CURRICULUM VITA

WILLIAM D. COLLINS

TITLES: Associate Laboratory Director
Earth & Environmental Sciences Area
Lawrence Berkeley National Laboratory
Berkeley, California

Professor in Residence
Department of Earth and Planetary Science
University of California, Berkeley
Berkeley, California

EDUCATION:

B.A.,	Physics (cum laude)	Princeton University, 1981
M.S.,	Astronomy and Astrophysics	University of Chicago, 1984
Ph.D.,	Astronomy and Astrophysics	University of Chicago, 1988

PROFESSIONAL EXPERIENCE:

1988 – 1990	Post-Graduate Research Associate, University of Chicago
1990 – 1992	Post-Graduate Research Associate, Scripps Institution of Oceanography
1992 – 1997	Assistant Research Physicist, Scripps Institution of Oceanography
1994 – 1994	Lecturer, Scripps Institution of Oceanography
1996 – 1997	Visiting Scientist, National Center for Atmospheric Research
1997 – 2001	Scientist II, National Center for Atmospheric Research
2001 – 2007	Scientist III, National Center for Atmospheric Research
2001 – 2007	Adjunct Professor, PAOS Program, University of Colorado
2006 – 2007	Deputy Section Head, National Center for Atmospheric Research
2007 – 2008	Senior Scientist, National Center for Atmospheric Research
2007 – 2015	Department Head, Lawrence Berkeley National Laboratory
2007 – present	Senior Scientist, Lawrence Berkeley National Laboratory
2007 – present	Professor in Residence, University of California, Berkeley
2013 – 2018	Director, Climate Readiness Institute
2015 – 2022†	Division Director, Lawrence Berkeley National Laboratory
2018 – 2020	Director, Environmental resilience accelerator (Era)
2018 – 2020	James and Katherine Lau Chair in Sustainability, University of California, Berkeley
2022† – present	Associate Laboratory Director, Lawrence Berkeley National Laboratory

† New as of Dec. 1, 2022.

Contents

PUBLICATIONS:

- Publons Record: `https://publons.com/researcher/2502767/william-d-collins/`
- ORCID Record: `https://orcid.org/0000-0002-4463-9848`
- Google Scholar: `https://scholar.google.com/citations?user=KOnzNo4AAAAJ&hl=en`

1 Dissertations

B.A. Thesis: Thermodynamics of apparent horizons, 1981, Princeton University, 38 pp.

Ph.D. Thesis: The theory of magnetohydrodynamic wave generation by localized sources, 1988, University of Chicago, University of Michigan Microfilms No. T-30997.

2 Reviewed Publications

2.1. Collins, W.D., and M. Turner, 1984: Thermal production of superheavy magnetic monopoles in the new inflationary universe scenario. *Physical Review D*, **29**, 2158–2161. doi:10.1103/PHYSREVD.29.2158.

2.2. Collins, W.D., 1989: The theory of magnetohydrodynamic wave generation by localized sources I. General asymptotic theory. *The Astrophysical Journal*, **337**, 548–567. doi:10.1086/167123.

2.3. Collins, W.D., 1989: The theory of magnetohydrodynamic wave generation by localized sources II. Collisionless dissipation of wave packets. *The Astrophysical Journal*, **343**, 499–506. doi:10.1086/167724.

2.4. Ramanathan, V., and W.D. Collins, 1991: Thermodynamic regulation of ocean warming by cirrus clouds deduced from observations of the 1987 El Niño. *Nature*, **351**, 27–32. doi:10.1038/351027A0.

2.5. Collins, W.D., 1992: The theory of magnetohydrodynamic wave generation by localized sources III. Efficiency of plasma heating by dissipation of far-field waves. *The Astrophysical Journal*, **384**, 319–332. doi:10.1086/170875.

2.6. Collins, W.D., 1992: Mechanics of apparent horizons. *Physical Review D15*, **45**, 495–498. doi:10.1103/PHYSREVD.45.495.

2.7. Ramanathan, V., and W. Collins, 1992: Thermostat and global warming. *Nature*, **357**, 649. doi:10.1038/357649A0.

2.8. Ramanathan, V., and W. Collins, 1993: A thermostat in the tropics. *Nature*, **361**, 410–411. doi:10.1038/361410B0.

2.9. Weaver, C.P., W.D. Collins, and H. Grassl, 1994: The relationship between clear-sky atmospheric greenhouse effect and deep convection during the Central Equatorial Pacific Experiment (CEPEX): Model calculations and satellite observations. *J. Geophys. Res.*, **99**, 25891–25901. doi:10.1029/94JD02323.

2.10. Ramanathan, V., W.D. Collins, and B. Subasilar, 1994: Comment on the paper "An inquiry into the cirrus-cloud thermostat effect for tropical sea surface temperature" by K.M. Lau, C.H. Sui, M.D. Chou, and W.K. Tau. *Geophys. Res. Lett.*, **21**, 1185–1186. doi:10.1029/94GL00979.

2.11. Collins, W.D., and A.K. Inamdar, 1995: Validation of clear-sky fluxes for tropical oceans from the Earth Radiation Budget Experiment. *J. Climate*, **8**, 569–578. doi:10.1175/1520-0442(1995)008¡0569:VOCSFF¿2.0.CO;2.

2.12. Lohmann, U., E. Roeckner, W.D. Collins, A. Heymsfield, and G. McFarquhar, 1995: The role of water vapor and convection during the Central Equatorial Pacific Experiment (CEPEX) from observations and model simulations. *J. Geophys. Res.*, **100**, 26229–26245. doi:10.1029/95JD02898.

2.13. Collins, W.D., F.P.J. Valero, P. Flatau, H. Grassl, and P. Pilewskie, 1996: Radiative effects of convection in the tropical Pacific. *J. Geophys. Res.*, **101**, 14999–15012. doi:10.1029/95JD02534.

2.14. Waliser, D.E., W.D. Collins, and S.P. Anderson, 1995: An estimate of the surface shortwave cloud forcing over the western Pacific during TOGA COARE. *Geophys. Res. Lett.*, **23**, 519–522. doi:10.1029/96GL00245.

2.15. Valero, F.P.J., W.D. Collins, P. Pilewskie, P. Flatau, and A. Bucholtz, 1997: Direct radiometric observations of the water vapor super greenhouse effect over the equatorial Pacific Ocean. *Science*, **275**, 1773–1776. doi:10.1126/SCIENCE.275.5307.1773.

2.16. Collins, W.D., J. Wang, J.T. Kiehl, G.J. Zhang, D. Cooper, and W. Eichinger, 1997: Comparison of tropical ocean-atmosphere fluxes with the NCAR Community Climate Model CCM3. *J. Climate*, **10**, 3047–3058. doi:10.1175/1520-0442(1997)010¡3047:COTOAF¿2.0.CO;2.

2.17. Valero, F.P.J., A. Bucholtz, B. Bush, S.K. Pope, W.D. Collins, P. Flatau, A. Strawa, and W.J.Y. Gore, 1997: The Atmospheric Radiation Measurement Enhanced Shortwave Experiment (ARESE): Experimental and data details. *J. Geophys. Res.*, **102**, 29929–29937. doi:10.1029/97JD02434.

2.18. Zender, C.S., S. Pope, B. Bush, W.D. Collins, J.T. Kiehl, F.P.J. Valero, and J. Vitko, 1997: Atmospheric absorption during ARESE. *J. Geophys. Res.*, **102**, 29901–29915. doi:10.1029/97JD01781.

2.19. Kandel, R., M. Viollier, P. Raberanto, J.Ph. Duvel, L.A. Pakhomov, V.A. Golovko, A.P. Trishchenko, J. Mueller, E. Raschke, R. Stuhlmann, and the International ScaRaB Scientific

Working Group, 1998: The ScaRaB Earth Radiation Budget Dataset. *Bull. Amer. Meteor. Soc.*, **79**, 765–783. doi:10.1175/1520-0477(1998)079¡0765:TSERBD¿2.0.CO;2.

2.20. Jayaraman, A., D. Lubin, S. Ramachandran, V. Ramanathan, E. Woodbridge, W.D. Collins, and K.S. Zalpuri, 1998: Direct observations of aerosol radiative forcing over the tropical Indian Ocean during the Jan.–Feb. 1996 pre-INDOEX cruise. *J. Geophys. Res.*, **103**, 13827–13836. doi:10.1029/98JD00559.

2.21. Heymsfield, A.J., G.M. McFarquhar, W.D. Collins, J.A. Goldstein, F.P.J. Valero, J. Spinhirne, W. Hart, and P. Pilewskie, 1998: Cloud microphysical properties leading to highly reflective tropical cirrus. *J. Geophys. Res.*, **103**, 8805–8812. doi:10.1029/97JD03679.

2.22. Collins, W.D., 1998: A global signature of enhanced shortwave absorption by clouds. *J. Geophys. Res.*, **103**, 31669–31679. doi:10.1029/1998JD200022.

2.23. Wu, X., W.D. Hall, W.W. Grabowski, M.W. Moncrieff, W.D. Collins, and J.T. Kiehl, 1999: Long-term behavior of cloud systems in TOGA COARE and their interactions with radiative and surface processes, part II: Effects of microphysics on cloud-radiation interaction. *J. Atmos. Sci.*, **56**, 3177–3195. doi:10.1175/1520-0469(1999)056¡3177:LTBOCS¿2.0.CO;2.

2.24. van Hees, R.M., J. Lelieveld, and W.D. Collins, 1999: Detecting tropical convection using AVHRR satellite data. *J. Geophys. Res.*, **104**, 9213–9228. doi:10.1029/1998JD200079.

2.25. Meehl, G.A., W.D. Collins, B.A. Boville, J.T. Kiehl, T.M.L. Wigley, and J.M. Arblaster, 2000: Response of the NCAR Climate System Model to increased CO_2 and the role of physical processes. *J. Climate*, **13**, 1879–1898. doi:10.1175/1520-0442(2000)013¡1879:ROTNCS¿2.0.CO;2.

2.26. Bony, S., W.D. Collins, and D.W. Fillmore, 2000: Indian Ocean low clouds during the winter monsoon. *J. Climate*, **13**, 2028–2043. doi:10.1175/1520-0442(2000)013¡2028:IOLCDT¿2.0.CO;2.

2.27. Collins, W.D., A. Bucholtz, D. Lubin, P. Flatau, F.P.J. Valero, C.P. Weaver, and P. Pilewskie, 2000: Determination of surface heating by convective cloud systems in the central equatorial Pacific from surface and satellite measurements. *J. Geophys. Res.*, **105**, 14807–14821. doi:10.1029/2000JD900109.

2.28. Rasch, P.J., W.D. Collins and B.E. Eaton, 2001: Understanding the Indian Ocean Experiment (INDOEX) aerosol distributions with an aerosol assimilation. *J. Geophys. Res.*, **106**, 7337–7356. doi:10.1029/2000JD900508.

2.29. Duvel, J.P., M. Viollier, P. Raberanto, R. Kandel, M. Haeffelin, L.A. Pakhomov, V.A. Golovko, J. Mueller, R. Stuhlmann, and the International ScaRaB Scientific Working Group, 2001: The ScaRaB-Resurs Earth radiation budget dataset and first results. *Bull. Amer. Meteor. Soc.*, **82**, 1397–1408. doi:10.1175/1520-0477(2001)082¡1397:TSRERB¿2.3.CO;2.

2.30. Collins, W.D., P.J. Rasch, B.E. Eaton, B.V. Khattatov, J.-F. Lamarque, and C.S. Zender, 2001: Simulating aerosols using a chemical transport model with assimilation of satellite aerosol retrievals: Methodology for INDOEX. *J. Geophys. Res.*, **106**, 7313–7336. doi:10.1029/2000JD900507.

2.31. Collins, W.D., 2001: Parameterization of generalized cloud overlap for radiative calculations in general circulation models. *J. Atmos. Sci.*, **58**, 3224–3242. doi:10.1175/1520-0469(2001)058¡3224:POGCOF¿2.0.CO;2.

2.32. Ramanathan, V., P.J. Crutzen, J. Lelieveld, D. Althausen, J. Anderson, M.O. Andreae, W. Cantrell, G. Cass, C.E. Chung, A.D. Clarke, W.D. Collins, J.A. Coakley, F. Dulac, J. Heintzenberg, A.J. Heymsfield, B. Holben, J. Hudson, A. Jayaraman, J.T. Kiehl, T.N. Krishnamurti, D. Lubin, A.P. Mitra, G. McFarquhar, T. Novakov, J.A. Ogren, I.A. Podgorny, K. Prather, J.M. Prospero, K. Priestley, P.K. Quinn, K. Rajeev, P.J. Rasch, S. Rupert, R. Sadourney, S.K. Satheesh, P. Sheridan, G.E. Shaw, and F.P.J. Valero, 2001: The Indian Ocean Experiment: An integrated assessment of the climate forcing and effects of the great Indo-Asian haze. *J. Geophys. Res.*, **106**, 28371–28398. doi:10.1029/2001JD900133.

2.33. Collins, W.D., 2001: Effects of enhanced shortwave absorption on coupled simulations of the tropical climate system. *J. Climate*, **14**, 1147–1165. doi:10.1175/1520-0442(2001)014¡1147:EOESAO¿2.0.CO;2.

2.34. Clarke, A., W.D. Collins, P.J. Rasch, V. Kapustin, K. Moore, and S. Howell, 2001: Pollution transport on global scales: Measurements and model predictions. *J. Geophys. Res.*, **106**, 32555–32570. doi:10.1029/2000JD900842.

