

Britton B. Stephens

National Center for Atmospheric Research
Earth Observing Laboratory, Research Aviation Facility
3090 Center Green Drive, Boulder, CO 80301
(303) 497-1018, stephens@ucar.edu, <http://staff.ucar.edu/users/stephens>

1. EDUCATION

- 9/95–9/99 **Scripps Institution of Oceanography, UCSD** La Jolla, CA
Ph.D. in Oceanography. Dissertation: “Field-based Atmospheric Oxygen Measurements and the Global Carbon Cycle.”
- 9/89–6/93 **Harvard University** Cambridge, MA
A.B. Magna Cum Laude degree in Earth and Planetary Sciences.
Senior Honors Thesis: “An Investigation of Natural and Anthropogenic Influences on Stratospheric Ozone Trends.”

2. PROFESSIONAL EXPERIENCE

- 7/18–present **National Center for Atmospheric Research** Boulder, CO
Senior Scientist in EOL
- 7/09–6/18 **National Center for Atmospheric Research** Boulder, CO
Scientist III in EOL and ISP
- 2/09–8/10 **National Institute for Water and Atmospheric Research**
Visiting Scientist Wellington, New Zealand
- 7/05–6/09 **National Center for Atmospheric Research** Boulder, CO
Scientist II in EOL and TIIMES
- 1/02–7/05 **National Center for Atmospheric Research** Boulder, CO
Scientist I in ATD/EOL and TIIMES
- 11/99–10/01 **Coop. Inst. for Res. in Environmental Sciences** Boulder, CO
Visiting Fellow at NOAA CMDL
- 7/99–10/99 **Scripps Institution of Oceanography, UCSD** La Jolla, CA
Postdoctoral Research Chemist in the Marine Research Division
- 7/93–1/95 **United States Geological Survey** Woods Hole, MA
ECO Associate for the Geochemical Carbon Fluxes Project
- Summer '92 **Harvard University** Cambridge, MA
Research assistant in a carbon-isotope laboratory
- Summer '91 **Juneau Icefield Research Program** AK and BC
Research assistant on an 8-week field expedition

3. PUBLICATION LIST

Refereed Articles

- 3.1) Loechli, A. M., Stephens, B. B., Commane, R., Chevallier, F., McKain, K., Ralph, K., Morgan, E., Patra, P. K., Sargent, M., Sweeney, C., and Keppel-Aleks, G., 2023: Evaluating Northern Hemisphere growing season net carbon flux in climate models using aircraft observations, *Glob. Biogeochem. Cycles*, <https://doi.org/10.1029/2022GB007520>.
- 3.2) Laughner, J. L., Roche, S., Kiel, M., Toon, G. C., Wunch, D., Baier, B. C., Biraud, S., Chen, H., Kivi, R., Laemmle, T., McKain, K., Qu  h  , P.-Y., Rousogonous, C., Stephens, B. B., Walker, K., and Wennberg, P. O., 2023: A new algorithm to generate a priori trace gas profiles for the GGG2020 retrieval algorithm, *Atmos. Meas. Tech.*, 16, 1121–1146, <https://doi.org/10.5194/amt-16-1121-2023>.
- 3.3) Mitchell, L., J. Lin, L. Hutyra, D. Bowling, R. Cohen, K. Davis, E. DiGangi, R. Duren, J. Ehleringer, C. Fain, M. Falk, A. Guha, A. Karion, R. Keeling, J. Kim, N. Miles, C. Miller, S. Newman, D. Pataki, S. Prinzivalli, X. Ren, A. Rice, S. Richardson, M. Sargent, B. Stephens, J. Turnbull, K. Verhulst, F. Vogel, R. Weiss, J. Whetstone, and S. Wofsy, 2022: A multi-city urban atmospheric greenhouse gas measurement data synthesis, *Scientific Data*, <http://doi.org/10.1038/s41597-022-01467-3>.
- 3.4) Tilmes, S., A. Smith, P. Lawrence, T. Barnes, W. Grabowski, B. Medeiros, M. Morrison, A. Prein, B. B. Stephens, R. Rasmussen, G. Gadikota, D. G. MacMartin, K. Rosenlof, D. S. Rothman, A. Seimon, and G. Shrestha, 2022: Developing a framework for an interdisciplinary and international climate intervention strategies research program, *Bull. Amer. Met. Soc.*, <https://doi.org/10.1175/BAMS-D-21-0053.1>.
- 3.5) Thompson, C., et al., 2022: The NASA Atmospheric Tomography (ATom) Mission: Imaging the Chemistry of the Global Atmosphere, *Bull. Amer. Met. Soc.*, <https://doi.org/10.1175/BAMS-D-20-0315.1>.
- 3.6) Long, M. C., B. B. Stephens, K. McKain, C. Sweeney, R. F. Keeling, E. A. Kort, E. J. Morgan, J. D. Bent, N. Chandra, F. Chevallier, R. Commane, B. C. Daube, P. B. Krummel, Z. Loh, I. T. Lujikx, D. Munro, P. Patra, W. Peters, M. Ramonet, C. R  denbeck, A. Stavert, P. Tans, S. C. Wofsy, 2021: Strong Southern Ocean carbon uptake evident in airborne observations, *Science*, 374, 1275-1280, <https://doi.org/10.1126/science.abi4355>.

- 3.7) Hallar, A. G., S. S. Brown, E. Crosman, K. Barsanti, C. Cappa, J. Lin, J. Murphy, J. Horel, L. Mitchell, J. Fast, V. Aneja, R. Bahreini, R. Banta, C. Bray, A. Brewer, D. Caulton, J. de Gouw, S. F. J. De Wekker, D. K. Farmer, I. Faloon, C. J. Gaston, S. Hoch, H. A. Holmes, F. Hopkins, N. N. Karle, J. T. Kelly, K. Kelly, N. Lareau, K. Lu, R. L. Mauldin, D. V. Mallia, R. Martin, D. Mendoza, H. J. Oldroyd, Y. Pichugina, K. A. Pratt, P. Saide, P. Silva, W. Simpson, B. Stephens, J. Stutz, A. Sullivan, C. C. Womack, 2021, Coupled air quality and boundary-layer meteorology in Western U.S. basins during winter: Design and rationale for a comprehensive study, *Bull. Amer. Met. Soc.*, <https://doi.org/10.1175/BAMS-D-20-0017.1>.
- 3.8) Gonzalez, Y., Commane, R., Manninen, E., Daube, B. C., Schiferl, L., McManus, J. B., McKain, K., Hintsa, E. J., Elkins, J. W., Montzka, S. A., Sweeney, C., Moore, F., Jimenez, J. L., Campuzano Jost, P., Ryerson, T. B., Bourgeois, I., Peischl, J., Thompson, C. R., Ray, E., Wennberg, P. O., Crouse, J., Kim, M., Allen, H. M., Newman, P., Stephens, B. B., Apel, E. C., Hornbrook, R. S., Nault, B. A., Morgan, E., and Wofsy, S. C., 2021: Impact of stratospheric air and surface emissions on tropospheric nitrous oxide during ATom, *Atmos. Chem. Phys.*, <https://doi.org/10.5194/acp-21-11113-2021>.
- 3.9) Asher, E., A. J. Hills, R. S. Hornbrook, S. Shertz, S. Gabbard, B. B. Stephens, D. Helmig, and E. C. Apel, 2021: Unpiloted Aircraft System Instrument for the Rapid Collection of Whole Air Samples and Measurements for Environmental Monitoring and Air Quality Studies, *Environmental Science & Technology*, <https://doi.org/10.1021/acs.est.0c07213>.
- 3.10) Stephens, B. B., E. J. Morgan, J. D. Bent, A. S. Watt, S. R. Shertz, R. F. Keeling, and B. C. Daube, 2021: Airborne measurements of oxygen concentration from the surface to the lower stratosphere and pole to pole, *Atm. Meas. Tech.*, <https://doi.org/10.5194/amt-14-2543-2021>.
- 3.11) Liu, J., L. Baskarran, K. Bowman, D. Schimel, A. A. Bloom, N. C. Parazoo, T. Oda, D. Carroll, D. Menemenlis, J. Joiner, R. Commane, B. Daube, L. V. Gattii, K. McKain, J. Miller, B. B. Stephens, C. Sweeney, and S. Wofsy, 2021: Carbon Monitoring System Flux Net Biosphere Exchange 2020: (CMS-Flux NBE 2020), *Earth Syst. Sci. Data*, <https://doi.org/10.5194/essd-13-299-2021>.
- 3.12) Jin, Y., R. F. Keeling, E. Morgan, E. Ray, N. Parazoo, B. B. Stephens, 2021: A mass-weighted isentropic coordinate for mapping chemical tracers and computing inventories, *Atmos. Chem. Phys.*, <https://doi.org/10.5194/acp-21-217-2021>.
- 3.13) Birner, B., M. P. Chipperfield, E. J. Morgan, B. B. Stephens, M. Linz, W. Feng, C. Wilson, J.D. Bent, S. C. Wofsy, J. Severinghaus, and R. F. Keeling, 2020: Gravitational separation of Ar/N₂ and age of air in the lowermost stratosphere in airborne observations and a chemical transport model, *Atmos. Chem. Phys.*, <https://doi.org/10.5194/acp-20-12391-2020>.

