO-2 v7, Atmos. Chem. Phys. https://doi.org/10.5194/acp-22-1097-2022

Schuh, A.E., Byrne, B., Jacobson, A.R. *et al.* On the role of atmospheric model transport uncertainty in estimating the Chinese land carbon sink. *Nature* 603, E13–E14 (2022). https://doi.org/10.1038/s41586-021-04258-9

Zhang, L., Davis, K. J., **Schuh, A. E.**, et al. (2022). Multi-season evaluation of CO2 weather in OCO-2 MIP models. Journal of Geophysical Research: Atmospheres, 127, e2021JD035457. https://doi.org/10.1029/2021JD035457

Davis, Kenneth J.; … **Andrew E. Schuh** et al, 2021. The Atmospheric Carbon and Transport (ACT) – America Mission. In press, Bull. Amer. Meteorol. Soc., https://doi.org/10.1175/BAMS-D-20-0300.1

Andrew E. Schuh, et al., Far-field biogenic and anthropogenic emissions as a dominant source of variability in local urban carbon budgets: A global high-resolution model study with implications for satellite remote sensing, Remote Sensing of Environment,Volume 262,2021,112473,ISSN 0034-4257, https://doi.org/10.1016/j.rse.2021.112473.

B. J. Gaudet, …, **A. Schuh**, et al, Regional-scale, sector-specific evaluation of global CO_2 inversion models using aircraft data from the ACT-America project**,** JGR-Atmospheres**,** https://doi.org/10.1029/2020JD033623

Sha Feng, …, **Andrew E. Schuh** et al. Seasonal Characteristics of Model Uncertainties From Biogenic Fluxes, Transport, and Large-Scale Boundary Inflow in Atmospheric CO2 Simulations Over North America, JGR-A, 2020 Vol 124/ 24, 14325-14346

A. E. Schuh, et al, Quantifying the Impact of Atmospheric Transport Uncertainty on CO2 Surface Flux Estimates, Global Biogeochemical Cycles, https://doi.org/10.1029/2018GB006086 2019

Crowell, S., Baker, D., **Schuh, A.** et al: The 2015–2016 Carbon Cycle As Seen from OCO-2 and the Global *In Situ* Network, Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2019-87 2019.

Schuh, A. E. et al, Evaluating atmospheric CO_2 inversions at multiple scales over a highly inventoried agricultural landscape. Global Change Biology, 19: 1424–1439. doi: 10.1111/gcb.12141, 2013

A. E. Schuh, et al.: A regional high-resolution carbon flux inversion of North America for 2004, Biogeosciences, 7, 1625-1644, doi:10.5194/bg-7-1625-2010, 2010.

A. E. Schuh, et al.: Seeing the forest through the trees: Recovering large-scale carbon flux biases in the midst of small-scale variability, Journal of Geophysical Research 01/2009; 114. DOI:10.1029/2008JG000842