2.35. Collins, W.D., P.J. Rasch, B.E. Eaton, D.W. Fillmore, J.T. Kiehl, T.C. Beck, and C.S. Zender, 2002: Simulation of aerosol distributions and radiative forcing for INDOEX: Regional climate impacts. *J. Geophys. Res.*, **107**, article 8028, doi:10.1029/2000JD000032.

2.36. Pope, S.K., F.P.J. Valero, W.D. Collins, and P. Minnis, 2002: Comparison of ScaRaB, GOES-8, aircraft, and surface observations of the absorption of solar radiation by clouds. *J. Geophys. Res.*, **107**, article no. 4114, doi:10.1029/2001JD001139.

2.37. Collins, W.D., J.K. Hackney, and D.P. Edwards, 2002: An updated parameterization for infrared emission and absorption by water vapor in the National Center for Atmospheric Research Community Atmosphere Model. *J. Geophys. Res.*, **107**, article no. 4664, doi:10.1029/2001JD001365.

2.38. Tie X., S. Madronich, S. Walters, R. Zhang, P. Rasch, and W. Collins, 2003: Effect of clouds on photolysis and oxidants in the troposphere. *J. Geophys. Res.*, **108**, article no. 4642, doi:10.1029/2003JD003659.

2.39. Diner, D.J., R.T. Menzies, R.A. Kahn, T.L. Anderson, J. Bosenberg, R.J. Charlson, B.N. Holben, C.A. Hostetler, M.A. Miller, J.A. Ogren, G.L. Stephens, O. Torres, B.A. Wielicki, P.J. Rasch, L.D. Travis, and W.D. Collins, 2004: Using the PARAGON framework to establish an accurate, consistent, and cohesive long-term aerosol record. *Bull. Amer. Meteor. Soc.*, **85**, 1535–1548. doi:10.1175/BAMS-85-10-1535.

2.40. Diner, D.J., T.P. Ackerman, T.L. Anderson, J. Bosenberg, A.J. Braverman, R.J. Charlson, W.D. Collins, R. Davies, B.N. Holben, C.A. Hostetler, R.A. Kahn, J.V. Martonchik,

R.T. Menzies, M.A. Miller, J.A. Ogren, J.E. Penner, P.J. Rasch, S.E. Schwartz, J.H. Seinfeld, G.L. Stephens, O. Torres, L.D. Travis, B.A. Wielicki, and B. Yu, 2004: PARAGON: An integrated approach for characterizing aerosol climate impacts and environmental interactions. *Bull. Amer. Meteor. Soc.*, **85**, 1491–1501. doi:10.1175/BAMS-85-10-1491.

2.41. Lamarque, J.F., J.T. Kiehl, P.G. Hess, W.D. Collins, L.K. Emmons, P. Ginoux, C. Lou, and X.X. Tie, 2005: Response of a coupled chemistry-climate response to changes in aerosols emissions: Global impact on the hydrological cycle and the tropospheric burdens of OH, ozone and NO_X. *Geophys. Res. Lett.*, **32**, article no. L16809, doi:10.1029/2005GL023419.

2.42. Meehl, G.A, W.M. Washington, W.D. Collins, J.M. Arblaster, A. Hu, L.E. Buja, W.G. Strand, and H. Teng, 2005: How much more global warming and sea level rise? *Science*, **307**, 1769–1772. doi:10.1126/SCIENCE.1106663.

2.43. Lamarque, J.F., J. Kiehl, G. Brasseur, T. Butler, P. Cameron-Smith, W.D. Collins, W.J. Collins, C. Granier, D. Hauglustaine, P. Hess, E. Holland, L. Horowitz, M. Lawrence, D. McKenna, P. Merilees, M. Prather, P. Rasch, D. Rotman, D. Shindell, and P. Thornton, 2005: Assessing future nitrogen deposition and carbon cycle feedback using a multimodel approach. Part 1: Analysis of nitrogen deposition. *J. Geophys. Res.*, **110**, article no. D19303, doi:10.1029/2005JD005825.

2.44. Santer, B.D., T.M.L. Wigley, K.E. Taylor, P.W. Thorne, M.F. Wehner, J.S. Boyle, W. Collins, K.W. Dixon, C. Doutriaux, P.J. Gleckler, J.E. Hansen, T.R. Karl, S.A. Klein, J.R. Lanzante, C. Mears, G.A. Meehl, V. Ramaswamy, D.J. Seidel, and F.J. Wentz, 2005: Modeled and observed lapse-rate changes in the deep tropics. *Science*, **309**, 1551–1556. doi:10.1126/SCIENCE.1114867.

2.45. Collins, W.D., P.J. Rasch, B.A. Boville, J.J. Hack, J.R. McCaa, D.L. Williamson, B.P. Briegleb, C.M. Bitz, S.-J. Lin, and M. Zhang, 2006: The formulation and atmospheric simulation of the Community Atmosphere Model: CAM3. *J. Climate.* **19**, 2144–2161. doi:10.1175/JCLI3760.1.

2.46. Collins, W.D., C.M. Bitz, M.L. Blackmon, G.B. Bonan, C.S. Bretherton, J.A. Carton, P. Chang, S.C. Doney, J.J. Hack, T.B. Henderson, J.T. Kiehl, W.G. Large, D.S. McKenna, B.D. Santer, and R.D. Smith, 2006: The Community Climate System Model: CCSM3. *J. Climate*, vol 19, 2122–2143. doi:10.1175/JCLI3761.1.

2.47. Kiehl, J.T., C.A. Shields, J.J. Hack, and W.D. Collins, 2006: The climate sensitivity of the Community Climate System Model: CCSM3. *J. Climate*, **19**, 2584–2596. doi:10.1175/JCLI3747.1.

2.48. Collins W.D., V. Ramaswamy, M.D. Schwarzkopf, Y. Sun, R.W. Portmann, Q. Fu, S.E.B. Casanova, J.-L. Dufresne, D.W. Fillmore, P.M.D. Forster, V.Y. Galin, L.K. Gohar, W.J. Ingram, D.P. Kratz, M.-P. Lefebvre, J. Li, P. Marquet, V. Oinas, Y. Tsushima, T. Uchiyama and W.Y. Zhong, 2006: Radiative forcing by well-mixed greenhouse gases:

Estimates from climate models in the IPCC AR4. *J. Geophys. Res.*, **111**, article D14317, doi:10.1029/2005JD006713.

2.49. Sun, D.Z., T. Zhang, C. Covey, S. Klein, W.D. Collins, J.J. Hack, J.T. Kiehl, G.A Meehl, I.M. Held, and M. Suarez, 2006: Radiative and dynamical feedbacks over the equatorial cold-tongue: Results from seven atmospheric GCMs. *J. Climate*, **19**, 4059–4074. doi:10.1175/JCLI3835.1.

2.50. Collins, W.D., J.M. Lee-Taylor, D.P. Edwards, and G.L. Francis, 2006: Effects of increased near-infrared absorption by water vapor on the climate system. *J. Geophys. Res.*, **111**, article no. D18109, doi:10.1029/2005JD006796.

2.51. Gettelman, A., W.D. Collins, E.J. Fetzer, A. Eldering, and F.W. Irion, 2006: A satellite climatology of upper tropospheric relative humidity and implications for climate. *J. Climate*, **19**, 6104–6121. doi:10.1175/JCLI3956.1.

2.52. Mahowald, N.M., M. Yoshioka, W.D. Collins, A.J. Conley, D.W. Fillmore, and D.B. Coleman, 2006: Climate response and radiative forcing from mineral aerosols during the last glacial maximum, pre-industrial, current, and doubled-carbon dioxide climates. *Geophys. Res. Lett.*, **33**, article no. L20705, doi:10.1029/2006GL026126.

2.53. Meehl, G.A., W.M. Washington, B. Santer, W.D. Collins, J.M. Arblaster, A. Hu, D.M. Lawrence, H. Teng, L.E. Buja, and W.G. Strand, 2006: Climate change in the 20th and 21st centuries and climate change commitment in the CCSM3. *J. Climate*, **19**, 2597–2616. doi:10.1175/JCLI3746.1.

2.54. Kinne, S., M. Schulz, C. Textor, S. Guibert, Y. Balkanski, S. Bauer, T. Berntsen, T. Berglen, O. Boucher, M. Chin, W. Collins, F. Dentener, T. Diehl, R. Easter, H. Feichter, D. Fillmore, S. Ghan, P. Ginoux, S. Gong, A. Grini, J. Hendricks, M. Herzog, L. Horrowitz, I. Isaksen, T. Iversen, A. Jones, S. Kloster, D. Koch, M. Krool, A. Lauer, J.F. Lamarque, G. Lesins, X. Liu, U. Lohmann, V. Montanaro, G. Myhre, J. Penner, G. Pitari, S. Reddy, D. Roberts, O. Seland, P. Stier, T. Takemura, and X. Tie, 2006: An AeroCom initial assessment–Optical properties in aerosol component modules of global models. *Atmos. Chem. Phys.*, **6**, 1815–1834. doi:10.5194/ACP-6-1815-2006.

2.55. Collins, W., R. Colman, J. Haywood, M.R. Manning, and P. Mote, 2007: "The Physical Science behind Climate Change," Scientific American, 297(2), pp. 64-73. doi:10.1038/SCIENTIFICAMERICAN0807-64.

2.56. Yoshioka, M., N.M. Mahowald, A.J. Conley, W.D. Collins, D.W. Fillmore, C.S. Zender, and D.B. Coleman, 2007: Impact of desert dust radiative forcing on Sahel precipitation: Relative importance of dust compared to sea surface temperature variations, vegetation changes and greenhouse gas warming. *J. Climate*, **20**, 1445–1467. doi:10.1175/JCLI4056.1.

2.57. Iacono, M.J., J.S. Delamere, E.J. Mlawer, M.W. Shephard, S.A. Clough, and W.D. Collins, 2008, Radiative forcing by long-lived greenhouse gases: Calculations with the AER radiative transfer models, *J. Geophys. Res.*., **113**, article D13103, doi:10.1029/2008JD009944.

2.58. Jensen, M.P., A.M. Vogelmann, W.D. Collins, G.J. Zhang, and E. Luke, 2008: Investigation of regional and seasonal variations in marine boundary layer cloud properties from MODIS observations. *J. Climate* **21**, 4955–4973. doi:10.1175/2008JCLI1974.1.

2.59. Meehl, G.A., J.M. Arblaster, and W.D. Collins, 2008: Effects of black carbon aerosols on the South Asian Monsoon. *J. Climate*, **21**, 2869–2882. doi:10.1175/2007JCLI1777.1.

2.60. Zhang, G.J., A.M. Vogelmann, M.P. Jensen, W.D. Collins, and E.P. Luke, 2009: Relating Satellite-Observed Cloud Properties from MODIS to Meteorological Conditions for Marine Boundary Layer Clouds. *J. Climate*, **23**, 1374–1391, doi:10.1175/2009JCLI2897.1.

2.61. de Boer, G., W.D. Collins, S. Menon, and C.N. Long, 2011: Using Surface Remote Sensors to Derive Mixed-Phase Cloud Radiative Forcing: An Example from M-PACE. *Atmos. Chem. Phys*, (11), 11937–11949, doi:10.5194/ACP-11-11937-2011.

2.62. Feldman, D.R., C.A. Algieri, W.D. Collins, Y.L. Roberts, and P.A. Pilewskie, 2011: Simulation studies for the detection of changes in broadband albedo and shortwave nadir reflectance spectra under a climate change scenario. *J. Geophys. Res.*, **116**, No. D24, D24103, doi:10.1029/2011JD016407.

2.63. Li, F., W.D. Collins, M.F. Wehner, D.L. Williamson, and J.G. Olson, 2011: Response of precipitation extremes to idealized global warming in an aqua-planet climate model: Towards robust projection from regional to global scales. *Tellus A*, **63**, 876–883, doi:10.1111/j.1600-0870.2011.00543.x.

2.64. Kato, S., F.G. Rose, S. Sun-Mack, W.F. Miller, Y. Chen, D.A. Rutan, G.L. Stephens, N.G. Loeb, P. Minnis, B.A. Wielicki, D.M. Winker, T.P. Charlock, P.W. Stackhouse, K.-M. Xu, and W. Collins, 2010: Computation of top-of-atmosphere and surface irradiances with CALIPSO, CloudSat, and MODIS derived cloud and aerosol properties. *J. Geophys. Res.* **116**, D19209, doi:10.1029/2011JD016050.

2.65. Li, F., W.D. Collins, M.F. Wehner, D.L. Williamson, J.G. Olson, and C.A. Algieri, 2011: Impact of horizontal resolution on simulation of precipitation extremes in an aqua-planet version of Community Atmospheric Model (CAM3). *Tellus A*, **63**, 884–892, doi:10.1111/j.1600-0870.2011.00544.x.

2.66. Conley, A.J., and W.D. Collins, 2011: Extension of the weak-line approximation and application to correlated-k methods. *Journal of Quantitative Spectroscopy and Radiative Transfer*, **112**(10), 1525–1532, doi:10.1016/j.jqsrt.2011.02.008.

2.67. Feldman, D.R., C.A. Algieri, J.R. Ong, and W.D. Collins, 2011: CLARREO shortwave observing system simulation experiments of the twenty-first century: Simulator design and implementation, *J. Geophys. Res.*, **116**, D10107, doi:10.1029/2010JD015350.