- 3.14) Morgan, E. J., B. B. Stephens, M. C. Long, R. F. Keeling, J. D. Bent, K. McKain, C. Sweeney, M. S. Hoecker-Martínez, and E. A. Kort, 2019: Summertime atmospheric boundary layer gradients of O₂ and CO₂ over the Southern Ocean, *J. Geophys. Res.*, 124, 13439-13456, <https://doi.org/10.1029/2019JD031479>.
- 3.15) Asher, E., R. S. Hornbrook, B. B. Stephens, D. Kinnison, E. J. Morgan, R. F. Keeling, E. L. Atlas, S. M. Schauffler, S. Tilmes, E. A. Kort, M. S. Hoecker-Martínez, M. C. Long, J. F. Lamarque, A. Saiz-Lopez, K. McKain, C. Sweeney, A. J. Hills, and E. C. Apel, 2019: Novel approaches to improve estimates of short-lived halocarbon emissions during summer from the Southern Ocean using airborne observations, *Atmos. Chem. Phys.*, 19, 14071–14090, <https://doi.org/10.5194/acp-19-14071-2019>.
- 3.16) Crowell, S., D. Baker, A. Schuh, S. Basu, A. R. Jacobson, F. Chevallier, J. J. Liu, F. Deng, L. Feng, K. McKain, A. Chatterjee, J. B. Miller, B. B. Stephens, A. Eldering, D. Crisp, D. Schimel, R. Nassar, C. O'Dell, T. Oda, C. Sweeney, P. I. Palmer, and D. B. A. Jones, 2019: 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>.
- 3.17) Wanninkhof, R., P. A. Pickers, A. M. Omar, A. Sutton, A. Murata, A. Olsen, B. B. Stephens, B. Tilbrook, D. Munro, D. Pierrot, G. Rehder, J. M. Santana-Casiano, J. D. Muller, J. Trinanes, K. Tedesco, K. O'Brien, K. Currie, L. Barberols, M. Telszewski, M. Hoppema, M. Ishii, M. Gonzalez-Davila, N. R. Bates, N. Metzl, P. Suntharalingam, R. A. Feely, S. Nakaoka, S. K. Lauvset, T. Takahashi, T. Steinhoff, and U. Schuster, 2019: A surface ocean CO₂ reference network, SOCONET and associated marine boundary layer CO₂ measurements, *Front. Mar. Sci.*, 6, 400, <https://doi.org/10.3389/fmars.2019.00400>.
- 3.18) D'Alessandro, J. J., M. Diao, C. Wu, X. Liu, J. B. Jensen, and B. B. Stephens, 2019: Cloud phase and relative humidity distributions over the Southern Ocean in austral summer based on in situ observations and CAM5 simulations. *J. Climate*, 32, 2781–2805, <https://doi.org/10.1175/JCLI-D-18-0232.1>.
- 3.19) Gaubert, B., B. B. Stephens, S. Basu, F. Chevallier, F. Deng, E. A. Kort, P. K. Patra, W. Peters, C. Rödenbeck, T. Saeki, D. Schimel, I. Van der Laan-Luijkx, S. Wofsy, and Y. Yin, 2019: Global atmospheric CO₂ inverse models converging on neutral tropical land exchange but disagreeing on fossil fuel and atmospheric growth rate, *Biogeosciences*, 16, 117-134, <https://doi.org/10.5194/bg-16-117-2019>.
- 3.20) Fay, A. R., N. S. Lovenduski, G. A. McKinley, D. R. Munro, C. Sweeney, A. R. Gray, P. Landschützer, B. B. Stephens, T. Takahashi, and N. Williams, 2018: Utilizing the Drake Passage Time-series to understand variability and change in subpolar Southern Ocean pCO₂, *Biogeosciences*, 15, 3841-3855, <https://doi.org/10.5194/bg-15-3841-2018>.

- 3.21) Resplandy, L., R. F. Keeling, C. Rödenbeck, B. B. Stephens, S. Khatiwala, K. B. Rodgers, M. C. Long, L. Bopp, and P.P. Tans, 2018: Revision of global carbon fluxes based on a reassessment of oceanic and riverine carbon transport, *Nature Geosciences*, 11, 504–509, <https://doi.org/10.1038/s41561-018-0151-3>.
- 3.22) Bares, R., J. C. Lin, S. W. Hoch, M. Baasandorj, D. L. Mendoza, B. Fasoli, L. Mitchell, D. Catharine, and B. B. Stephens, 2018: The wintertime co-variation of CO₂ and criteria pollutants in an urban valley of the Western United States, *J. Geophys. Res.*, 123, 2684–2703, <https://doi.org/10.1002/2017JD027917>.
- 3.23) Mitchell, L. E., J. C. Lin, D. R. Bowling, D. E. Pataki, C. Strong, A. J. Schauer, R. Bares, S. E. Bush, B. B. Stephens, D. Mendoza, D. Mallia, L. Holland, K. R. Gurney, and J. R. Ehleringer, 2018: Long-term urban carbon dioxide observations reveal spatial and temporal dynamics related to urban characteristics and growth, *PNAS*, 115, 2912-2917, <https://doi.org/10.1073/pnas.1702393115>.
- 3.24) Stephens, B. B., M. C. Long, R. F. Keeling, E. A. Kort, C. Sweeney, E. C. Apel, E. L. Atlas, S. Beaton, J. D. Bent, N. J. Blake, J. F. Bresch, J. Casey, B. C. Daube, M. H. Diao, E. Diaz, H. Dierssen, V. Donets, B. C. Gao, M. Gierach, R. Green, J. Haag, M. Hayman, A. J. Hills, M. S. Hoecker-Martinez, S. B. Honomichl, R. S. Hornbrook, J. B. Jensen, R. R. Li, I. McCubbin, K. McKain, E. J. Morgan, S. Nolte, J. G. Powers, B. Rainwater, K. Randolph, M. Reeves, S. M. Schauffler, K. Smith, M. Smith, J. Stith, G. Stossmeister, D. W. Toohey, and A. S. Watt, 2018: The O₂/N₂ Ratio and CO₂ Airborne Southern Ocean (ORCAS) Study. *Bull. Amer. Meteor. Soc.*, <https://doi.org/10.1175/BAMS-D-16-0206.1>.
- 3.25) Chatterjee, A., M. M. Gierach, A. J. Sutton, R. A. Feely, D. Crisp, A. Eldering, M. R. Gunson, C. W. O'Dell, B. B. Stephens, and D. S. Schimel, 2017: Influence of El Niño on atmospheric CO₂ over the tropical Pacific Ocean: Findings from NASA's OCO-2 mission. *Science*, 358, <https://doi.org/10.1126/science.aam5776>.
- 3.26) Lin, J. C., D. Mallia, D. Wu, and B. B. Stephens, 2017: How can mountaintop CO₂ observations be used to constrain regional carbon fluxes? *Atmos. Chem. Phys.*, 17, 5561-5581, <https://doi.org/10.5194/acp-17-5561-2017>.
- 3.27) Kulawik, S. S., C. O'Dell, V. H. Payne, L. Kuai, H. Worden, S. C. Biraud, C. Sweeney, B. Stephens, L. Iraci, E. Yates, and T. Tanaka, 2017: Lower-tropospheric CO₂ from near-infrared ACOS-GOSAT observations. *Atmos. Chem. Phys.*, 17, 5407-5438, <https://doi.org/10.5194/acp-17-5407-2017>.
- 3.28) Steinkamp, K., S. E. Mikaloff Fletcher, G. Brailsford, D. Smale, S. Moore, E. D. Keller, W. T. Baisden, H. Mukai, and B. B. Stephens, 2017: Atmospheric CO₂ observations and models suggest strong carbon uptake by forests in New Zealand. *Atmos. Chem. Phys.*, 17, 47-76, <https://doi.org/10.5194/acp-17-47-2017>.