2.68. Liu, X., R.C. Easter, S.J. Ghan, R. Zaveri, P. Rasch, X. Shi, J.-F. Lamarque, A. Gettelman, H. Morrison, F. Vitt, A. Conley, S. Park, R. Neale, C. Hannay, A. M. L. Ekman, P. Hess,

N. Mahowald, W. Collins, M.J. Iacono, C.S. Bretherton, M. G. Flanner, and D. Mitchell, 2012: Toward a minimal representation of aerosols in climate models: Description and evaluation in the Community Atmosphere Model CAM5, *Geosci. Model Dev.*, **5**, 709–739, doi:10.5194/gmd-5-709-2012.

2.69. Murphy, L.N., W.J. Riley, and W.D. Collins, 2012: Local and Remote Climate Impacts from Expansion of Woody Biomass for Bioenergy Feedstock in the Southeastern United States. *J. Climate*, **25**(21):7643–7659. doi:10.1175/JCLI-D-11-00535.1.

2.70. Kirtman, B.P., C. Bitz, F. Bryan, W. Collins, J. Dennis, N. Hearn, J.L. Kinter III, R. Loft, C. Rousset, L. Siqueira, C. Stan, R. Tomas and M. Vertenstein, 2012: Impact of ocean model resolution on CCSM climate simulations. *Climate Dynamics*, **39**(6):1303–1328. doi:10.1007/S00382-012-1500-3.

2.71. Rosa, D., J.F. Lamarque, and W.D. Collins, 2013: Global transport of passive tracers in conventional and superparameterized climate models: Evaluation of multiscale methods. *J. Adv. In Modeling Earth Systems*, **4**:M10003, doi:10.1029/2012MS000206.

2.72. Pressel, K.G., and W.D. Collins, 2012: First order Structure Function Analysis of Statistical Scale Invariance in the AIRS Observed Water Vapor Field. *J. Climate*, **25**(16), 5538–5555. doi:10.1175/JCLI-D-11-00374.1.

2.73. Koffi, B., M. Schulz, F.-M. Bréon, J. Griesfeller, D. Winker, Y. Balkanski, S. Bauer, T. Berntsen, M. Chin, W.D. Collins, F. Dentener, T. Diehl, R. Easter, S. Ghan, P. Ginoux, S. Gong, L.W. Horowitz, T. Iversen, A. Kirkevg, D. Koch, M. Krol, G. Myhre, P. Stier, and T. Takemura, 2012: Application of the CALIOP layer product to evaluate the vertical distribution of aerosols estimated by global models: AeroCom phase I results, *J. Geophys. Res.*, **117**, D10201, doi:10.1029/2011JD016858.

2.74. Li, F., D. Rosa, W.D. Collins, and M.F. Wehner, 2012: "Super-Parameterization": A Better Way to Simulate Regional Extreme Precipitation? *Journal of Advances in Modeling of the Earth System (JAMES)*, **4**, doi:10.1029/2011MS000106.

2.75. Koven, C., W. Riley, M. Torn, Z. Subin, J. Tang, W. Collins, D. Lawrence, G. Bonan, and S. Swenson, 2013: The effect of vertically resolved soil biogeochemistry and alternate soil C and N models on C dynamics of CLM4. *Biogeosciences Discuss.*, **10**, 7201–7256, doi:10.5194/BG-10-7109-2013.

2.76. Hurrell, J., M.M. Holland, P.R. Gent, S. Ghan, J. Kay, P. Kushner, J.-F. Lamarque, W.G. Large, D. Lawrence, K. Lindsay, W.H. Lipscomb, M. Long, N. Mahowald, D. Marsh, R. Neale, P. Rasch, S. Vavrus, M. Vertenstein, D. Bader, W.D. Collins, J.J. Hack, J. Kiehl, and S. Marshall, 2013: The Community Earth System Model: A Framework for Collaborative Research. *Bulletin of the American Meteorological Society*, **94**, 1339–1360, doi:10.1175/BAMS-D-12-00121.1.

2.77. Roberts, Y., Pilewskie, P., B.C. Kindel, Feldman, D.R., and W.D. Collins, 2012: Quantitative Comparison of the Variability in Observed and Simulated Shortwave Reflectance, *Atmos. Chem. Phys.*, **12**, 28305–28341, doi:10.5194/ACPD-13-3133-2013.

2.78. Conley, A.J., J.F. Lamarque, F. Vitt, and W.D. Collins, and J. Kiehl, 2013: PORT: A CESM tool for the diagnosis of radiative forcing. *Geosci. Model Dev.*, **6**, 469–476, doi:10.5194/GMD-6-469-2013.

2.79. Feldman, D.R., D.M. Coleman, and W.D. Collins, 2013: On the Usage of Spectral and Broadband Satellite Instrument Measurements to Differentiate Climate Models with Different Low Cloud Feedback Strengths. *Journal of Climate.* **26**(17), 6561–6574, doi:10.1175/JCLI-D-12-00378.1.

2.80. Jones, A.D., W.D. Collins, and M.S. Torn, 2013: On the additivity of radiative forcing between land use change and greenhouse gases. *Geophysical Research Letters*, **40**, 4036–4041, doi:10.1002/grl.50754.

2.81. O'Brien, T.A., F. Li, W.D. Collins, S.A. Rauscher, T.D. Ringler, M.A. Taylor, S. M. Hagos, and L.R. Leung, 2013: Observed scaling in clouds and precipitation and scale incognizance in regional to global atmospheric models. *Journal of Climate,* doi:10.1175/JCLI-D-13-00005.1.

2.82. Li, F., W.D. Collins, M.F. Wehner, and L.R. Leung, 2013: Hurricanes in an aquaplanet world: Implications of the impacts of external forcing and model horizontal resolution. *J. Advances Modeling Earth Systems*, **5**, 1–12, doi:10.1002/jame.20020.

2.83. Jones, A.D., W.D. Collins, J. Edmonds, M. Torn, A. Janetos, K. Calvin, et al., 2013: Greenhouse gas policies influence climate via direct effects of land use change. *J. Climate*, **26**(11), 3657–3670, doi:10.1175/JCLI-D-12-00377.1.

2.84. Hsieh, W.-C., D. Rosa, and W.D. Collins, 2013: Global dust simulations in the multiscale modeling framework. *Journal of Advances in Modeling of the Earth System (JAMES)*, **5**, 15–31, doi:10.1029/2012MS000150.

2.85. Hsieh, W.C., W.D. Collins, Y. Liu, J.C. H. Chiang, C.L. Shie, K. Caldeira, and L. Cao, 2013: Climate response due to carbonaceous aerosols and aerosol induced SST effects in NCAR Community Atmospheric Model CAM3.5. *Atmos. Chem. Phys. Discuss.*, **13**, 7349–7396, 2013, doi:10.5194/ACP-13-7489-2013.

2.86. Wielicki, B.A. D.F. Young, M.G. Mlynczak, K.J. Thome, S. Leroy, J. Corliss, J. G. Anderson, C.O. Ao, R. Bantges, F. Best, K. Bowman, H. Brindley, J.J. Butler, W. Collins, et al., 2013: Achieving Climate Change Absolute Accuracy in Orbit. *Bulletin Amer. Meteor. Soc.*, doi:10.1175/BAMS-D-12-00149.1.

2.87. Leung, R., T.D. Ringler, W. Collins, M. Taylor, and M. Ashfaq, 2013: A Hierarchical Framework for Evaluation of Regional Climate Simulations. *EOS*, **94**, 297–298, doi:10.1002/2013EO340001.

2.88. Rosa, D., and W.D. Collins, 2013: A case study of subdaily simulated and observed continental convective precipitation: CMIP5 and multiscale global climate models comparison. *Geophys. Res. Lett.*, **40**, 5999–6003, doi:10.1002/2013GL057987.

2.89. Pressel, K.G., W.D. Collins, and A.R. Desu, 2014: The Spatial Scale Dependence of Water Vapor Variability Inferred from Observations from a Very Tall Tower. *J. Geophys. Res.*, doi:10.1002/2013JD021141.

2.90. Lu, J., L. Leung, Q. Yang, G. Chen, W.D. Collins, F.Y. Li, Z.J. Hou, and X.L. Feng, 2014: The robust dynamical contribution to precipitation extremes in idealized warming simulations across model resolutions. *Geophysical Research Letters*, **41**(8), 2971–2978, doi:10.1002/2014GL059532.

2.91. Wehner, M.F., K.A. Reed, F. Li, Prabhat, J. Bacmeister, C.-T. Chen, C. Paciorek, P.J. Gleckler, K.R. Sperber, W.D. Collins, A. Gettelman, and C. Jablonowski, 2014: The effect of horizontal resolution on simulation quality in the Community Atmospheric Model, CAM5.1. *Journal of Advances in Modeling Earth Systems*, 6(4):980–997, doi:10.1002/2013MS000276.

2.92. Roberts, Y., Lukashin, C., B.C. Kindel, Feldman, D.R., and W.D. Collins, 2014: Temporal Variability of Observed and Simulated Hyperspectral Reflectance, *Journal of Geophysical Research–Atmospheres*, 119(17), doi:10.1002/2014JD021566.

2.93. O'Brien, T.A., W.D. Collins, S.A. Rauscher, and T.D. Ringler, 2014: Reducing the computational cost of the ECF using a nuFFT: A fast and objective probability density estimation method. *Computational Statistics and Data Analysis*, **79**, 222–234, doi:10.1016/j.csda.2014.06.002.

2.94. Jin, Z., C. Lukashin, Y.L. Roberts, B. Wielicki, D.R. Feldman, and W.D. Collins, 2014: Interannual Variability of The Earth's Spectral Solar Reflectance From Data And Model, *Journal of Geophysical Research-Atmospheres*, **119**, 4458–4470, doi:10.1002/2013JD021056.

2.95. Rubin, J.I. and W.D. Collins, 2014: Global simulations of aerosol amount and size using MODIS observations assimilated with an Ensemble Kalman Filter. *Journal of Geophysical Research-Atmospheres*, 119(22):12780-12806, doi:10.1002/2014JD021627.

2.96. Di Vittorio, A.V., L.P. Chini, B. Bond-Lamberty, J. Mao, X. Shi, J. Truesdale, A. Craig, K. Calvin, A. Jones, W.D. Collins, J. Edmonds, G.C. Hurtt, P. Thornton, and A. Thomson, 2014: From land use to land cover: Restoring the afforestation signal in a coupled integrated assessment earth system model and the implications for CMIP5 RCP simulations, *Biogeosciences*, **11**, 6435–6450, doi:10.5194/BG-11-6435-2014.

2.97. Holm, J.A., J.Q. Chambers, W.D. Collins, and N. Higuchi, 2014: Forest response to increased disturbance in the Central Amazon and comparison to Western Amazonian forests, *Biogeosciences*, **11**, 7721–7773, doi:10.5194/BG-11-5773-2014.

2.98. Feldman, D.R., W.D. Collins, R. Pincus, X. Huang, and X. Chen, 2014: Far-infrared surface emissivity, *Proceedings of the National Academy of Sciences of the United States of America*, 111(46):16297-16302, doi:10.1073/pnas.1413640111.

2.99. Collins, W.D., A.P. Craig, J.E. Truesdale, A.V. Di Vittorio, A.D. Jones, B. Bond-Lamberty, K.V. Calvin, J.A. Edmonds, S.H. Kim, A.M. Thomson, P. Patel, Y. Zhou, J. Mao, X. Shi, P.E. Thornton, L.P. Chini, and G.C. Hurtt, 2015: The integrated Earth System Model (iESM): Formulation and functionality. *Geosci. Model Dev.*, 8, 2203-2219, doi:10.5194/gmd-8-2203-2015.

2.100. Prabhat, S. Byna, V. Vishwanath, E. Dart, M. Wehner, and W. D. Collins, 2015: TECA: Petascale pattern recognition for climate science. *Computer Analysis of Images and Patterns. 16th International Conference, CAIP 2015. Proceedings: LNCS 9257*, pages 426–436, doi:10.1007/978-3-319-23117-4_37.

2.101. Wang, H.-J., W.J. Riley, and W.D. Collins, 2015: Statistical uncertainty of eddy covariance CO_2 fluxes inferred using a residual bootstrap approach. *Agricultural and Forest Meteorology*, 206:163-171, doi:10.1016/j.agrformet.2015.03.011.

2.102. Benedict, J.J., M.S. Pritchard, and W.D. Collins, 2015: Sensitivity of MJO propagation to a robust positive Indian Ocean dipole event in the superparameterized CAM. *Journal of Advances in Modeling Earth Systems*, 7(4):1901–1917, doi:10.1002/2015MS000530.

2.103. Wehner, M., Prabhat, K.A. Reed, D. Stone, W.D. Collins, and J. Bacmeister, 2015: Resolution dependence of future tropical cyclone projections of CAM5.1 in the US CLIVAR Hurricane Working Group idealized configurations. *J. Climate.* doi:10.1175/JCLI-D-14-00311.1.

2.104. Collins, W.D. , H. Johansen, K.J. Evans, C.S. Woodward, and P.M. Caldwell, 2015: Progress in fast, accurate multi-scale climate simulations. *Procedia Computer Science*, 51:2006–2015, doi:10.1016/j.procs.2015.05.465.

2.105. Feldman, D.R., W.D. Collins, and J.L. Paige, 2015: Pan-Spectral Observing System Simulation Experiments of Shortwave Reflectance and Longwave Radiance for Climate Model Evaluation. *Geosci. Model. Dev.*, **8**, 1943–1954, doi:10.5194/gmd-8-1943-2015.