- 3.29) Nevison, C. D., M. Manizza, R. F. Keeling, B. B. Stephens, J. D. Bent, J. Dunne, T. Ilyina, M. Long, L. Resplandy, J. Tjiputra, and S. Yukimoto, 2016: Evaluating CMIP5 ocean biogeochemistry and Southern Ocean carbon uptake using atmospheric potential oxygen: Present-day performance and future projection. *Geophys. Res. Lett.*, 43, 2077–2085, <https://doi.org/10.1002/2015GL067584>.
- 3.30) Resplandy, L., R. F. Keeling, B. B. Stephens, J. D. Bent, A. Jacobson, C. Rödenbeck, and S. Khatiwala, 2016: Constraints on oceanic meridional heat transport from combined measurements of oxygen and carbon. *Clim. Dyn.*, 47, 3335–3357, <https://doi.org/10.1007/s00382-016-3029-3>, plus correction *Clim. Dyn.*, 49, 4317, <https://doi.org/10.1007/s00382-017-3839-y>.
- 3.31) Munro, D. R., N. S. Lovenduski, T. Takahashi, B. B. Stephens, T. Newberger, and C. Sweeney, 2015: Recent evidence for a strengthening CO₂ sink in the Southern Ocean from carbonate system measurements in the Drake Passage (2002-2015). *Geophys. Res. Lett.*, 42, 7623–7630, <https://doi.org/10.1002/2015GL065194>.
- 3.32) Munro, D. R., N. S. Lovenduski, B. B. Stephens, C. Sweeney, K. R. Arrigo, T. Newberger, T. Takahashi, and P. D. Quay, 2015: Estimates of net community production in the Southern Ocean determined from time series observations of nutrients and dissolved inorganic carbon in Drake Passage. *Deep Sea Res. II*, 114, 49-63, <https://doi.org/10.1016/j.dsr2.2014.12.014>.
- 3.33) Schimel, D., B. B. Stephens, and J. B. Fisher, 2015: Effect of increasing CO₂ on the terrestrial carbon cycle. *Proc. Nat. Acad. Sci.*, 112, 441-446, <https://doi.org/10.1073/pnas.1407302112>.
- 3.34) Patra, P. K., M. C. Krol, S. A. Montzka, T. Arnold, E. L. Atlas, B. R. Lintner, B. B. Stephens, B. Xiang, J. W. Elkins, P. J. Fraser, A. Ghosh, E. J. Hintsa, D. F. Hurst, K. Ishijima, P. B. Krummel, B. R. Miller, K. Miyazaki, F. L. Moore, J. Muhle, S. O'Doherty, R. G. Prinn, L. P. Steele, M. Takigawa, H. J. Wang, R. F. Weiss, S. C. Wofsy, and D. Young, 2014: Observational evidence for interhemispheric hydroxyl-radical parity. *Nature*, 513, 219-223, <https://doi.org/10.1038/nature13721>.
- 3.35) Santoni, G. W., B. C. Daube, E. A. Kort, R. Jiménez, S. Park, J. V. Pittman, E. Gottlieb, B. Xiang, M. S. Zahniser, D. D. Nelson, J. B. McManus, J. Peischl, T. B. Ryerson, J. S. Holloway, A. E. Andrews, C. Sweeney, B. Hall, E. J. Hintsa, F. L. Moore, J. W. Elkins, D. F. Hurst, B. B. Stephens, J. Bent, and S. C. Wofsy, 2014: Evaluation of the airborne quantum cascade laser spectrometer (QCLS) measurements of the carbon and greenhouse gas suite—CO₂, CH₄, N₂O, and CO—during the CalNex and HIPPO campaigns. *Atmos. Meas. Tech.*, 7, 1509-1526, <https://doi.org/10.5194/amt-7-1509-2014>.
- 3.36) Bowling, D. R., A. P. Ballantyne, J. B. Miller, S. P. Burns, T. J. Conway, O. Menzer, B. B. Stephens, and B. H. Vaughn, 2014: Ecological processes dominate

- the ^{13}C land disequilibrium in a Rocky Mountain subalpine forest. *Global Biogeochem. Cycles*, 28, 352–370, <https://doi.org/10.1002/2013GB004686>.
- 3.37) Basu, S., S. Guerlet, A. Butz, S. Houweling, O. Hasekamp, I. Aben, P. Krummel, P. Steele, R. Langenfelds, M. Torn, S. Biraud, B. Stephens, A. Andrews, and D. Worthy, 2013: Global CO_2 fluxes estimated from GOSAT retrievals of total column CO_2 . *Atmos. Chem. Phys.*, 13, 8695–8717, <https://doi.org/10.5194/acp-13-8695-2013>.
- 3.38) Graven, H. D., R. F. Keeling, S. C. Piper, P. K. Patra, B. B. Stephens, S. C. Wofsy, L. R. Welp, C. Sweeney, P. P. Tans, J. J. Kelley, B. C. Daube, E. A. Kort, G. W. Santoni, and J. D. Bent, 2013: Enhanced seasonal exchange of CO_2 by northern ecosystems since 1960. *Science*, 341, 1085–1089, <https://doi.org/10.1126/science.1239207>.
- 3.39) Kulawik, S. S., J. R. Worden, S. C. Wofsy, S. C. Biraud, R. Nassar, D. B. A. Jones, E. T. Olsen, R. Jimenez, S. Park, G. W. Santoni, B. C. Daube, J. V. Pittman, B. B. Stephens, E. A. Kort, G. B. Osterman, and TES team, 2013: Comparison of improved Aura Tropospheric Emission Spectrometer CO_2 with HIPPO and SGP aircraft profile measurements. *Atmos. Chem. Phys.*, 13, 3205–3225, <https://doi.org/10.5194/acp-13-3205-2013>.
- 3.40) Stephens, B. B., G. Brailsford, A. J. Gomez, K. Riedel, S. Nichol, and M. Manning, 2013: Analysis of a 39-year continuous atmospheric CO_2 record from Baring Head, New Zealand. *Biogeosciences*, 10, 2683–2697, <https://doi.org/10.5194/bg-10-2683-2013>.
- 3.41) Keppel-Aleks, G., J. T. Randerson, K. Lindsay, B. B. Stephens, J. K. Moore, S. C. Doney, P. E. Thornton, N. M. Mahowald, F. M. Hoffman, C. Sweeney, P. P. Tans, P. O. Wennberg, and S. C. Wofsy, 2013: Atmospheric carbon dioxide variability in the Community Earth System Model: Evaluation and transient dynamic during the 20th and 21st centuries. *J. Climate*, 26, 4447–4475, <https://doi.org/10.1175/JCLI-D-12-00589.1>.
- 3.42) Moore, D. J. P., N. A. Trahan, P. Wilkes, T. Quaife, B. B. Stephens, K. Elder, A. R. Desai, J. Negron, and R. K. Monson, 2013: Persistent reduced ecosystem respiration after insect disturbance in high elevation forests. *Ecol. Lett.*, 16, 731–737, <https://doi.org/10.1111/ele.12097>.
- 3.43) Brailsford, G., B. B. Stephens, A. J. Gomez, K. Riedel, S. Nichol, and M. Manning, 2012: Long term continuous atmospheric CO_2 measurements at Baring Head, New Zealand. *Atmos. Meas. Tech.*, 5, 3109–3117, <https://doi.org/10.5194/amt-5-3109-2012>.
- 3.44) McKain, K., S. C. Wofsy, T. Nehrkorn, J. Eluszkiewicz, J. R. Ehleringer, and B. B. Stephens, 2012: Assessment of ground-based atmospheric observations for verification of greenhouse gas emissions from an urban region. *Proc. Nat. Acad. Sci.*, 109, 8423–8428, <https://doi.org/10.1073/pnas.1116645109>.

- 3.45) Brooks, B.-G. J., A. R. Desai, B. B. Stephens, D. R. Bowling, S. P. Burns, A. S. Watt, S. L. Heck, and C. Sweeney, 2012: Assessing filtering of mountaintop CO₂ mole fractions for application to inverse models of biosphere-atmosphere carbon exchange. *Atmos. Chem. Phys.*, 12, 2099-2115, <https://doi.org/10.5194/acp-12-2099-2012>.
- 3.46) Keppel-Aleks, G., P. O. Wennberg, R. A. Washenfelder, D. Wunch, T. Schneider, G. C. Toon, R. Andres, J.-F. Blavier, B. Connor, K. A. Davis, A. R. Desai, J. Messerschmidt, J. Notholt, C. M. Roehl, V. Sherlock, B. B. Stephens, S. A. Vay, and S.C. Wofsy, 2012: The imprint of surface fluxes and transport on variations in total column carbon dioxide. *Biogeosciences*, 9, 875-891, <https://doi.org/10.5194/bg-9-875-2012>.
- 3.47) Stephens, B. B., N. L. Miles, S. J. Richardson, A. S. Watt, and K. J. Davis, 2011: Atmospheric CO₂ monitoring with single-cell NDIR-based analyzers. *Atmos. Meas. Tech.*, 4, 2737-2748, <https://doi.org/10.5194/amt-4-2737-2011>.
- 3.48) Strong, C., C. Stwertka, D. R. Bowling, B. B. Stephens, and J. R. Ehleringer, 2011: Urban carbon dioxide cycles within the Salt Lake Valley: a multiple box model validated by observations. *J. Geophys. Res.*, 116, D15307, <https://doi.org/10.1029/2011JD015693>.
- 3.49) Desai, A. R., D. J. P. Moore, W. K. M. Ahue, P. J. Wilkes, S. F. J. De Wekker, B.-G. Brooks, T. L. Campos, B. B. Stephens, R.K. Monson, S. Burns, T. Quaife, S. Aulenbach, and D. S. Schimel, 2011: Seasonal pattern of regional carbon balance in the Central Rocky Mountains from the Airborne Carbon in the Mountains Experiment 2007. *J. Geophys. Res.*, 116, G04009, <https://doi.org/10.1029/2011JG001655>.
- 3.50) Wofsy, S. C., the HIPPO Science Team and Cooperating Modellers and Satellite Teams, 2011: HIAPER Pole-to-Pole Observations (HIPPO): Fine grained, global scale measurements for determining rates for transport, surface emissions, and removal of climatically important atmospheric gases and aerosols. *Proc. Roy. Soc. A*, 369 (1943) 2073-2086, <https://doi.org/10.1098/rsta.2010.0313>.
- 3.51) Burns, S. P., J. Sun, D. H. Lenschow, S. P. Oncley, B. B. Stephens, C. Yi, D. E. Anderson, J. Hu, and R. K. Monson, 2011: Atmospheric stability effects on wind fields and scalar mixing within and just above a subalpine forest in sloping terrain. *Bound. Layer. Meteor.*, 138, 231–262, <https://doi.org/10.1007/s10546-010-9560-6>, plus correction *Bound. Layer. Meteor.*, 172, 481–484, <https://doi.org/10.1007/s10546-019-00436-5>.
- 3.52) Wunch, D., G. C. Toon, P. O. Wennberg, S. C. Wofsy, B. B. Stephens, M. L. Fischer, O. Uchino, J. B. Abshire, P. Bernath, S. C. Biraud, J.-F. L. Blavier, C. Boone, K. P. Bowman, E. V. Browell, T. Campos, B. J. Connor, B. C. Daube, N. M. Deutscher, M. Diao, J. W. Elkins, C. Gerbig, E. Gottlieb, D. W. T. Griffith, D. F. Hurst, R. Jimenez, G. Keppel-Aleks, E. A. Kort, R. Macatangay, T.