2.106. Fildier, B., and W.D. Collins, 2015: Origins of climate model discrepancies in atmospheric shortwave absorption and global precipitation changes. *Geophys. Res. Lett.*, **42**, 8749–8757, doi:10.1002/2015GL065931.

2.107. Feldman, D.R., W.D. Collins, P.J. Gero, M.S. Torn, E.J. Mlawer, and T.R. Shippert, 2015: Observational determination of surface radiative forcing by CO_2 from 2000 to 2010. Nature, 519(7543):339+, doi:10.1038/NATURE14240.

2.108. Collins, W., 2015: From research to action on climate change. *Frontiers in Ecology and the Environment*, 13(9):459–459, doi:10.1890/1540-9295-13.9.459.

2.109. Dale L.L., Karali N., Millstein D., Carnall M., Vicuna S., Borchers N., Bustos E., O'Hagan J., Purkey D., Heaps C., Sieber J., Collins W.D., Sohn M.D., 2015: An Integrated Assessment of Water Energy and Climate Change in Sacramento California: How Strong is the Nexus? *Climatic Change*, **132**, 223–235, doi:10.1007/s10584-015-1370-x.

2.110. Jones, A.D., K.V. Calvin, W.D. Collins, and J. Edmonds, 2015: Accounting for radiative forcing from albedo change in future global land-use scenarios. *Climatic Change*, 1-13, doi:10.1007/s10584-015-1411-5.

2.111. Jeon, S., Prabhat, S. Byna, J. Gu, W.D. Collins, and M.F. Wehner, 2015: Characterization of extreme precipitation within atmospheric river events over California. Advances in Statistical Climatology, Meteorology and Oceanography, **1**(1):45–57, doi:10.5194/ASCMO-1-45-2015.

2.112. Di Vittorio, A., P. Kyle, and W.D. Collins, 2016: What are the effects of Agro-Ecological Zones and land use region boundaries on land resource projection using the Global Change Assessment Model?, *Environmental Modelling & Software*, **85**, 246–265, doi:10.1016/j.envsoft.2016.08.016.

2.113. Mlynczak, M. G., T.S. Daniels, D.P. Kratz, D.R. Feldman, W.D. Collins, E.J. Mlawer, M.J. Alvarado, J.E. Lawler, L.W. Anderson, D.W. Fahey, L.A. Hunt, and J.C. Mast, 2016: The spectroscopic foundation of radiative forcing of climate by carbon dioxide, Geophys. Res. Lett., **43**, doi:10.1002/2016GL068837.

2.114. O'Brien, T. A., W.D., Collins, K. Kashinath, O. Rübel, S. Byna, J. Gu, H. Krishnan and P.A. Ullrich, 2016: Resolution dependence of precipitation statistical fidelity in hindcast simulations. *J. Adv. Model. Earth Syst.*, Available Online. doi:10.1002/2016MS000671.

2.115. Du, E., A. Di Vittorio, and W.D. Collins, 2015: Evaluation of hydrologic components of Community Land Model (CLM4) and bias identification. *International Journal of Applied Earth Observation and Geoinformation*, **48**, 5–16, doi:10.1016/j.jag.2015.03.013.

2.116. Kahn, B.H., X.L. Huang, G.L. Stephens, W.D. Collins, D.R. Feldman, H. Su, S. Wong, and Q. Yue, 2016: The ENSO regulation of far- and mid-infrared contributions to clear-sky OLR, *Geophysical Research Letters*, **43**, doi:10.1002/2016GL070263.

2.117. Rauscher, S.A., T.A. O'Brien, C. Piani, E. Coppola, F. Giorgi, W.D. Collins, P.M. Lawston, 2016: A Multimodel Intercomparison of Resolution Effects on Precipitation: Simulations and Theory. *Climate Dynamics*, 1–14, doi:10.1007/s00382-015-2959-5.

2.118. O'Brien, T.A., K. Kashinath, W.D. Collins, and J.P. O'Brien, 2015: A fast and objective multidimensional kernel density estimation method: fastKDE, *Computational Statistics and Data Analysis*, **101**, 148–160, doi:10.1016/j.csda.2016.02.014.

2.119. Liu, Y., E. Racah, Prabhat, J. Correa, A. Khosrowshahi, D. Lavers, K. Kunkel, M. Wehner, and W.D. Collins, 2016: Application of Deep Convolutional Neural Networks for Detecting Extreme Weather in Climate Datasets. *KDD* (http://www.kdd.org/kdd2016/) applied data analytics track, arXiv.

2.120. Angélil, O., D.A. Stone, M.F. Wehner, C.J. Paciorek, H. Krishnan, and W.D. Collins, 2016: An independent assessment of anthropogenic attribution statements for recent extreme weather events. *Journal of Climate*, **30**(1), 5–16, doi:10.1175/JCLI-D-16-0077.1.

2.121. Thornton, P.E, J. Edmonds, W.D. Collins, K. Calvin, A.D. Jones, A. Thomson, A. Di Vittorio, X. Shi, L. Chini, B. Bond-Lamberty, J. Truesdale, J. Mao, and M. Branstetter, 2017: Biospheric feedback effects in a synchronously coupled model of Earth and human systems. *Nature Climate Change*. **7**, 496–500, doi:10.1038/NCLIMATE3310.

2.122. Cavanaugh, N.R., M.J. DeFlorio, T.A. O'Brien, W.D. Collins, and W.C. Skamarock, 2017: Spherical Harmonic Spectral Estimation on Arbitrary Grids. *Monthly Weather Review*, doi:10.1175/MWR-D-16-0259.1.

2.123. Fildier, B., H. Parishani, and W.D. Collins, 2017: Simultaneous Characterization of Mesoscale and Convective-Scale Tropical Rainfall Extremes and their Dynamical and Thermodynamic Modes of Change. *Journal of Advances in Modeling of the Earth System*, **9**(4), doi:10.1002/2017MS001033.

2.124. Pall, P., C.M Patricola, M. Wehner, D.A. Stone, C.J. Paciorek, and W.D. Collins, 2017: Diagnosing Anthropogenic Contributions to Heavy Colorado Rainfall in September 2013. *Weather and Climate Extremes*. **17**, 1–6, doi:10.1016/j.wace.2017.03.004.

2.125. Jones, A. L., D.R. Feldman, S. Freidenreich, D. Paynter, V. Ramaswamy, W.D. Collins, and R. Pincus, 2017: A New Paradigm for Diagnosing Contributions to Model Aerosol Forcing Error. *Geophysical Research Letters*, **44**(23), 12004-12012, doi:10.1002/2017GL075933.

2.126. Feldman, D.R., W.D. Collins, S.C. Biraud, M.D. Risser, D.D. Turner, P.J. Gero, J. Tadi, D. Helmig, S. Xie, E.J. Mlawer, T.R. Shippert, and M.S. Torn, 2018: Observationally derived rise in methane surface forcing mediated by water vapour trends. *Nature Geoscience*, **11**(4), 238-243, doi:10.1038/s41561-018-0085-9.

2.127. Di Vittorio, A. V., J. Mao, X. Shi, L. Chini, G. Hurtt, and W.D. Collins, 2018: Quantifying the Effects of Historical Land Cover Conversion Uncertainty on Global Carbon and Climate Estimates. *Geophysical Research Letters*, **45**(2), 974-982, doi:10.1002/2017GL075124.

2.128. Stone, D.A. M.D. Risser, O.M. Angelil, M.F. Wehner, S. Cholia, N. Keen, H. Krishnan, T.A. O'Brien, and W.D. Collins, 2018: A basis set for exploration of sensitivity to prescribed ocean conditions for estimating human contributions to extreme weather in CAM5.1-1 degree. *Weather and Climate Extremes*, **19**, 10–19, doi:10.1016/j.wace.2017.12.003.

2.129. Collins, W.D., D.R. Feldman, C. Kuo, and N. Nguyen, 2018: Large Regional Shortwave Forcing by Anthropogenic Methane Informed by Jovian Observations. *Science Advances*, **4**(9), eaas9593, doi:10.1126/SCIADV.AAS9593.

2.130. Rhoades, A., P.A. Ullrich, C.M. Zarzycki, H. Johansen, S.A. Margulis, H. Morrison, Z. Xu, and W. Collins, 2018: Sensitivity of Mountain Hydroclimate Simulations in Variable-Resolution CESM to Microphysics and Horizontal Resolution. *Journal of Advances in Modeling Earth Systems (JAMES)*, **10**, 1357–1380, doi:10.1029/2018MS001326.

2.131. Xu, Z., A.M. Rhoades, H. Johansen, P.A. Ullrich, and W.D. Collins, 2018: An intercomparison of GCM and RCM dynamical downscaling for characterizing the hydroclimatology of California and Nevada. *Journal of Hydrometeorology*, **19**(9), 1485-1506, doi:10.1175/JHM-D-17-0181.1.

2.132. Soden, B., D.R. Feldman, and W.D. Collins, 2018: Revisiting uncertainties in climate models. *Science*, **361**(6400), 326-327, doi:10.1126/science.aau1864.

2.133. Jones, A.D., K.V. Calvin, X. Shi, A.V. Di Vittorio, B. Bond-Lamberty, P.E. Thornton, and W.D. Collins, 2018: Quantifying human-mediated carbon cycle feedbacks, *Geographical Research Letters*, **45**(20), 11370-11379, doi:10.1029/2018GL079350.

2.134. Fildier, B., H. Parishani, and W.D. Collins, 2018: Prognostic Power of Extreme Rainfall Scaling Formulas across Space and Time Scales. *Journal of Advances in Modeling Earth Systems (JAMES)*, **10**(12), 3252-3267, doi:10.1029/2018MS001462.

2.135. Eyring, V., P.M. Cox, G.M. Flato, P.J. Gleckler, G. Abramowitz, P. Caldwell, W.D. Collins, B. Gier, A.D. Hall, F.M. Hoffman, G.C. Hurtt, A. Jahn, C.D. Jones, S. Klein, J. Krasting, L. Kwiatkowski, R. Lorenz, E. Maloney, J. Meehl, A. Pendergrass, R. Pincus, A.C. Ruane, J. L. Russell, B. Sanderson, B. Santer, S.C. Sherwood, I. Simpson, R. Stouffer, and M.S. Williamson, 2019: Taking climate model evaluation to the next level. *Nature Climate Change*, **9**(2), 102-110, doi:10.1038/s41558-018-0355-y.

2.136. Langhans, W., J. Mueller, and W.D. Collins, 2019: Optimization of the Eddy-Diffusivity/Mass-Flux shallow cumulus and boundary-layer parameterization using surrogate models. *Journal of Advances in Modeling Earth Systems (JAMES)*, **11**(2), 402-416, doi:10.1029/2018MS001449.

2.137. Risser, M.D., C.J. Paciorek, M.F. Wehner, T.A. O'Brien, and W.D. Collins, 2019: A probabilistic gridded product for daily precipitation extremes over the United States. *Clim. Dyn.* **53**(2517), doi:10.1007/s00382-019-04636-0.

2.138. Patricola, C.M., J.P. O'Brien, M.D. Risser, A.M. Rhoades, T.A. O'Brien, P.A. Ullrich, D.A. Stone, and W.D. Collins, 2020: Maximizing ENSO as a Source of Western US Hydroclimate Predictability. *Clim. Dyn.* **54**(351), doi:10.1007/s00382-019-05004-8.

2.139. Risser, M.D., C.J. Paciorek, T.A. O'Brien, M.F. Wehner, and W.D. Collins, 2020: Detected trends in precipitation extremes at their native scales derived from in situ measurements. *J. Climate*, **32**(3), doi:10.1175/JCLI-D-19-0077.1.

2.140. Ramaswamy, V., W. Collins, J. Haywood, J. Lean, N. Mahowald, G. Myhre, V. Naik, K.P. Shine, B. Soden, G. Stenchikov, and T. Storelvmo, 2020: Radiative Forcing of Climate: The Historical Evolution of the Radiative Forcing Concept, the Forcing Agents and their Quantification, and Applications. *Meteorological Monographs*, **59**, 14.1–14.101, doi:10.1175/AMSMONOGRAPHS-D-19-0001.1.

2.141. Charn, A.B., W.D. Collins, H. Parishani, M.D. Risser, and T.A. O'Brien, 2020: Microphysical sensitivity of superparameterized precipitation extremes in the contiguous United States due to feedbacks on large-scale circulation. Earth and Space Science, **7**, doi:10.1029/2019EA000731.

2.142. Prabhat, K. Kashinath, M. Mudigonda, S. Kim, L. Kapp-Schwoerer, A. Graubner, E. Karaismailoglu, L. von Kleist, T. Kurth, A. Greiner, K. Yang, C. Lewis, J. Chen, A. Lou, S. Chandran, B. Toms, W. Chapman, K. Dagon, C. Shields, T.A. O'Brien, M. Wehner, and W.D. Collins, 2020: ClimateNet: an open dataset and Deep Learning architecture for enabling precision analytics of extreme weather. *Geoscientific Model Development*, **14**, 107–124, doi:10.5194/gmd-14-107-2021.

2.143. OBrien, T. A., Risser, M. D., Loring, B., Elbashandy, A. A., Krishnan, H., Johnson, J., Patricola, C. M., OBrien, J. P., Mahesh, A., Arriaga Ramirez, S., Rhoades, A. M., Charn, A., Inda Daz, H., and Collins, W. D., 2020: Detection of atmospheric rivers with inline uncertainty quantification: TECA-BARD v1.0.1. *Geoscientific Model Development*, 13(12), 6131–6148. doi:10.5194/gmd-13-6131-2020.

2.144. Fildier, B., W.D. Collins, and C. Muller, 2020: Distortions of the rainfall distribution with warming, with and without self-aggregation. *Journal of Advances in Modeling Earth Systems*, **13**, e2020MS002256, doi:10.1029/2020MS002256.

2.145. Errickson, F.C., K. Keller, W.D. Collins, V. Srikrishnan, and D. Anthoff, 2020: Improving the climate model calibration reduces the social cost of methane. *Nature*, **592**, 564–570, doi:10.1038/s41586-021-03386-6.

2.146. Risser, M.D., M.F. Wehner, J.P. O'Brien, C.M. Patricola, T.A. O'Brien, W.D. Collins, C.J. Paciorek, and H. Huang, 2020: Detection and attribution for observed precipitation over the contiguous United States Part I: quantifying the influence of natural climate variability on in situ measurements of seasonal total and extreme daily precipitation. *Climate Dynamics*, **56**, 3205–3230, doi:10.1007/s00382-021-05638-7.

2.147. Wehner, M., J. Lee, M. Risser, P. Ullrich, P. Gleckler, and W.D. Collins, 2020: Evaluation of extreme subdaily precipitation in high-resolution global climate model simulations. *Philosophical Transactions of the Royal Society*, **379**, doi:10.1098/rsta.2019.0545.

2.148. Huang H., C.M. Patricola, T.A. O'Brien, E. Bercos-Hickey, Y. Zhou, A. Rhoades, M. Risser, W.D. Collins, 2021: Sources of subseasonal-to-seasonal predictability of atmospheric rivers and precipitation in the western United States. *JGR Atmospheres*, **126**, e2020JD034053, doi:10.1029/2020JD034053.

2.149. Zhou, Y., T.A. O'Brien, P.A. Ullrich, W.D. Collins, C.M. Patricola, and A.M. Rhoades, 2021: Uncertainties in Atmospheric River Life Cycles by Detection Algorithms: Climatology and Variability. *JGR-Atmospheres*, **126**, e2020JD033711 doi:10.1029/2020JD033711.

2.150. Charn, A.B., W.D. Collins. H. Parishani, and M. Risser, 2021: Global microphysical sensitivity of superparameterized precipitation extremes. *Earth and Space Science*, **8**, e2020EA001308, doi:10.1029/2020EA001308.

2.151. Freidenreich, S., D. Paynter, P. Lin, V. Ramaswamy, D. Feldman, W. Collins, and A. Jones, 2021: An investigation into biases in instantaneous aerosol radiative effects calculated by shortwave parameterizations in two Earth System Models. *J. Geophys. Res.*, **126**, e2019JD032323, doi:10.1029/2019JD032323.

2.152. Inda-Díaz, H.A., T.A. O'Brien, Y. Zhou, and W.D. Collins, 2021: Constraining and characterizing the size of atmospheric rivers: A perspective independent from the detection algorithm. *JGR-Atmospheres*, **126**, e2020JD033746, doi:10.1029/2020JD033746.

2.153. Molter, E.M., W.D. Collins, and M. Risser, 2021: Quantitative precipitation estimation of extremes in CONUS with radar data. *Geophys. Rev. Lett.*, **48**, e2021GL094697, doi:10.1029/2021GL094697.

2.154. Huang, H., C.M. Patricola, and W.D. Collins, 2021: The Influence of Ocean Coupling on Simulated and Projected Tropical Cyclone Precipitation in the HighResMIP-PRIMAVERA Simulations. *Geophys. Res. Lett.*, **48**, e2021GL094801, doi:10.1029/2021GL094801.

2.155. Siirila-Woodburn, E.R., A.M. Rhoades, B.J. Hatchett, L.S. Huning, J. Szinai, C. Tague, P.S. Nico, D.R. Feldman, A.D. Jones, W.D. Collins, and L. Kaatz, 2021: A low-to-no snow future and its impacts on water resources in the western United States. *Nature Reviews Earth & Environment*, **2**(11), 800–819, doi:10.1038/s43017-021-00219-y.

2.156. Abel, A.J., A.J. Berliner, M. Mirkovic, W.D. Collins, A.P. Arkin, and D.S. Clark, 2022: Photovoltaics-driven power production can support human exploration on Mars. *Frontiers in Astronomy and Space Sciences*, **9**, doi:10.3389/fspas.2022.868519

2.157. Risser, M.D., W.D. Collins, M.F. Wehner, T.A. O'Brien, C.J. Paciorek, J.P. O'Brien, C.M. Patricola, H. Huang, P.A. Ullrich, and B. Loring, 2021: A framework for detection and attribution of regional precipitation change: Application to the United States historical record. *Clim. Dyn.*, doi:10.1007/s00382-022-06321-1

2.158. Collins, W.D., R. Orbach, M. Bailey, S. Biraud, I. Coddington, D. DiCarolo, J. Peischl, A. Radhakrishnan, and D. Schimel, 2022: Monitoring methane emissions from oil and gas operations. *PRX Energy*, **1**(1), 017001, doi:10.1103/PRXEnergy.1.017001

2.159. Rhoades, A.M., B.J. Hatchett, M.D. Risser, W.D. Collins, L. Huning, R. McCrary, E. Siirila-Woodburn, P.A. Ullrich, M.F. Wehner, C.M. Zarzycki, and A.D. Jones, 2022: Asymmetric Emergence of Low-to-No Snow in the American Cordillera. *Nature Climate Change*, article NCLIM-21101874, doi:10.1038/s41558-022-01518-y

2.160. Zhou, Yang, Travis O'Brien, William Collins, Christine Shields, Burlen Loring, and Abdelrahman Elbashandy, 2022: Characteristics and Variability of Atmospheric River Flavors. Accepted to *J. Geophys. Res. – Atmos.*, **127**, e2022JD037105, 10.1029/2022JD037105.

3 Manuscripts Submitted to Refereed Journals

3.161. Dai, Yi, Margaret S. Torn, Ian N. Williams, and William D. Collins, 2022: Longwave radiative effects beyond the initial intensification phase of tropical cyclones. Submitted to *Journal of the Atmospheric Sciences*.

3.162. Molina, Maria J., Travis A. OBrien, Gemma Anderson, Moetasim Ashfaq, Katrina Eleanor Bennett, William Collins, Katie Dagon, Juan M. Restrepo, Paul A. Ullrich, 2022: Emerging Applications in Machine Learning for Climate Variability and Extremes. Submitted to *AMS Artificial Intelligence for the Earth Systems*.

3.163. Nair, Vishnu S., William R. Boos, and William D. Collins, 2022: Historical and future trends in South Asian monsoon low-pressure systems in an ensemble of high-resolution climate models. In preparation for *GRL/ERL*.

3.164. Bercos-Hickey, E., C.M. Patricola, B. Loring, and W.D. Collins, 2022: The relationship between African easterly waves and tropical cyclones in historical and future climates in the HighResMIP-PRIMAVERA simulations. Submitted to *J. Geophys. Res.*

3.165. Huang, Huanping, William D. Collins, Christina M. Patricola, Yohan Ruprich-Robert, and Paul A. Ullrich, 2022: Contrasting Responses of Atlantic and Pacific Tropical Cyclone Activity to the Atlantic Multidecadal Variability. Submitted to *Geophys. Res. Lett.*

3.166. Risser, Mark D., William D. Collins, Michael F. Wehner, Travis A. O'Brien, Christopher J. Paciorek, John P. O'Brien, Christina M. Patricola, Huanping Huang, Paul A. Ullrich and Burlen Loring, 2022: Anthropogenic aerosols mask human-induced increases in rain gauge precipitation over the United States. Submitted to *Nature*.

3.167. Zhou, Yang, Travis A. OBrien, William D. Collins, Christine A. Shields, Burlen Loring, and Abdelrahman A. Elbashandy, 2022: Atmospheric Rivers in Community Earth System Model version 2 Large Ensemble Project. In preparation for *Geoscientific Model Development*.

3.168. Mahesh, A., Travis A. O'Brien, Burlen Loring, William Boos, and William D. Collins, 2022: Identifying Atmospheric Rivers and their Poleward Latent Heat Transport with Generalizable Neural Networks. In preparation for *Geoscientific Model Development*.

3.169. Collins, William D., Veronika Eyring, Elizabeth A. Barnes, Marcelo Barreiro, Tom Beucler, Marc Bocquet, Christopher S. Bretherton, Hannah Christensen, Katherine Dagon, David John Gagne, Pierre Gentine, David Hall, Dorit Hammerling, Stephan Hoyer, Fernando Iglesias-Suarez, Ignacio Lopez-Gomez, Marie C. McGraw, Gerald A. Meehl, Maria J. Molina, Claire Monteleoni, Juliane Mueller, Michael S. Pritchard, David Rolnick, Jakob Runge, Philip Stier, Oliver Watt-Meyer, Katja Weigel, Rose Yu, and Laure Zanna , 2022: Pushing the Frontiers in Climate Modeling and Analysis with Machine Learning. In preparation for *Nature Climate Change*.

3.170. Collins, W.D., and D.R. Feldman, 2022: Evidence for Hemispheric Spectral Albedo Inequality. In preparation for *Geophysical Review Letters*.

4 Other External Refereed Publications

4.171. Collins, W.D., W.C. Conant, and V. Ramanathan, 1993: Earth radiation budget, clouds, and climate sensitivity. *Atmospheric Chemistry: The Implications for Global Change* (Blackwell Scientific Publishers, Oxford), ed. J. Calvert, 207–215.

4.172. Collins, W.D., R.L. Grossman, A. Heymsfield, D. Kley, J. Kuettner, and V. Ramanathan, 1995: The Central Equatorial Pacific Experiment. *Clouds, Chemistry, and Climate* (Springer, Berlin), NATO ASI Series 1: Global Environmental Change, **35**, 135–152.

4.173. Bailey, B.A., L.M. Berliner, W.D. Collins, D.W. Nychka, and J.T. Kiehl, 2000: Neural networks: Cloud parameterizations. *Studies in the Atmospheric Sciences* (Springer-Verlag, New York), eds. M.L. Berliner, D. Nychka, and T. Hoar, Lecture Notes in Statistics, **144**, 97–116.

4.174. Collins, W.D., 2002: Aerosols: Role in Radiative Transfer. *Encyclopedia of Atmospheric Science*, (Academic Press, London), eds. J.R. Holton, J. Pyle, and J.A. Curry, **1**, 48–53.

4.175. Santer, B.D., J.E. Penner, P.W. Thorne, W. Collins, K. Dixon, T.L. Delworth, C. Doutriaux, C.K. Folland, C.E. Forest, I.M. Held, J.R. Lanzante, G.A. Meehl, V. Ramaswamy, D.J. Seidel, M.F. Wehner, and T.M.L. Wigley, 2006: How well can the observed vertical temperature changes be reconciled with our understanding of the causes of these temperature changes? in Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences. T.R. Karl, S.J. Hassol, C.D. Miller, and W.L. Murray, editors, 2006. A Report by the Climate Change Science Program and the Subcommittee on Global Change Research, Washington, DC.

4.176. Collins, W.D., 2006: Unresolved issues in atmospheric solar absorption. *Frontiers of Climate Modeling Climate Modeling* (Cambridge University Press, Cambridge), eds. J.T. Kiehl and V. Ramanathan, 179–216.

4.177. Meehl, G.A., T.F. Stocker, W.D. Collins, P. Friedlingstein, A. Gaye, J. Gregory, A. Kitoh, R. Knutti, J. Murphy, A. Noda, S. Raper, I. Watterson, A. Weaver, Z.-C. Zhao, J. Annan, J. Arblaster, C. Bitz, A. le Brocq, P. Brockmann, L. Buja, G. Clarke, M. Collins, E. Driesschaert, N.A. Diansky, K. Dixon, J.-L. Dufresne, J. Kyurgerov, J. Eby, N. Edwards, S. Emori, P. Forster, R. Furrer, J. Hansen, G. Hegerl, M. Holland, A. Hu, P. Huybrechts, F. Joos, J. Kettleborough, M. Kimoto, M. Krynytzky, M.-F. Loutre, J. Lowe, M. Meinshausen, S. Müller, S. Nawrath, J. Oerlemans, T. Palmer, A. Payne, G.-K. Plattner, J. Räisänen, G.L. Russell, A. Rinke, D. Salas y Melia, G. Schmidt, B. Schneider, A. Shepherd, D. Stainforth, C. Tebaldi, H. Teng, L. Terray, A. Sokolov, P. Stott, E.M. Volodin, B. Wang, T.M.L. Wigley, Y. Yu, and S. Yukimoto, 2007: Chapter 10: Global Climate Projections, in *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Avery, M. Tignor

and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.

4.178. Forster, P., V. Ramaswamy, P. Artaxo, T. Berntsen, R. Betts, D. Fahey, J. Haywood, J. Lean, D. Lowe, G. Myhre, J. Nganga, R. Prinn, G. Raga, M. Schulz, R. Van Dorland, G. Bodeker, G. Boer, O. Boucher, W.D. Collins, T.J. Conway, E. Dlugokencky, J. Elkins, D. Etheridge, P. Fraser, D. Keeling, S. Kinne, K. Lassey, U. Lohmann, A. Manning, S. Montzka, D. Oram, K. O'Shaughnessy, S. Piper, M. Ponater, N. Ramankutty, K. Rosenlof, R. Saussen, M.D. Schwarzkopf, G. Stenchikov, N. Stuber, C. Textor, R. Wang, R. Weiss, and T. Whorf, 2007: Chapter 2: Changes in Atmospheric Constituents and in Radiative Forcing, in *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.