- Machida, H. Matsueda, F. Moore, I. Morino, S. Park, J. Robinson, C. M. Roehl, Y. Sawa, V. Sherlock, C. Sweeney, T. Tanaka, and M. A. Zondlo, 2010: Calibration of the Total Carbon Column Observing Network using aircraft profile data, *Atmos. Meas. Tech.*, 3, 1351-1362, <https://doi.org/10.5194/amt-3-1351-2010>.
- 3.53) Subramanian, R., G. L. Kok, D. Baumgardner, A. Clarke, Y. Shinozuka, T. L. Campos, C. G. Heizer, B. B. Stephens, B. de Foy, P. B. Voss, R. and A. Zaveri, 2010: Black carbon over Mexico: the effect of atmospheric transport on mixing state, mass absorption cross-section, and BC/CO ratios. *Atm. Chem. Phys.*, 10, 219-237, <https://doi.org/10.5194/acp-10-219-2010>.
- 3.54) Sun, J., S. Oncley, S. Burns, B. Stephens, A. Watt, T. Campos, D. Lenschow, R. Monson, J. Hu, M. Tschudi, D. Schimel, S. Aulenbach, W. Sacks, S. de Wekker, C.-T. Lai, B. Lamb, E. Allwine, T. Coons, D. Ojima, P. Ellsworth, L. Sternberg, S. Zhong, C. Clements, and D. Anderson, 2010: A multi-scale and multi-disciplinary investigation of ecosystem-atmosphere CO₂ exchange over the rocky mountains of Colorado. *Bull. Amer. Meteor. Soc.*, 91, 209-230, <https://doi.org/10.1175/2009BAMS2733.1>.
- 3.55) Kort, E. A., A. E. Andrews, E. Dlugokencky, C. Sweeney, A. Hirsch, J. Eluszkiewicz, T. Nehrkorn, A. Michalak, B. Stephens, C. Gerbig, J. B. Miller, J. Kaplan, S. Houweling, B. C. Daube, P. Tans, and S. C. Wofsy, 2010: Atmospheric constraints on 2004 emissions of methane and nitrous oxide in North America from atmospheric measurements and a receptor-oriented modelling framework. *J. Integrative Env. Sci.*, 7, 125, <https://doi.org/10.1080/19438151003767483>.
- 3.56) De Wekker, S. F. J., A. Ameen, G. Song, B. B. Stephens, A. G. Hallar, and I. B. McCubbin, 2009: A preliminary investigation of boundary layer effects on daytime atmospheric CO₂ concentrations at a mountaintop location in the Rocky Mountains. *Acta Geophys.*, 57, 904, <https://doi.org/10.2478/s11600-009-0033-6>.
- 3.57) Burns, S. P., A. C. Delany, J. Sun, B. B. Stephens, S. P. Oncley, G. D. Maclean, S. R. Semmer, J. Schröter, and J. Ruppert, 2009: An evaluation of calibration techniques for in situ carbon dioxide measurements using a programmable portable trace-gas measuring system. *J. Atmos. Oceanic Technol.*, 26, 291, <https://doi.org/10.1175/2008JTECHA1080.1>.
- 3.58) Graven, H. D., B. B. Stephens, T. P. Guilderson, T. L. Campos, D. S. Schimel, and J. E. Campbell, 2008: Vertical profiles of biospheric and fossil fuel-derived CO₂ and fossil fuel CO₂:CO ratios from airborne measurements of $\Delta^{14}\text{C}$, CO₂, and CO above Colorado, USA. *Tellus B*, 61, 536, <https://doi.org/10.1111/j.1600-0889.2009.00421.x>.
- 3.59) Kort, E. A., J. Eluszkiewicz, B. B. Stephens, J. B. Miller, C. Gerbig, T. Nehrkorn, B. C. Daube, J. O. Kaplan, S. Houweling, and S. C. Wofsy, 2008:

- Emissions of CH₄ and N₂O over the United States and Canada based on a receptor-oriented modeling framework and COBRA-NA atmospheric observations. *Geophys. Res. Lett.*, 35, L18808, <https://doi.org/10.1029/2008GL034031>.
- 3.60) Obrist, D., A. G. Hallar, I. McCubbin, B. B. Stephens, and T. Rahn, 2008: Atmospheric mercury concentrations at Storm Peak Laboratory in the Rocky Mountains: Evidence for long-range transport from Asia, boundary layer contributions, and plant mercury uptake. *Atmos. Environ.*, 42, 7579-7589, <https://doi.org/10.1016/j.atmosenv.2008.06.051>.
- 3.61) Stephens, B. B., K. R. Gurney, P. P. Tans, C. Sweeney, W. Peters, L. Bruhwiler, P. Ciais, M. Ramonet, P. Bousquet, T. Nakazawa, S. Aoki, T. Machida, G. Inoue, N. Vinnichenko, J. Lloyd, A. Jordan, M. Heimann, O. Shibistova, R. L. Langenfelds, L. P. Steele, R. J. Francey, and A. S. Denning, 2007: Weak northern and strong tropical land carbon uptake from vertical profiles of atmospheric CO₂. *Science*, 316, 1732-1735, <https://doi.org/10.1126/science.1137004>.
- 3.62) Sun, J., S. P. Burns, A. C. Delany, S. P. Oncley, A. A. Turnipseed, B. B. Stephens, D. H. Lenschow, M. A. LeMone, R. K. Monson, and D. E. Anderson, 2007: CO₂ transport over complex terrain. *Agric. For. Meteorol.*, 145, 1–21, <https://doi.org/10.1016/j.agrformet.2007.02.007>.
- 3.63) Stephens, B. B., P. S. Bakwin, P. P. Tans, R. M. Teclaw, and D. D. Baumann, 2007: Application of a differential fuel-cell analyzer for measuring atmospheric oxygen variations. *J. Atmos. Oceanic Technol.*, 24, 82–94, <https://doi.org/10.1175/JTECH1959.1>.
- 3.64) Lin, J. C., C. Gerbig, S. C. Wofsy, A. E. Andrews, B. C. Daube, C. A. Grainger, B. B. Stephens, P. S. Bakwin, and D. Y. Hollinger, 2004: Measuring fluxes of trace gases at regional scales by Lagrangian observations: Application to the CO₂ Budget and Rectification Airborne (COBRA) study. *J. Geophys. Res.*, 109, D15304, <https://doi.org/10.1029/2004JD004754>.
- 3.65) Gerbig, C., J. C. Lin, S. C. Wofsy, B. C. Daube, A. E. Andrews, B. B. Stephens, P. S. Bakwin, and C. A. Grainger, 2003: Toward constraining regional-scale fluxes of CO₂ with atmospheric observations over a continent: 2. Analysis of COBRA data using a receptor-oriented framework. *J. Geophys. Res.*, 108 (D24), 4757, <https://doi.org/10.1029/2003JD003770>.
- 3.66) Gerbig, C., J. C. Lin, S. C. Wofsy, B. C. Daube, A. E. Andrews, B. B. Stephens, P. S. Bakwin, and C. A. Grainger, 2003: Toward constraining regional-scale fluxes of CO₂ with atmospheric observations over a continent: 1. Observed spatial variability from airborne platforms. *J. Geophys. Res.*, 108 (D24), 4756, <https://doi.org/10.1029/2002JD003018>.