4.179. Hegerl, G., F. Zwiers, P. Braconnot, N. Gillett, Y. Luo, J. Marengo, N. Nicholls, J. Penner, P. Stott, M. Allen, C. Ammann, N. Andronova, R. Betts, A. Clement, W.D. Collins, S. Crooks, T. Delworth, R. van Dorland, C. Forest, P. Forster, H. Goosse, J. Gregory, D. Harvey, F. Joos, G. Jones, J. Kenyon, J. Kettleborough, R. Knutti, H. Lambert, M. Lavine, D. Levinson, V. Masson, T. Nozawa, B. Otto-Bliesner, D. Pierce, S. Power, D. Rind, L. Rotstayn, B.D. Santer, C. Senior, S. Stark, D. Stone, S. Tett, P. Thorne, M. Wang, B. Wielicki, T. Wong, L. Xu, X. Zhang, and E. Zorita, 2007: Chapter 9: Understanding and Attributing Climate Change, in *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.

4.180. Quaas, J., S. Bony, W.D. Collins, L. Donner, A. Illingworth, A. Jones, U. Lohmann, M. Satoh, S.E. Schwartz, W.-K. Tao, and R. Wood, 2008, "Current Understanding and Quantification of Clouds in the Changing Climate System," *Perturbed Clouds in the Climate System: Report of the Ernst Strüngmann Forum*, Frankfurt, March 2–7, R.J. Charlson and J. Heintzenberg, Eds., MIT Press.

4.181. Collins, W.D., and M. Satoh, 2008: "Simulating Global Clouds: Past, Present and Future," in *Perturbed Clouds in the Climate System: Report of the Ernst Strüngmann Forum*, Frankfurt, March 2–7, R.J. Charlson and J. Heintzenberg, Eds., MIT Press.

4.182. G. Flato, J. Marotzke, B. Abiodun, P. Braconnot, S.C. Chou, W. Collins, P. Cox, F. Driouech, S. Emori, V. Eyring, C. Forest, P. Gleckler, E. Guilyardi, C. Jakob, V. Kattsov, C. Reason, and M. Rummukainen, 2013: Chapter 9: Evaluation of Climate Models. In *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F.,

D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp. doi:10.1017/CBO9781107415324.021.

4.183. G.A. Ban Weiss and W.D. Collins, 2014: Aerosols: Role in Radiative Transfer. In press, *Encyclopedia of Atmospheric Sciences*, (eds. F. Zhang, J. Pyle, and G. North), Elsevier, 2998 pp.

4.184. Randall, D.A., A.D. Del Genio, L.J. Donner, W.D. Collins, and S.A. Klein, 2016: The Impact of ARM on Climate Modeling. Meteorological Monographs, 57, 26.1–26.16, doi:10.1175/AMSMONOGRAPHS-D-15-0050.1.

4.185. Collins, W. D., S. J. Davis, R. Bales, J. Burney, R. McCarthy, E. Rignot, W. Torre, and D. Victor, 2016. Chapter 3. Science and Pathways for Bending the Curve. Collabra, 2(1): 17, pp. 1–17, doi:http://dx.doi.org/10.1525/collabra.62.

4.186. Ramanathan, V., M. J. Molina, D. Zaelke, N. Borgford-Parnell, Y. Xu, K. Alex, M. Auffhammer, P. Bledsoe, W. D. Collins, B. Croes, F. Forman, Ö. Gustafsson, A. Haines, R. Harnish, M.Z. Jacobson, S. Kang, M. Lawrence, D. Leloup, T. Lenton, T. Morehouse, W. Munk, R. Picolotti, K. Prather, G. Raga, E. Rignot, D. Shindell, A. K. Singh, A. Steiner, M. Thiemens, D. W. Titley, M. E. Tucker, S. Tripathi, and D. Victor, 2017: *Well Under 2 Degrees Celsius: Fast Action Policies to Protect People and the Planet from Extreme Climate Change*. Available at: http://www-ramanathan.ucsd.edu/about/publications.php and www.igsd.org/publications/.

4.187. Feng Y., R.I. Negron-Juarez, C.M. Patricola, W.D. Collins, M. Uriarte, J.S. Hall, N. Clinton, and J.Q. Chambers, 2018: Rapid remote sensing assessment of impacts from Hurricane Maria on forests of Puerto Rico. *PeerJ Preprints* 6:e26597v1.

4.188. Risser, M, C. Paciorek, M. Wehner, T.A. O'Brien, and W.D. Collins, 2019, "A probabilistic gridded product for daily precipitation extremes over the United States" (data product), Harvard Dataverse, V3, doi:10.7910/DVN/LULNUQ.

4.189. Szopa, S., V. Naik, B. Adhikary, P. Artaxo, T. Berntsen, W.D. Collins, S. Fuzzi, L. Gallardo, A. Kiendler-Scharr, Z. Klimont, H. Liao, N. Unger, and P. Zanis, 2021: Short-Lived Climate Forcers. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yeleki, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 817922, doi:10.1017/9781009157896.008.

4.190. Szopa, S., V. Naik, B. Adhikary, P. Artaxo, T. Berntsen, W.D. Collins, S. Fuzzi, L. Gallardo, A. Kiendler-Scharr, Z. Klimont, H. Liao, N. Unger, and P. Zanis, 2021: Short-Lived Climate

Forcers Supplementary Material. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yeleki, R. Yu, and B. Zhou (eds.)]. Available from `https://www.ipcc.ch/`.

4.191. Arias, P.A., N. Bellouin, E. Coppola, R.G. Jones, G. Krinner, J. Marotzke, V. Naik, M.D. Palmer, G.-K. Plattner, J. Rogelj, M. Rojas, J. Sillmann, T. Storelvmo, P.W. Thorne, B. Trewin, K. Achuta Rao, B. Adhikary, R.P. Allan, K. Armour, G. Bala, R. Barimalala, S. Berger, J.G. Canadell, C. Cassou, A. Cherchi, W. Collins, W.D. Collins, S.L. Connors, S. Corti, F. Cruz, F.J. Dentener, C. Dereczynski, A. Di Luca, A. Diongue Niang, F.J. Doblas-Reyes, A. Dosio, H. Douville, F. Engelbrecht, V. Eyring, E. Fischer, P. Forster, B. Fox-Kemper, J.S. Fuglestvedt, J.C. Fyfe, N.P. Gillett, L. Goldfarb, I. Gorodetskaya, J.M. Gutierrez, R. Hamdi, E. Hawkins, H.T. Hewitt, P. Hope, A.S. Islam, C. Jones, D.S. Kaufman, R.E. Kopp, Y. Kosaka, J. Kossin, S. Krakovska, J.-Y. Lee, J. Li, T. Mauritsen, T.K. Maycock, M. Meinshausen, S.-K. Min, P.M.S. Monteiro, T. Ngo-Duc, F. Otto, I. Pinto, A. Pirani, K. Raghavan, R. Ranasinghe, A.C. Ruane, L. Ruiz, J.-B. Salle, B.H. Samset, S. Sathyendranath, S.I. Seneviratne, A.A. Srensson, S. Szopa, I. Takayabu, A.-M. Trguier, B. van den Hurk, R. Vautard, K. von Schuckmann, S. Zaehle, X. Zhang, and K. Zickfeld, 2021: Technical Summary. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yeleki, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 33144, doi:10.1017/9781009157896.002.

5 Technical Reports, Notes, Chapters, and Articles in Non-archival Journals

5.1. Valero, F.P.J., J. Herman, P. Minnis, W.D. Collins, R. Sadourney, W. Wiscombe, D. Lubin, and K. Ogilvie, 1999: *Triana–A Deep Space Earth and Solar Observatory*, prepared for the National Academy of Sciences Review, December 1999, 100 pp.

5.2. Cass, G.R., S.K. Chhabra, W.D. Collins, P.J. Crutzen, N. Kalra, T.N. Krishnamurti, J. Lelieveld, A.P. Mitra, H.V. Nguyen, V. Ramanathan, J.M. Samet, and D.R. Sikka, 2001: The South Asian Brown Cloud: Climate and Other Environmental Impacts. United Nations Environmental Program.

5.3. Collins, W.D., J.J. Hack, B.A. Boville, P.J. Rasch, D.L. Williamson, J.T. Kiehl, B. Briegleb, J.R. McCaa, C. Bitz, S.-J. Lin, R.B. Rood, M. Zhang, and Y. Dai, 2003: Description of

the NCAR Community Atmosphere Model (CAM2). `http://www.ccsm.ucar.edu/models/atm-cam/#documentation`

5.4. Collins, W.D., P.J. Rasch, B.A. Boville, J.J. Hack, J.R. McCaa, D.L. Williamson, J.T. Kiehl, B. Briegleb, C. Bitz, S.-J. Lin, M. Zhang, and Y. Dai, 2004: Description of the NCAR Community Atmosphere Model (CAM 3.0), NCAR Technical Note, NCAR/TN-464+STR, 226 pp.

5.5. Modeling and Simulation at the Exascale for Energy and the Environment. Report on the Advanced Scientific Computing Research Town Hall Meetings on Simulation and Modeling at the Exascale for Energy, Ecological Sustainability, and Global Security (E3). DOE Office of Science; Co-chairs Horst Simon, Thomas Zacharia, and Rick Stevens. 162 pp. `http://www.sc.doe.gov/ascr/ProgramDocuments/ProgDocs.html`.

5.6. Computational and Informational Technology Rate Limiters to the Advancement of Climate Change Science, Joint ASCAC-BERAC Subcommittee, J.J. Hack and E. Bierly (co chairs), Feb. 2008, 19 pp. Available at

`http://www.sc.doe.gov/ober/berac/Climate${}_{}$Modeling${}_{}$Final${}_{}$Joint${}_{}$ASCAC-BERAC${}_{}$Report.pdf`.

5.7. Washington, W., D. Bader, W. Collins, J. Drake, M. Taylor, B. Kirtman, D. Williams, and D. Middleton, 2009: Scientific grand challenges: Challenges in climate change science and the role of computing at the extreme scale. Report from the Workshop Held November 6–7, 2008, Sponsored by the U.S. Department of Energy's Offices of Biological and Environmental Research and Advanced Scientific Computing Research, 98 pp.

5.8. Janetos, A.C., L. Clarke, W. Collins, K. Ebi, J. Edmonds, I. Foster, J. Jacoby, K. Judd, R. Leung, R. Newell, D. Ojima, G. Pugh, A. Sanstad, P. Schultz, R. Stevens, J. Weyant, and T. Wilbanks, 2009: Science Challenges and Future Directions: Climate Change Integrated Assessment Research, Report from the U.S. Department of Energy Office of Science and Office of Biological and Environmental Research. Workshop on Integrated Assessment, November 2008, 100 pp.

5.9. Neale, R.B., J.H. Richter, A.J. Conley, S. Park, P.H. Lauritzen, A. Gettelman, D.L. Williamson, P.J. Rasch, S.J. Vavrus, M.A. Taylor, W.D. Collins, M. Zhang, and S.J. Lin, 2010: Description of the NCAR Community Atmosphere Model (CAM 4.0), NCAR Technical Note NCAR/TN-485+STR, National Center for Atmospheric Research, Boulder, Colorado, 224 pp.

5.10. Neale, R.B., C.-C. Chen, A. Gettelman, P.H. Lauritzen, S. Park, D.L. Williamson, A.J. Conley, R. Garcia, D. Kinnison, J.-F. Lamarque, D. Marsh, M. Mills, A.K. Smith, S. Tilmes, F. Vitt, H. Morrison, P. Cameron-Smith, W.D. Collins, M.J. Iacono, R.C. Easter, S.J. Ghan, X. Liu, P.J. Rasch, and M.A. Taylor, 2012: Description of the NCAR Community Atmosphere Model (CAM 5.0), NCAR Technical Note NCAR/TN-486+STR, National Center for Atmospheric Research, Boulder, Colorado, 289 pp.

5.11. R. Leung, W.D. Collins, and J. Famiglietti, 2013: DOE report for Workshop on Community Modeling and Long-Term Predictions of the Integrated Water Cycle, DOE/SC0155, 100 pp., at `climatemodeling.science.energy.gov/f/2013/Water_Cycle_Report_High_Res.pdf`.

5.12. Ramanathan, V., D. Kammen, F. Forman, et al., 2015: *Bending the Curve*, Executive Summary of the UC Carbon Neutrality Initiative, 44 pp., Available at `http://uc-carbonneutralitysummit2015.ucsd.edu/_files/Bending-the-Curve.pdf` (last verified June 9, 2016).

5.13. Arkin, A, et al. Biological and Environmental Research Exascale Requirements Review. An Office of Science review sponsored jointly by Advanced Scientific Computing Research and Biological and Environmental Research, March 28-31, 2016,Rockville, Maryland. United States: N. p., 2016. See https://www.osti.gov/biblio/1375720. doi:10.2172/1375720.

5.14. Mudigonda, M., Prabhat, K. Kashinath, E. Racah, A. Mahesh, Y. Liu, C. Beckham, J. Biard, T. Kurth, S. Kim, S. Kahou, T. Maharaj, B. Loring, C. Pal, T.A. O'Brien, K. Kunkel, M.F. Wehner, W.D. Collins, 2020: Chapter 12: Deep Learning for Detecting Extreme Weather Patterns, in *Deep Learning for the Earth Sciences*, [eds. G. Camps-Valls, X. Zhu, D. Tuia, and M. Reichstein], Wiley & Sons, pp. 161–185, ISBN 9781119646181, doi:10.1002/9781119646181.ch12.