- 3.67) Dilling, L., S. C. Doney, J. Edmonds, K. R. Gurney, R. Harriss, D. Schimel, B. Stephens, and G. Stokes, 2003: The role of carbon cycle observations and knowledge in carbon management. *Ann. Rev. Environ. Resources*, 28, 521-558, <https://doi.org/10.1146/annurev.energy.28.011503.163443>.
- 3.68) Bakwin, P. S., P. P. Tans, B. B. Stephens, S. C. Wofsy, C. H. Gerbig, and A. Grainger, 2003: Strategies for measurement of atmospheric column means of carbon dioxide from aircraft using discrete sampling. *J. Geophys. Res.*, 108 (D16), 4514, <https://doi.org/10.1029/2002JD003306>.
- 3.69) Stephens, B. B., R. F. Keeling, and W. J. Paplawsky, 2003: Shipboard measurements of atmospheric oxygen using a vacuum-ultraviolet absorption technique. *Tellus B*, 55, 857-878, <http://doi.org/10.3402/tellusb.v55i4.16386>.
- 3.70) Keeling, R. F. and B. B. Stephens, 2001: Antarctic sea ice and the control of Pleistocene climate instability. *Paleoceanography*, 16, 112-131, <https://doi.org/10.1029/2000PA000529>, plus typesetting correction, *Paleoceanography*, 16, 330-334, <https://doi.org/10.1029/2001PA000648>.
- 3.71) Stephens, B. B. and R. F. Keeling, 2000: The influence of Antarctic sea ice on glacial-interglacial CO₂ variations. *Nature*, 404, 171-174, <https://doi.org/10.1038/35004556>.
- 3.72) Stephens, B. B., S. C. Wofsy, R. F. Keeling, P. P. Tans, and M. J. Potosnak, 2000: The CO₂ Budget and Rectification Airborne Study: Strategies for measuring rectifiers and regional fluxes. *Inverse Methods in Global Biogeochemical Cycles*, *Geophys. Monogr. Ser.*, 114, Amer. Geophys. Union, 311-324, <https://doi.org/10.1029/GM114p0311>.
- 3.73) Stephens, B. B., R. F. Keeling, M. Heimann, K. D. Six, R. Murnane, and K. Caldeira, 1998: Testing global ocean carbon cycle models using measurements of atmospheric O₂ and CO₂ concentration. *Global Biogeochem. Cycles*, 12, 213-230, <https://doi.org/10.1029/97GB03500>.
- 3.74) Keeling, R. F., B. B. Stephens, R. G. Najjar, S. C. Doney, D. Archer, and M. Heimann, 1998: Seasonal variations in the atmospheric O₂/N₂ ratio in relation to the kinetics of air-sea gas exchange. *Global Biogeochem. Cycles*, 12, 141-163, <https://doi.org/10.1029/97GB02339>.
- 3.75) Winston, G. C., E. T. Sundquist, B. B. Stephens, and S. E. Trumbore, 1997: Winter CO₂ fluxes in a boreal forest. *J. Geophys. Res.*, 102, 28795-28804, <https://doi.org/10.1029/97JD01115>.
- 3.76) Winston, G. C., B. B. Stephens, E. T. Sundquist, J. P. Hardy, and R. E. Davis, 1995: Seasonal variability in CO₂ transport through snow in a boreal forest. In *Biogeochemistry of Seasonally Snow-Covered Catchments*, K. A. Tonnessen, M. W. Williams, and M. Tranter, Eds., IAHS publ. no. 228, 61-70, https://iahs.info/uploads/dms/iahs_228_0061.pdf.

Non-refereed Publications

- 3.77) Stephens, B. B., 2014: Interview with Britton Stephens. Carbon Management, 5, 109-113, <https://doi.org/10.1080/17583004.2014.912824>.
- 3.78) Smale, D., V. Sherlock, D. W. T. Griffith, R. Moss, G. Brailsford, M. Kotkamp, and B. Stephens, 2014: Furtherance of the CO₂ measurement error characterisation for the prototype in situ FTIR trace gas analyser operated at Lauder, New Zealand. 17th WMO/IAEA Meeting on Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques (GGMT-2013), GAW Report 213, 130-137, https://library.wmo.int/index.php?lvl=notice_display&id=16373.
- 3.79) Brailsford, G. W., B. Stephens, S. Mikaloff-Fletcher, S. Nichol, K. Riedel, J. McGregor, and K. Steinkamp, 2014: Baring Head CO₂—four decades of observations in New Zealand. 17th WMO/IAEA Meeting on Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques (GGMT-2013), GAW Report 213, 72-76, https://library.wmo.int/index.php?lvl=notice_display&id=16373.
- 3.80) Smale, D., and Coauthors, 2012: In situ FTIR trace gas analyser measurements of CO₂ at Lauder, New Zealand: error characterisation and comparisons with co-located in situ measurements. 16th WMO/IAEA Meeting on Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques (GGMT-2011), GAW Report 206, 121-127, https://library.wmo.int/index.php?lvl=notice_display&id=14214.
- 3.81) Brailsford, G. W., and Coauthors, 2011: In situ and ground-based remote sensing measurements of atmospheric CO₂ in New Zealand. 15th WMO/IAEA Meeting of Experts on Carbon Dioxide Concentration and Related Tracers Measurement Techniques, WMO TD 1553, 7-11, https://library.wmo.int/index.php?lvl=notice_display&id=4748.
- 3.82) Stephens, B. B., 2011: Greenhouse gas emissions: How to manage what cannot be measured. Carbon Management, 2, 1-4, <https://doi.org/10.4155/cmt.10.37>.
- 3.83) Stephens, B. B., 2007: Scientists hunting for missing carbon may have been looking in the wrong place, Scitizen, http://scitizen.com/climate-change/scientists-hunting-for-missing-carbon-may-have-been-looking-in-the-wrong-place_a-13-856.html.
- 3.84) Stephens, B., A. Watt, and G. Maclean, 2006: An autonomous inexpensive robust CO₂ analyzer (AIRCOA). 13th WMO/IAEA Meeting of Experts on Carbon Dioxide Concentration and Related Tracers Measurement Techniques, WMO TD 1359, 95-99, http://library.wmo.int/pmb_ged/wmo-td_1359.pdf.
- 3.85) Doney, S. C., and Coauthors, 2004: Ocean Carbon and Climate Change (OCCC): An Implementation Strategy for U. S. Ocean Carbon Cycle Science, UCAR,

Boulder, CO, 108pp,

https://www.carboncyclescience.us/sites/default/files/documents/occc_is_2004.pdf.

- 3.86) Stephens, B. B. and P. P. Tans, 2002: Atmospheric Observations (Chapter 2), in A Large-Scale CO₂ Observing Plan: In Situ Oceans and Atmosphere (LSCOP), 21-53, <http://www.globalcarbonproject.org/global/pdf/lscop2002.pdf>.
- 3.87) Stephens, B. B., 1999: Field-based atmospheric oxygen measurements and the ocean carbon cycle. Ph.D. thesis, Scripps Institution of Oceanography, University of California, San Diego, 221 pp, https://archive.eol.ucar.edu/homes/stephens/papers/stephens_dissertation.pdf.
- 3.88) Stephens B. B. and E. T. Sundquist, 1997: Measurement of soil surface gas fluxes using closed-chamber techniques: Estimates of accuracy from experiments and models, unpublished manuscript.
- 3.89) Stephens, B. B., 1993: An investigation of natural and anthropogenic influences on stratospheric ozone trends, Senior honors thesis, Harvard University, Cambridge, 122 pp.

4. PRESENTATIONS

Invited Presentations

- 4.1) “NSF Airborne Oceanography Activities,” UNOLS Scientific Committee for Oceanographic Aircraft Research meeting, Broomfield, CO, October, 2022.
- 4.2) “High Performance Aircraft for Global Scale Oceanography,” UNOLS Scientific Committee for Oceanographic Aircraft Research meeting, January, 2022.
- 4.3) “Evaluating global CO₂ inversions with integral airborne constraints,” NOAA GMD Carbon Cycle Modeling meeting, June, 2021.
- 4.4) “NCAR/NSF Earth system observing resources,” COVID-19: Identifying Unique Opportunities for Earth System Science, Keck Institute for Space Studies Workshop, virtual, April, 2020.
- 4.5) “Atmospheric CO₂ observations over the Southern Ocean,” NOAA GMD Carbon Cycle Group meeting, March, 2020.
- 4.6) “The atmospheric fingerprint of terrestrial CO₂ fertilization,” AGU Chapman Conference on Understanding Carbon Climate Feedbacks, La Jolla, CA, August, 2019.

- 4.7) “Evaluating emergent carbon cycle model properties with observations,” NCAR ASP Colloquium on Synthesis of Observations and Models in Studies of Shallow and Deep Clouds, June, 2018.
- 4.8) “Southern Ocean CO₂ exchange inferred from airborne, shipboard, and surface station measurements of atmospheric O₂ and CO₂,” NOAA ESRL Global Monitoring Division Seminar, Boulder, CO, September, 2017.
- 4.9) “Atmospheric oxygen constraints on Southern Ocean air-sea CO₂ flux seasonality,” NCAR Southern Ocean Workshop, Boulder, CO, April, 2017 (<http://www.cgd.ucar.edu/events/20170410/presentations>).
- 4.10) “The O₂/N₂ Ratio and CO₂ Airborne Southern Ocean (ORCAS) Study,” CLIVAR Process Study Webinar, January, 2017 (<https://www.youtube.com/watch?v=owyCmULdiWo>).
- 4.11) “Oceanography at 460 knots: The O₂/N₂ Ratio and CO₂ Airborne Southern Ocean Study (ORCAS),” SOCCOM Webinar Series, April, 2016 (<https://www.youtube.com/watch?v=-v8yDPhiIw8>).
- 4.12) **Keynote:** “Atmospheric oxygen measurements over the Southern Ocean,” Atmospheric Composition and Chemistry Observations and Modelling Conference / Cape Grim Annual Science Meeting, Murramarang, Australia, November, 2015.
- 4.13) “The latitudinal distribution of terrestrial carbon sinks,” CSIRO Marine and Atmospheric Research Seminar, Aspendale, Australia, November, 2015.
- 4.14) “The O₂/N₂ Ratio and CO₂ Airborne Southern Ocean Study (ORCAS),” CU ATOC 5300: The Global Carbon Cycle, Boulder, CO, September, 2015.
- 4.15) **Keynote:** “Airborne measurements of oxygen concentration from the surface to the lower stratosphere,” 18th WMO/IAEA Meeting on Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques (GGMT-2015), La Jolla, CA, September, 2015.
- 4.16) “An atmospheric view of the global carbon cycle,” CU ATOC 5300: The Global Carbon Cycle, Boulder, CO, November, 2013.
- 4.17) “The global carbon cycle as seen by the atmosphere,” NCAR ASP Colloquium on Carbon-climate Connections in the Earth System, Boulder, CO, July, 2013.
- 4.18) “Southern Ocean O₂/CO₂ observations,” NCAR Southern Hemisphere Climate System Workshop, Boulder, CO, May, 2013.
- 4.19) “Atmospheric carbon cycle observations from Colorado to the globe,” Chautauqua Science Forum, Boulder, CO, January, 2013.

- 4.20) “Attacking CO₂ from land, sea, and air,” National Institute of Water and Atmospheric Research TROPAC Meeting, Wellington, New Zealand, April, 2013.
- 4.21) “Atmospheric carbon dioxide measurements from the Navajo Nation to the globe,” Diné College Climate Change course, Tsaile, AZ, February, 2013.
- 4.22) “Carbon dioxide measurements,” Geoscience Research at Storm Peak Laboratory (GRASP) summer school, Steamboat Springs, CO, August, 2011.
- 4.23) “HIPPO: Toward rigid seasonal hemispheric flux constraints,” IRWG/TCCON Meeting, Boulder, CO, May, 2011.
- 4.24) “Connecting atmospheric measurements and global carbon cycle fluxes,” NOAA Carbon Cycle and Greenhouse Gases group meeting, Boulder, CO, April, 2011.
- 4.25) “Atmospheric carbon dioxide observations and climate change on local to global scales,” University of Victoria, Wellington, New Zealand, July, 2010.
- 4.26) “Global observations of climatically important atmospheric gases and aerosols during HIPPO,” Kidson Seminar Series, NIWA, Wellington, New Zealand, May, 2010.
- 4.27) “Constraining New Zealand carbon fluxes using atmospheric CO₂ data,” Managing Climate Change (MC2) Conference, Palmerston North, New Zealand, November, 2009.
- 4.28) “Atmospheric CO₂ and O₂ observations and the global carbon cycle,” National Institute of Water and Atmospheric Research, Lauder, New Zealand, May, 2009.
- 4.29) “Climate change and carbon on local to global scales,” Wallowa Mountain Institute, Joseph, OR, November, 2008.
- 4.30) “Challenging global carbon cycle models with observations,” National Institute of Water and Atmospheric Research, Wellington, New Zealand, November, 2008.
- 4.31) “Carbon cycle observations, modeling, and analyses,” Drivers and Mitigation of Global Change Programme Meeting, Wellington, New Zealand, October, 2008.
- 4.32) **Keynote:** “Comparing global carbon cycle models to observations is hard, but better than the alternative,” Berkeley Atmospheric Sciences Symposium, Berkeley, CA, October, 2008.
- 4.33) “Aircraft CO₂ observations and global carbon budgeting,” NCAR IMAGE/MSRI Summer Graduate Workshop on Data Assimilation for the Carbon Cycle, Boulder, CO, July, 2007.

- 4.34) “Regional needs and instrumentation for CO₂ observations,” NCAR ASP Colloquium: Regional Biogeochemistry, Boulder, CO, June, 2007.
- 4.35) “An Autonomous Inexpensive Robust CO₂ Analyzer (AIRCOA),” CarboEurope Activity 2.7 Meeting, Hyytiälä, Finland, January, 2006.
- 4.36) **Panelist:** “Fate of Fossil Fuel Emissions,” 7th International Carbon Dioxide Conference, Broomfield, CO, September, 2005.
- 4.37) “An Autonomous Inexpensive Robust CO₂ Analyzer (AIRCOA),” NOAA CMDL Carbon Cycle Greenhouse Gases Group weekly meeting, Boulder, CO, July, 2005.
- 4.38) “Regional scale carbon flux estimates over complex terrain and the Airborne Carbon in the Mountains Experiment,” NOAA CMDL Carbon Cycle Greenhouse Gases Group weekly meeting, Boulder, CO, January, 2005.
- 4.39) “The vertical distribution of atmospheric CO₂,” NOAA CMDL Carbon Cycle Greenhouse Gases Group weekly meeting, Boulder, CO, August, 2003.
- 4.40) “Atmospheric carbon observations,” Carbon Data Assimilation Workshop, College Park, MD, October, 2002.
- 4.41) “Carbon model-data fusion,” North American Carbon Program Methane Workshop, Durham, NH, September, 2002.
- 4.42) “CO₂ and O₂ concentration measurements: Global carbon cycle,” and “CO₂ and O₂ concentration measurements: Results from the WLEF O₂ measurement program,” Chequamegon Ecosystem-Atmosphere Study Workshop, Woodruff, WI, August, 2002.
- 4.43) “What atmospheric oxygen measurements can tell us about ocean circulation and carbon cycling,” NOAA Climate Monitoring and Diagnostics Laboratory Seminar Series, Boulder, CO, March, 2000.
- 4.44) “Field-based atmospheric O₂ measurements and the ocean carbon cycle,” Pennsylvania State University, College Station, PA, September, 1999.
- 4.45) “Carbon cycle constraints from recent field-based atmospheric O₂ measurements,” UCI Earth System Science Seminar Series, Irvine, CA, November, 1998.

NCAR Seminars

- 4.46) “The potential for repeat global airborne surveys to solve the carbon cycle and support climate mitigation,” UCAR President's Council, June, 2022.

- 4.47) “Global Airborne Repeat Tomography HIPPO/ORCAS/ATomResults and Future Opportunities,” NCAR Executive Committee, June, 2022.
- 4.48) “Global Airborne Repeat Tomography HIPPO/ORCAS/ATomResults and Future Opportunities,” EOL Management Committee,” June, 2022.
- 4.49) “Observational capabilities for climate intervention research,” NCAR / UCAR Climate Intervention Strategies Workshop, Boulder, CO, July, 2019.
- 4.50) “Oceanography among the clouds and terrestrial ecology a thousand miles from land: The power of global-scale airborne observations,” NCAR EOL Seminar Series, Boulder, CO, February, 2018
(<https://www.youtube.com/watch?v=v5uFrqoURO0>).
- 4.51) “Oxygen and carbon above the Southern Ocean,” NCAR Day of Networking and Discovery, Boulder, CO, April, 2017.
- 4.52) “Tropical vs. extratropical terrestrial CO₂ uptake and implications for carbon-climate feedbacks,” NCAR Day of Networking and Discovery, Boulder, CO, April, 2015.
- 4.53) “The global distribution of atmospheric oxygen,” EOL Seminar Series, Boulder, CO, April, 2015 (<https://www.youtube.com/watch?v=o77Cgqz64hU>).
- 4.54) “Observational constraints on global carbon cycle models: Atmospheric measurements of emergent model properties,” NCAR CGD/EOL Joint Seminar, Boulder, CO, December, 2013.
- 4.55) “Atmospheric perspectives on Southern Ocean carbon cycling,” EOL Seminar Series, Boulder, CO, February, 2011.
- 4.56) “Global carbon cycle model-data fusion,” NCAR Earth Observing Laboratory Seminar Series, Boulder, CO, March, 2009.
- 4.57) “Light aircraft CO₂ observations and the global carbon cycle,” NCAR TIIMES and EOL Seminar Series, Boulder, CO, April, 2007.
- 4.58) “The potential role of NCAR in the future carbon observing network,” NCAR Atmospheric Technology Division Seminar Series, Boulder, CO, May, 2002.
- 4.59) “The first measurements of atmospheric oxygen variations in forests: what they say about plant physiology, industrial emissions, continental boundary-layer mixing, and the global carbon cycle,” NCAR Biogeochemistry Seminar Series, Boulder, CO, April, 2001.