5.15. Collins, William D., Raymond Orbach, Micelle Bailey, Sebastien Biraud, Ian Coddington, David DiCarlo, Jeffrey Peischl, Anuradha Radhkrishnan, and David Schimel, 2022: "Monitoring Methane Emissions from Oil and Gas Operations," APS POPA and Optica Report. `https://www.aps.org/policy/reports/popa-reports/methane.cfm`

6 Presentations

6.1 Conference papers, symposia, and abstracts (published)

1. Collins, W.D., 1985: Dynamics of vortex tubes in rotating flows. *Proceedings 1985 Summer Study Program in Geophysical Fluid Dynamics, WHOI CHAOS* (Woods Hole Oceanographic Institution), ed. Linda Hudon, WHOI Technical Report 85–36, pp. 176–191.

2. Collins, W.D., 1991: A Monte Carlo method for identifying clear-sky regions in satellite scanner data. 1991 Spring Meeting, American Geophysical Union. *Eos. Trans. AGU*, **72** (no. 17), p. 56.

3. Ramanathan, V., and W.D. Collins, 1991: Ocean warming, greenhouse effect and cloud feedbacks: A natural experiment in the equatorial Pacific. 1991 Spring Meeting, American Geophysical Union. *Eos. Trans. AGU*, **72** (no. 17), p. 82.

4. Collins, W.D., 1992: A statistical solution for infrared radiative transfer through random fractal clouds. 1992 Spring Meeting, American Geophysical Union. *Eos. Trans. AGU*, **73**, p. 59.

5. Collins, W.D., D. Lubin, P. Flatau, B. Subasilar, and C.P. Weaver, 1993: Determination of surface heating by cirrus clouds in the equatorial Pacific. 1993 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **74**, p. 107.

6. Weaver, C.P., W.D. Collins, and H. Grassl, 1993: The variation in atmospheric greenhouse effect across the CEPEX region: Model calculations and satellite observations. 1993 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **74**, p. 130.

7. Ramanathan, V., E. Boer, W.D. Collins, W.C. Conant and J. Del Corral, 1993: Reflection of solar radiation by mesoscale convective systems in the equatorial Pacific. 1993 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **74**, p. 107.

8. McFarquhar, G.M., A.J. Heymsfield, N. Knight, J.D. Spinhirne, and W.D. Collins, 1993: Horizontal and vertical variations in the structure of a cirrus anvil sampled April 4/93 during the Central Equatorial Pacific Experiment. 1993 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **74**, p. 116.

9. Flatau, M., W.D. Collins, and P. Flatau, 1994: Analysis of 7–13 March 93 westerly wind burst in western Pacific. *Proceedings of the Sixth Conference on Climate Variations*, 74th AMS Annual Meeting, Jan. 23–28, 1994, Nashville, Tennessee (American Meteorological Society, Boston), pp. J40–J43.

10. Collins, W.D., F.P.J. Valero, and P. Pilewskie, 1995: The relation of convective cloud forcing, sea-surface temperature, and insolation in the central Pacific. *Symposium on the Regulation of Sea Surface Temperatures and Warming of the Tropical Ocean Atmosphere System*, 75th AMS Annual Meeting, Jan. 15–20, 1995, Dallas, Texas (American Meteorological Society, Boston), pp. 9–12.

11. Boer, E.R., W.D. Collins, and V. Ramanathan, 1995: First scientific results of a newly developed CEPEX Data Integration System. *Symposium on the Regulation of Sea Surface Temperatures and Warming of the Tropical Ocean Atmosphere System*, 75th AMS Annual Meeting, Jan. 15–20, 1995, Dallas, Texas (American Meteorological Society, Boston), p. 103.

12. Valero, F.P.J., P. Pilewskie, A. Bucholtz, W.D. Collins, and P. Flatau, 1995: Radiometric observations of the greenhouse effect over the tropical Pacific Ocean. 1995 Spring Meeting, American Geophysical Union. *Eos. Trans. AGU*, **76**, p. 64.

13. Collins, W.D., A. Heymsfield, D. Lubin, P. Pilewskie, F.P.J. Valero, and C.P. Weaver, 1995: Radiation and microphysics. *Proceedings of the CEPEX Santa Fe Workshop* (UCAR Office of Field Project Support, Boulder), pp. 31–52.

14. Collins, W.D., G.J. Zhang, and V. Ramanathan, 1995: Summary of heat budget and feedback terms. *Proceedings of the CEPEX Santa Fe Workshop* (UCAR Office of Field Project Support, Boulder), pp. 77–92.

15. Collins, W.D., A. Bucholtz, and F.P.J. Valero, 1996: Estimation of broadband top-of-atmosphere fluxes from satellite data using airborne radiometers. 1996 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **77**, p. F62.

16. Collins, W.D., A. Bucholtz, and F.P.J. Valero, 1997: Derivation of top-of-atmosphere fluxes from geostationary satellites using high-altitude aircraft measurements: Results from COARE and CEPEX. *Ninth Conference on Atmospheric Radiation*, 77th AMS Annual Meeting, Feb. 2–7, 1997, Long Beach, California (American Meteorological Society, Boston), pp. 198–202.

17. Collins, W.D., and G.J. Zhang, 1997: Effects of convection on the surface heat budget in the COARE IFA: Comparison of observations and GCM simulations. *Twenty-second Conference on Hurricanes and Tropical Meteorology*, May 19–23, 1997, Fort Collins, Colorado (American Meteorological Society, Boston), pp. 258–259.

18. Collins, W.D., 1997: A spectral signature of enhanced shortwave absorption by clouds in the central and western Pacific. 1997 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **78**, p. F68.

19. Collins, W.D., 1998: Improved clear-sky top-of-atmosphere fluxes for studies of the greenhouse effect using Nimbus-7 observations. 1998 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **79**, p. F78.

20. Collins, W.D., 1999: Improved clear-sky top-of-atmosphere fluxes for studies of the greenhouse effect using mid-IR water-vapor data. *Proceedings, CNES ALPS 99 Conference* (Centre National d'Etudes Spatiales, Paris), Jan. 18–22, 1999, Méribel, France, presentation WK2-O-26, pp. 1–4.

21. Collins, W.D., 1999: Limits on detection of large TOA shortwave forcing by aerosols in current satellite radiation data. *Proceedings, CNES ALPS 99 Conference* (Centre National d'Etudes Spatiales, Paris), Jan. 18–22, 1999, Méribel, France, presentation WK1-O-22, pp. 1–4.

22. Collins, W.D., P.J. Rasch, and B.E. Eaton, 1999: Forecasting aerosols using a CTM with assimilation of satellite aerosol retrievals: 1. Methodology for INDOEX. 1999 Spring Meeting, American Geophysical Union. *Eos. Trans. AGU*, **80** (17), pp. S31–S32.

23. Rasch, P.J., W.D. Collins, and B.E. Eaton, 1999: Forecasting aerosols using a CTM with assimilation of satellite aerosol retrievals: 2. A 4D aerosol analysis for INDOEX. 1999 Spring Meeting, American Geophysical Union. *Eos. Trans. AGU*, **80** (17), p. S32.

24. Collins, W.D., 1999: Anomalous spectral shortwave absorption over the tropical Pacific warm pool. *Tenth Conference on Atmospheric Radiation*, Jun. 28–Jul. 2, 1999, Madison, Wisconsin (American Meteorological Society, Boston), pp. 273–275.

25. Collins, W.D., P.J. Rasch, D.W. Fillmore, C.S. Zender, J.T. Kiehl, and B.E. Eaton, 1999: Direct radiative forcing and heating during INDOEX: Results from an aerosol analysis with assimilation. 1999 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **80** (no. 46), p. F183.

26. Rasch, P.J., W.D. Collins, and B.E. Eaton, 1999: A prototype global aerosol analysis using assimilation of satellite retrievals of optical thickness. 1999 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **80** (no. 46), p. F193.

27. Andronache, C., L.J. Donner, C. Semas, J.T. Kiehl, P.J. Rasch, W.D. Collins, and M. Ko, 1999: A high-resolution mesoscale model study of the indirect effects of aerosols during INDOEX. 1999 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **80** (no. 46), p. F162.

28. Ramanathan, V., M.O. Andreae, J. Anderson, G. Cass, T. Clarke, W.D. Collins, J. Coakley, B. Gandrud, A. Heymsfield, A. Jayaraman, J.T. Kiehl, J. Ogren, J. Prospero, T. Novakov, and K. Prather, 2000: The Indian Ocean Experiment: An overview of the aerosol climate forcing with implications to climate change. XXV General Assembly, European Geophysical Society. *EGS Newsletter*, **74**, p. 189.

29. Collins, W.D., P.J. Rasch, B.E. Eaton, D.W. Fillmore, J.T. Kiehl, and C.S. Zender, 2000: Simulation of aerosol distributions and radiative forcing for INDOEX. XXV General Assembly, European Geophysical Society. *EGS Newsletter*, **74**, p. 189.

30. Clarke, A.D., W.D. Collins, P.J. Rasch, V.N. Kapustin, K. Moore, and S. Howell, 2000: Pollution transport on global scales: Measurements from PEMT-B confirm model predictions. 2000 Spring Meeting, American Geophysical Union. *Eos. Trans. AGU*, **81** (no. 19), p. S118.

31. Collins, W.D., A.D. Clarke, P.J. Rasch, K. Moore, and V. Kapustin, 2000: Analysis of the PEMT pollution event on April 10, 1999 using an aerosol assimilation model. 2000 Spring Meeting, American Geophysical Union. *Eos. Trans. AGU*, **81** (no. 19), p. S127.

32. Rasch, P.J., and W.D. Collins, 2000: The modulation of constituent transport by important transient features of the general circulation. 2000 Spring Meeting, American Geophysical Union. *Eos. Trans. AGU*, **81** (no. 19), p. S154.

33. Collins, W.D., P.J. Rasch, E.J. Welton, C.T. Beck, and J.S. Spinhirne, 2000: Assimilation of space-based aerosol lidar measurements for studying African dust: Methodology. 2000 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **81** (no. 48), p. F70.

34. Rasch, P.J., W.D. Collins, and D. Winker, 2000: Assimilation of space-based aerosol lidar measurements for studying African dust: Results. 2000 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **81** (no. 48), pp. F43–F44.

35. Pope, S.K., F.P.J. Valero, and W.D. Collins, 2000: Comparison of ScaRaB, GOES-8, aircraft, and surface observations of the absorption of solar radiation by clouds. 2000 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **81** (no. 48), p. F136.

36. Collins, W.D., and D.W. Fillmore, 2001: Analysis of cloud and atmospheric absorption using spectral albedos from Triana. XXVI General Assembly, European Geophysical Society. *EGS Newsletter*, **78**, p. 179.

37. Rasch, P.J. and W.D. Collins, 2001: Estimating natural variability of Asian aerosols: Relationship of ACE-Asia to the 1990s. 2001 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **82** (no. 47), p. F44.

38. Collins, W.D., and M.G. Mlynczak, 2001: Prospects for measurement of the far infrared tropospheric spectra: Implications for climate modeling. 2001 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **82** (no. 47), p. F308.

39. Mlynczak, M.G., D. Johnson, E. Kist, D. Kratz, C. Mertens, and W. Collins, 2001: Far-infrared spectroscopy of the troposphere. 2001 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **82** (no. 47), p. F308.

40. Uno, I., M. Chin, W. Collins, P. Ginoux, P. Rasch, G.R. Carmichael, and J.J. Yienger, 2001: ACE-Asia chemical transport modeling overview. 2001 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **82** (no. 47), p. F62.

41. Collins, W.D., P.J. Rasch, and A. Conley, 2002: Evaluation of an assimilated aerosol climatology using AERONET. 2002 Spring Meeting, American Geophysical Union. *Eos. Trans. AGU*, **83** (no. 19), p. S86.

42. Fillmore, D.W., and W.D. Collins, 2002: Global aerosol distributions from a chemical transport model with MODIS assimilation. 2002 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **83** (no. 47), p. F108.

43. Masonis, S.J., T.L. Anderson, A.D. Clarke, B.J. Huebert, W.D. Collins, J.R. Anderson, S.G. Howell, C.S. McNaughton, D.S. Covert, and N.C. Ahlquist, 2002: Constraining the single scatter albedo of Asian dust using in-situ measurements. 2002 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **83** (no. 47), p. F124.

44. Bond, T.C., P.J. Rasch, W.D. Collins, and D.G. Streets, 2002: Climate forcing by black and organic carbon: Central values and uncertainties. 2002 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **83** (no. 47), p. F129.

45. Collins, W.D., P.J. Rasch, A.J. Conley, D.W. Fillmore, V. Ramanathan, and J.T. Kiehl, 2002: Atmospheric response to anthropogenic aerosols modeled using assimilation. 2002 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **83** (no. 47), p. F194.

46. Collins, W.D., D.W. Fillmore, and A.J. Conley, 2003: Response of the coupled climate system to aerosols simulated with a MODIS aerosol assimilation. 2003 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **84** (no. 46), p. F132.

47. Fillmore, D.W., W.D. Collins, and A.J. Conley, 2003: Aerosol direct radiative forcing – Estimates from a global aerosol analysis with a MODIS assimilation. 2003 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **84** (no. 46), p. F67.

48. Charlock, T.P., F.G. Rose, D. Rutan, Z. Jin, D. Fillmore, and W.D. Collins, 2004: Global retrievals of the surface and atmosphere radiation budget and direct aerosol forcing. *Thirteenth Conference on Satellite Meteorology and Oceanography*, Sep. 20–24, 2004, Norfolk, Virginia (American Meteorological Society, Boston), Abstract P8.11.