Submitted Conference and Workshop Presentations

- 4.60) "The APO Forward Model Intercomparison Experiment," TRANSCOM 2022, Wageningen, Netherlands, September, 2022.
- 4.61) "Chasing the WMO CO₂ Compatibility Goal around the Southern Ocean," WMO Greenhouse Gas Measurement Techniques meeting (GGMT-2022), Wageningen, Netherlands, September, 2022.
- 4.62) "Global Scale Airborne Oceanography," Expanding the Reach of the Research Fleet: Autonomous (and Piloted) Airborne Systems in Support of Ocean Sciences, Ocean Sciences UNOLS SCOAR Town Hall, February, 2022.
- 4.63) "Armchair OCO analyses," OCO-2/3 Science Team Meeting, October, 2021
- 4.64) "Evaluating OCO-2 MIP fluxes with aircraft observations," OCO-2/3 Flux Group Meeting, October, 2020.
- 4.65) "NCAR O₂ measurement and analysis activities," Virtual Atmospheric Oxygen Workshop, August, 2020.
- 4.66) O₂:CO₂ ratios of the African tropical Atlantic Plume," ATom Science Team meeting, Boulder, CO, November, 2019.
- 4.67) "Recent NSF supported airborne oceanography campaigns and future directions," UNOLS Scientific Committee for Oceanographic Aircraft Research Meeting, Boston, MA, September, 2019.
- 4.68) "Observations at the intersection of atmospheric and ecological science," NCAR-NEON Workshop, Boulder, CO, April, 2019.
- 4.69) "Evaluating OCO-2 Level 4 v7 MIP Inversions by Comparison to ATom," Orbiting Carbon Observatory (OCO-2/3) Science Team Meeting, Cocoa Beach, Florida, April, 2019.
- 4.70) "Atmospheric perspectives on northern land carbon exchange, 1981–present," Inez Fung Symposium, 2019 AMS Annual Meeting, Phoenix, AZ, January, 2019.
- 4.71) "Measuring the metabolism of planet Earth," Atmospheric Tomography Mission (ATom) Science Team Meeting, Boulder, CO, November, 2018.
- 4.72) "OCO-2 Monthly Zonal XCO₂ Gradients and Planned ATom / HIPPO Comparisons," Orbiting Carbon Observatory 2 (OCO-2) Science Team Meeting, Boulder, CO, October, 2018.
- 4.73) "OCO-2 Monthly Zonal XCO₂ Gradients," Orbiting Carbon Observatory 2 (OCO-2) Science Team Meeting, Boulder, CO, October, 2017.

- 4.74) “Atmospheric oxygen constraints on Southern Ocean air-sea CO₂ flux seasonality,” 10th International Carbon Dioxide Conference, Interlaken, Switzerland, August, 2017.
- 4.75) “Fractionation of O₂/N₂, Ar/N₂, and CO₂ at aircraft sampling inlets,” 19th WMO/IAEA Meeting on Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques (GGMT-2017), Dubendorf, Switzerland, August, 2017.
- 4.76) “Global scale airborne and ship based observations of atmospheric potential oxygen,” Atmospheric Potential Oxygen Meeting, La Jolla, CA, September, 2015.
- 4.77) “The diurnal cycle of atmospheric CO₂ at mountain locations,” Symposium on Atmospheric Chemistry and Physics at Mountain Sites, Steamboat, CO, August, 2014.
- 4.78) “The NCAR O₂ / CO₂ Calibration Facility,” 17th WMO/IAEA Meeting on Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques (GGMT-2013), Beijing, China, June, 2013.
- 4.79) “Strong observational constraints on seasonal northern extratropical CO₂ exchange,” 9th International Carbon Dioxide Conference, Beijing, China, June, 2013.
- 4.80) “Long-term observations of atmospheric O₂:CO₂ ratios over the Southern Ocean,” AGU Ocean Sciences Meeting, Salt Lake City, UT, February, 2012.
- 4.81) “What happens when you measure CO₂ five different ways on a single aircraft: Intercomparison results from the HIPPO project,” 16th WMO/IAEA Meeting on Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques (GGMT-2011), Wellington, New Zealand, October, 2011.
- 4.82) “Airborne observations of atmospheric O₂ and CO₂ on regional to global scales,” 8th International Carbon Dioxide Conference, Jena, Germany, September, 2009.
- 4.83) “Closing in on the missing carbon sink: Implications for climate research and mitigation,” U.N. Climate Change Conference, Bali, Indonesia, December, 2007.
- 4.84) “There's a rectifier in my closet: Vertical CO₂ transport and latitudinal flux partitioning,” TransCom Meeting, Purdue, IN, April, 2007.
- 4.85) “Preliminary data, reproducibility metrics, and representativity from Rocky RACCOON,” Workshop on Data Assimilation Techniques and the North American Carbon Budget, Boulder, CO, February, 2006.

- 4.86) "Preliminary data and reproducibility metrics from Rocky RACCOON," North American Carbon Program Mid-Continent Intensive (MCI) Campaign 1st Science Team Meeting, Boulder, CO, February, 2006.
- 4.87) "An Autonomous Inexpensive Robust CO₂ Analyzer (AIRCOA)," 13th WMO/IAEA Meeting of Experts on Carbon Dioxide Concentration and Related Tracer Measurement Techniques, Boulder, CO, September, 2005.
- 4.88) "Southern Ocean carbon fluxes and air-sea gas-exchange from past and future atmospheric O₂ measurements," Ocean Carbon and Climate Change (OCCC) Workshop, Woods Hole, MA, August, 2005.
- 4.89) "Regional scale carbon flux estimates over complex terrain and the Airborne Carbon in the Mountains Experiment," American Geophysical Union Fall Meeting, San Francisco, CA, December, 2004.
- 4.90) "CME, ACME, and regional carbon fluxes in the Mountain West," NOAA CMDL Modeling and Data Analysis Workshop, Boulder, CO, September, 2004.
- 4.91) "Atmospheric oxygen in and above forests," Atmospheric Potential Oxygen Workshop, Jena, Germany, July, 2004.
- 4.92) "Tradeoffs between measurement accuracy and cost, vertical and horizontal sampling density, and signal strength and variability in an expanded CO₂ observing network," American Meteorological Society Annual Meeting, Long Beach, CA, February, 2003.
- 4.93) "Using airborne and continental data to evaluate global atmospheric CO₂ inverse models," TransCom 3 Science Meeting, Ft. Collins, CO, February, 2002.
- 4.94) "Using airborne and continental data to evaluate global atmospheric CO₂ inverse models," Sixth International Carbon Dioxide Conference, Sendai, Japan, October, 2001.
- 4.95) "Results from the first year of atmospheric O₂ measurements at the WLEF tall-tower site," NOAA Climate Monitoring and Diagnostics Laboratory Annual Meeting, Boulder, CO, May, 2001.
- 4.96) "Including atmospheric O₂ in a fully coupled carbon system model," 5th Annual Community Climate System Model Workshop, Breckenridge, CO, June, 2000.
- 4.97) "Planned WLEF atmospheric O₂ measurements and COBRA summer campaign," 3rd Chequamegon Ecosystem-Atmosphere Study Annual Meeting, St. Paul, MN, June, 2000.
- 4.98) "Atmospheric O₂ measurements in temperate forests," NOAA Climate Monitoring and Diagnostics Laboratory Annual Meeting, Boulder, CO, May, 2000.

- 4.99) “The influence of Antarctic sea ice on glacial-interglacial CO₂ variations,” American Geophysical Union Fall Meeting, San Francisco, CA, December, 1999.
- 4.100) “CO₂ Budget and Rectification Airborne Study, North America (COBRANA),” Workshop on Inverse Methods in Global Biogeochemical Cycles, Heraklion, Greece, March, 1998.
- 4.101) “Testing global ocean carbon cycle models using measurements of atmospheric O₂ and CO₂ concentrations,” Fifth International Carbon Dioxide Conference, Cairns, Australia, September, 1997.
- 4.102) “Strategies for measuring rectifiers,” Third Carbon Modelers Consortium Meeting, Princeton, NJ, July, 1997.
- 4.103) “Seasonal variations in the atmospheric O₂/N₂ ratio in relation to the kinetics of air-sea gas exchange,” American Geophysical Union Spring Meeting, Baltimore, MD, May, 1997.
- 4.104) “Remote continuous CO₂ measurements from commercial aircraft,” Commercial Aviation Atmospheric Measurement Program (CAAMP) Meeting, Boulder, CO, October, 1996.
- 4.105) “Measurement of soil surface gas fluxes using closed-chamber techniques: Are they accurate and scalable?” American Geophysical Union Fall Meeting, San Francisco, CA, December, 1995.

Poster Presentations

- 4.106) “Slicing the tomato skin: Global scale airborne atmospheric tomography,” Orbiting Carbon Observatory 2 (OCO-2) Science Team Meeting, Boulder, CO, October, 2018.
- 4.107) “Slicing the tomato skin: Global scale airborne atmospheric tomography,” Celebration of Science and Times of Professor Steven C. Wofsy, Cambridge, MA, June, 2018.
- 4.108) **Session Chair:** “Southern Ocean zonal scale summertime oxygen outgassing and carbon dioxide ingassing,” American Geophysical Union Fall Meeting, San Francisco, CA, December, 2016.
- 4.109) “Seasonal Northern Hemisphere CO₂ exchange as observed by HIPPO,” North American Carbon Project Meeting, Albuquerque, NM, February, 2013.
- 4.110) **Session Chair:** “Seasonal Northern Hemisphere CO₂ exchange as observed by HIPPO,” American Geophysical Union Fall Meeting, San Francisco, CA, December, 2012.

- 4.111) “The Rocky Mountain Regional Atmospheric Continuous CO₂ Network,” 15th WMO/IAEA Meeting of Experts on Carbon Dioxide Concentration and Related Tracer Measurement Techniques, Jena, Germany, September, 2009.
- 4.112) “Atmospheric CO₂ measurements in mountainous terrain to monitor regional fluxes and local disturbance,” 2nd Integrated Land Ecosystem-Atmosphere Study (iLEAPS) Science Conference, Melbourne, Australia, August, 2009.
- 4.113) “Vertical profiles of CO₂ and the latitudinal partitioning of carbon fluxes,” 50th Anniversary of the Global Carbon Dioxide Record Symposium, Kona, HI, November, 2007.
- 4.114) “A Regional Atmospheric Continuous CO₂ Network in the Rocky Mountains (Rocky RACCOON),” AmeriFlux Annual Science Team Meeting, Boulder, CO, October, 2005.
- 4.115) “An Autonomous Inexpensive Robust CO₂ Analyzer (AIRCOA),” AmeriFlux Annual Science Team Meeting, Boulder, CO, October, 2005.
- 4.116) “A Regional Atmospheric Continuous CO₂ Network in the Rocky Mountains (Rocky RACCOON),” 7th International Carbon Dioxide Conference, Broomfield, CO, September, 2005.
- 4.117) “An Autonomous Inexpensive Robust CO₂ Analyzer (AIRCOA),” 7th International Carbon Dioxide Conference, Broomfield, CO, September, 2005.
- 4.118) “Biologically driven southern ocean carbon fluxes as observed by atmospheric O₂ and CO₂ concentrations,” 7th International Carbon Dioxide Conference, Broomfield, CO, September, 2005.
- 4.119) “A Regional Atmospheric Continuous CO₂ Network in the Rocky Mountains (Rocky RACCOON),” 13th WMO/IAEA Meeting of Experts on Carbon Dioxide Concentration and Related Tracer Measurement Techniques, Boulder, CO, September, 2005.
- 4.120) “An Autonomous Inexpensive Robust CO₂ Analyzer (AIRCOA),” 13th WMO/IAEA Meeting of Experts on Carbon Dioxide Concentration and Related Tracer Measurement Techniques, Boulder, CO, September, 2005.
- 4.121) “Measurements of atmospheric O₂ variations at the WLEF tall-tower site,” 6th International Carbon Dioxide Conference, Sendai, Japan, October, 2001.
- 4.122) “Seasonal variations in the atmospheric O₂/N₂ ratio in relation to the kinetics of air-sea gas exchange,” 5th International Carbon Dioxide Conference, Cairns, Australia, September, 1997.

Outreach Presentations

- 4.123) “STEM Career Connections,” Eagle County, CO middle-schoolers, virtual, Apr. 7.
- 4.124) “Exploring the CO₂ (bi)cycle,” NCAR Super Science Saturday Wizards Show, November, 2021 (<https://www.youtube.com/watch?v=bAKUVTE6ikM>).
- 4.125) “NCAR|UCAR Meet the Experts: Ocean-Sniffing Airplanes and Climate Science in Antarctica, NCAR/UCAR Meet the Experts webinar, April, 2021 (<https://www.youtube.com/watch?v=F-LeYiMEMZg>).
- 4.126) "Infrared, it's out there!" NCAR Super Science Saturday Wizards Show, November, 2020 (<https://www.youtube.com/watch?v=OfbGxBDEI9Q>).

5. COMMITTEES

- 5.1) Schmidt Futures Carbon Cycle Panel, 2022-23.
- 5.2) South Pole Station Master Plan Science User Group, 2020-2021.
- 5.3) Organizing Committee, 4th Atmospheric Oxygen Workshop, Bowdoin, ME, 2020–present.
- 5.4) Organizing Committee, 3rd Atmospheric Potential Oxygen Workshop, Bowdoin, ME, 2019–2020.
- 5.5) UNOLS, Scientific Committee for Oceanographic Aircraft Research (SCOAR), 2019–present.
- 5.6) NCAR-NEON Workshop: Predicting life in the Earth system–linking the geosciences and ecology, steering committee, 2018–2022.
- 5.7) Orbiting Carbon Observatory 2 and 3 (OCO-2 and OCO-3) Science Team member, 2015–present.
- 5.8) Organizing Committee, 2nd Decadal Atmospheric Potential Oxygen Workshop, La Jolla, CA, 2015.
- 5.9) Scientific Steering Committee, 17th WMO/IAEA Meeting on Carbon Dioxide, other Greenhouse Gases, and Related Measurement Techniques (GGMT-2013), Beijing, China, 2013.
- 5.10) Co-chair, Scientific Steering Committee, 16th WMO/IAEA Meeting on Carbon Dioxide, other Greenhouse Gases, and Related Measurement Techniques (GGMT-2011), Wellington, New Zealand, 2010–2011.
- 5.11) Editorial Advisory Board, Carbon Management, 2009–2022.

- 5.12) CarbonTracker Data Group, 2010–present.
- 5.13) Scientific Steering Committee, 8th International Carbon Dioxide Conference (ICDC8), 2008–2009.
- 5.14) Advisory Board, Wallowa Mountain Institute, 2008–2009.
- 5.15) U.S. National Ecological Observatory Network (NEON) Fundamental Instrument Unit Tiger Team, 2007.
- 5.16) North American Carbon Program (NACP) Mid-Continent Intensive (MCI) working groups: MCI Science Team, MCI Coordination, MCI Topic 2 Region-wide Inversion Analyses, 2006–2008.
- 5.17) The Surface Ocean - Lower Atmosphere Study (SOLAS) Implementation Group 3, Air-Sea Flux of CO₂ and Other Long-Lived Radiatively-Active Gases, 2003–2005.
- 5.18) SOLAS/Integrated Marine Biogeochemistry and Ecosystem Research (IMBER) Carbon Working Group (SIC), 2005–2017.
- 5.19) Organizing Committee, 13th WMO/IAEA Meeting of Experts on Carbon Dioxide Concentration and Related Tracer Measurement Techniques, 2004–2005.
- 5.20) Local Organizing Committee, 7th International Carbon Dioxide Conference (ICDC7), 2004–2005.
- 5.21) U.S. Carbon Cycle Science Ocean Interim Implementation Group (OCCC), including co-authoring the group report, 2002–2004.
- 5.22) U.S. In Situ Large-Scale CO₂ Observations Working Group (LSCOP), including co-lead authoring the Atmospheric Observations chapter of the group report, 1999–2002.

6. HONORS AND AWARDS

- 6.1) Antarctica Service Medal, 2023
- 6.2) UCAR Special Recognition Award for Outstanding Performance in Education and Outreach, 2021.
- 6.3) NASA Group Achievement Award, ATom Science Team, 2019.
- 6.4) NASA Group Achievement Award, OCO-2 Science Team, 2018.
- 6.5) Invited Keynote Presentation: “Airborne measurements of oxygen concentration from the surface to the lower stratosphere,” 18th WMO/IAEA Meeting on

Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques (GGMT-2015), La Jolla, CA, 2015.

- 6.6) Invited Keynote Presentation: “Atmospheric oxygen measurements over the Southern Ocean,” Atmospheric Composition and Chemistry Observations and Modelling Conference / Cape Grim Annual Science Meeting, Murrumarang, Australia, 2015.
- 6.7) UCAR Outstanding Scientific and Technical Advancement Award, 2013.
- 6.8) UCAR Outstanding Publication Award, 2008.
- 6.9) Invited Keynote Presentation: “Comparing global carbon cycle models to observations is hard, but better than the alternative,” Berkeley Atmospheric Sciences Symposium, Berkeley, CA, 2008.
- 6.10) Invited Panelist: “Fate of Fossil Fuel Emissions,” 7th International Carbon Dioxide Conference, Broomfield, CO, 2005.
- 6.11) Cooperative Institute for Research in Environmental Sciences Visiting Fellowship, 1999-2001.
- 6.12) Offered NCAR Advanced Studies Program post-doctoral fellowship, 1999.
- 6.13) Achievement Rewards for College Scientists Scholar, 1998-1999.
- 6.14) NSF Graduate Research Fellowship, 1995-1998.