49. Jensen, M.P., A.M. Vogelmann, and W. Collins, 2004: Radiative effects of stratus cloud subgrid scale variability observed by MODIS. 2004 Fall Meeting, American Geophysical Union, *Eos Trans. AGU*, 85(47), Fall Meet. Suppl., Abstract A51A-0738.

50. Vogelmann, A.M., M.P. Jensen and W.D. Collins, 2004: Regional and seasonal variations in stratus cloud properties from MODIS observations. 2004 Fall Meeting, American Geophysical Union, *Eos Trans. AGU*, 85(47), Fall Meet. Suppl., Abstract A21C-0752.

51. Yoshioka, M., N. Mahowald, A. Conley, D. Fillmore, W. Collins, and C. Zender, 2005: Impact of Desert Dust Radiative Forcing on Sahel Precipitation. 2005 Fall Meeting, American Geophysical Union, *Eos Trans. AGU*, 86(52), Fall Meeting Suppl., Abstract P13B-0157.

52. Collins, W.D., and A.J. Conley, 2006: A constructive method for approximating transmission in radiative transfer calculations. 2006 Fall Meeting, American Geophysical Union, *Eos Trans. AGU*, 87(52), Fall Meeting Suppl., Abstract A41D-0050.

53. Kato, S., S. Sun-Mack, W.F. Miller, F.G. Rose, P. Minnis, B.A. Wielicki, D.M. Winker, G. Stephens, T.P. Charlock, W.D. Collins, N.G. Loeb, P.W. Stackhouse, and K.-M. Xu, "Cloud vertical profiles derived from CALIPSO and CloudSat and a comparison with MODIS derived clouds," 2008 Spring Meeting, American Geophysical Union, *Eos Trans. AGU*, 89(23), Jt. Assem. Suppl., Abstract A33C-08.

54. Feldman, D., and W.D. Collins, 2008: "CLARREO Shortwave Observing System Simulation Experiment to Detect Forcing and Feedback," in Session GC19, "SI-Traceable Climate Measurements From Space: Requirements, Methods, and Accuracies." Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract GC23A-0740.

55. Collins, W.D., D.R. Feldman, and C.A. Algieri, 2009: "Detecting Land Surface and Cloud Feedbacks using Shortwave CLARREO Spectra." Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract GC51B-08. December 12–14, 2009.

56. Pressel, K.G., and W.D. Collins, 2009: "Satellite observations of atmospheric water vapor." 62nd Annual Meeting of the APS Division of Fluid Mechanics. Vol. 54(19), Abstract BAPS.2009.DFD.AS.3, Nov. 22–24, 2009, Minneapolis, Minnesota.

57. Feldman, D.R., and W.D. Collins, 2010: "Detecting Aerosols and Greenhouse Gases Forcings using Shortwave CLARREO Spectra." Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract GC51B-07. December 12–14, 2009.

58. Rosa, D., and W. Collins, 2010: "Global Chemical Transport of Radon and Carbon Monoxide using the Colorado State University Multiscale Modeling Framework." Poster EGU2010-12880 (session AS1.10), European Geophysical Union Meeting, Vienna, May 3, 2010.

59. Collins, W.D., and C.A. Algieri, 2010: "The significance of shortwave methane forcing for climate change." Presentation EGU2010-12514 (session CL2.2), European Geophysical Union Meeting, Vienna, May 3, 2010.

60. Feldman, D.R., W.D. Collins, C. Algieri, J. Ong, and A. Young, 2010: "The Earth's reflected shortwave spectrum: Present and future." Talk 1.1, 13th Cloud Physics and Atmospheric Radiation Conference of the American Meteorological Society, Portland, Jun. 27–Jul 2, 2010.

61. Hsieh, W.-C., D. Rosa and W. Collins, 2010: "The effect of superparameterization on aerosol transport." Poster P1.46, 13th Cloud Physics and Atmospheric Radiation Conference of the American Meteorological Society, Portland, Jun. 27–Jul 2, 2010.

62. Kato, S., F.G. Rose, S. Sun-Mack, W.F. Miller, Y. Chen, B.A. Wielicki, D.M. Winker, G.L. Stephens, P. Minnis, N. Loeb, T.P. Charlock, P.W. Stackhouse, K.M. Xu, and W. Collins, 2010: "Computation of atmospheric heating rates and surface irradiances using CALIPSO, CloudSat and MODIS derived cloud and aerosol properties." Talk 8.4, 13th Cloud Physics and Atmospheric Radiation Conference of the American Meteorological Society, Portland, Jun. 27–Jul 2, 2010.

63. Pressel, K.G., W.D. Collins, and A.R. Desai, 2010: "Variance scaling in water vapor measurements from a tall tower." Poster P1.77, 13th Cloud Physics and Atmospheric Radiation Conference of the American Meteorological Society, Portland, Jun. 27–Jul 2, 2010.

64. Wielicki, B.A., and D.F. Young, J.G. Anderson, F. Best, K. Bowman, B. Cairns, W. Collins, J. Corliss, D.R. Doelling, J.A. Dykema, D.R. Feldman, R. Holz, Y. Huang, Z. Jin, K. Jucks, S. Kato, D.F. Keyes, D.B. Kirk-Davidoff, R. Knuteson, G. Kopp, D.P. Kratz, A.A. Lacis, S. Leroy, X. Liu, C. Lukashin, A.J. Mannucci, M.I. Mishchenko, M.G. Mlynczak, N. Phojanamongkolkij, P. Pilewskie, S. Platnick, V. Ramaswamy, H. Revercomb, C.M. Roithmayr, F.G. Rose, S. Sandford, E. Shirley, P. Speth, K.J. Thome, D. Tobin, and J. Xiong, 2010: "CLARREO: Decadal change accuracy for reflected and emitted Earth spectra." Talk 9.1, 13th Cloud Physics and Atmospheric Radiation Conference of the American Meteorological Society, Portland, Jun. 27–Jul 2, 2010.

65. Pressel, K. and W. Collins, 2010: Statistical scale invariance in satellite observations of water vapor mixing ratio from the Atmospheric Infrared Sounder. Abstract MG.00004, 63rd Annual Meeting of the APS Division of Fluid Dynamics, November 21–23, 2010; Long Beach, California.

66. Rubin, J.I., W. Collins, and A.F. Arellano, 2010: Uncertainty analysis in global aerosol size distribution and composition using ensemble-based data assimilation. Abstract A11E-0093, 2010 Fall AGU Meeting, San Francisco, CA.

67. Gunn, L.N., and W. Collins, 2010: Long-wave radiative forcing due to mineral dust aerosol. Abstract A11E-0101, 2010 Fall AGU Meeting, San Francisco, CA.

68. Jones, A., M.S. Torn, W.J. Riley, and W. Collins, 2010: Factors Driving Biofuel Crops' Influence on Climate. Abstract B22D-07, 2010 Fall AGU Meeting, San Francisco, CA.

69. Murphy, L.N., W.J. Riley, M.S. Torn, and W. Collins, 2010: Expansion of woody biomass for bioenergy feedstock in the Southeastern US has local and remote climate impacts. Abstract B23D-0419, 2010 Fall AGU Meeting, San Francisco, CA.

70. Feldman, D., W. Collins, C. Algieri, and J. Ong, 2010: Spectral Forcing and Feedback Signals in IPCC Simulations: Simulations of Next-Generation Observing Systems. Abstract GC41B-0896, 2010 Fall AGU Meeting, San Francisco, CA.

71. Li, F., W. Collins, M.F. Wehner, D. Williamson, and J. Olson, 2010: Response of precipitation extremes to global warming in an aqua-planet climate model: Towards robust projection from regional to global scales. Abstract GC51K-01, 2010 Fall AGU Meeting, San Francisco, CA.

72. Pressel, K.G., and W. Collins, 2010: Structure Function Analysis of Scaling in Water Vapor Observations from AIRS. Abstract A52B-03, 2010 Fall AGU Meeting, San Francisco, CA.

73. Collins, W., Feldman, D., C. Algieri, and J. Ong, 2010: Climate Change Time-to-Detection Simulations using IPCC Models for Shortwave Forcings and Feedbacks. Abstract GC53C-04, 2010 Fall AGU Meeting, San Francisco, CA.

74. Mlynczak, M.G., D.F. Young, B.A. Wielicki, Y. Huang, S.S. Leroy, D. Feldman, and W. Collins, 2010: Evaluating Climate Models with CLARREO. Abstract A12B-01, 2010 Fall AGU Meeting, San Francisco, CA.

75. Collins, W.D, and D.R. Feldman, 2011: The future evolution of the Earth's reflected shortwave spectrum. Abstract 8.3, 23rd Conference on Climate Variability and Change, 91st American Meteorological Society Annual Meeting, Seattle, WA. William D. Collins, University of California, Berkeley, CA.

76. Li, F., W. Collins, M.F. Wehner, D.L. Williamson, and J.G. Olson, 2011: Impact of horizontal resolution on simulation of precipitation extremes in an aqua-planet version of the Community Atmosphere Model. Abstract PM10A.4, 23rd Conference on Climate Variability and Change, 91st American Meteorological Society Annual Meeting, Seattle, WA.

77. Jones, A.D., M. Torn, W. Collins, and W.J. Riley, 2011: Characterizing the Climate Effects of Biofuel Cultivation. Abstract 11A.3, 23rd Conference on Climate Variability and Change, 91st American Meteorological Society Annual Meeting, Seattle, WA.

78. Collins, W.D., F. Li, M. Wehner, D. Williamson, and J. Olson, 2011: Response of extremes to global warming in an aqua-planet climate model: Towards robust projection from regional to global scales. Abstract EGU2011-10451, Session NH1.2/AS4.7/HS12.6, European Geophysical Union General Assembly 2011, Vienna, Austria.

79. Bhattacharyya, S., P.J. Cameron-Smith, D. Bergmann, M.T. Reagan, W.D. Collins, S.M. Elliott, and M.E. Maltrud, 2011: Atmospheric Impact of Large Methane Emission in the Arctic Region, Abstract GC41B-0803, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

80. Collins, W., F. Li, D. Rosa, and M.F. Wehner, 2011: "Super-Parameterization"–A Better Way to Simulate Regional Extreme Precipitation?, Abstract GC13C-04, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

81. Feldman, D., and W. Collins, 2011: Pan-Spectral Signatures of Climate Change and Prospects for Observational Constraints, Abstract GC11B-0910, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

82. Gunn, L.N., and W. Collins, 2011: Long-wave radiative forcing due to desert dust, Abstract A51E-07, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

83. Hsieh, W., D. Rosa, and W. Collins, 2011: Global dust simulations in the multiscale modeling framework, Abstract A13H-01, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

84. Jones, A.D., L.P. Chini, W. Collins, A.C. Janetos, J. Mao, X. Shi, A.M. Thomson, and M.S. Torn, 2011: Regional-Scale Forcing and Feedbacks from Alternative Scenarios of Global-Scale Land Use Change, Abstract GC22C-06, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

85. Li, F., W. Collins, M.F. Wehner, D. Williamson, and J.G. Olson, 2011: Impact of Horizontal Resolution on the Simulation of Tropical Storms in an Idealized Climate Model, Abstract A23D-0203, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

86. Nolan, L., and W. Collins, 2011: The Effects of Cloud-Scale Physics Variability on Convection, Abstract A13B-0250, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5-9 Dec.

87. Prabhat, M., S. Byna, C. Paciorek, G. Weber, K. Wu, T. Yopes, M.F. Wehner, G. Ostrouchov, D. Pugmire, R. Strelitz, W. Collins, and W. Bethel, 2011: Pattern Detection and Extreme Value Analysis on Large Climate Data, Abstract IN41C-03, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

88. Pressel, K.G., W. Collins, and A.R. Desai, 2011: Scaling of water vapor in the meso-gamma (2-20km) and lower meso-beta (20-50km) scales from tall tower time series, Abstract A54A-01, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

89. Riley, W.J., L.N. Murphy, and W. Collins, 2011: Impact of afforestation with Loblolly Pines (Pinus taeda L.) in the Southeastern US on regional and global climate, Abstract GC23C-0971, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

90. Roberts, Y., P. Pilewskie, B.C. Kindel, D. Feldman, and W. Collins, 2011: Quantitative Comparison of the Variability of Simulated and Observed Hyperspectral Solar Radiance, Abstract GC23E-07, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

91. Rosa, D., W. Collins, and J. Lamarque, 2011: Global Transport of Radon and Methyl iodide in a Cloud-Resolving Global Climate Model, Abstract A13D-0358, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

92. Rubin, J.I., and W. Collins, 2011: Investigation of Aerosol Radiative Forcing with Multi-Wavelength Data Assimilation, Abstract A53C-0377, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

93. Subin, Z.M., F. Li, L.N. Murphy, C. Bonfils, W.J. Riley, S. Lee, S. Kang, and W. Collins, 2011: Atmospheric Responses to Changes in Boreal Lake Distribution and to Idealized Extratropical Terrestrial Surface Forcing Propagate to the Tropics and the Southern Hemisphere, Abstract H24E-08, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5-9 Dec.

94. Thornton, P.E., J. Mao, X. Shi, J. Edmonds, W. Collins, G.C. Hurtt, L.P. Chini, A.M. Thomson, and A.C. Janetos, 2011: Influence of prognostic land use on 21st century climate prediction, Abstract GC22C-02, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

95. Feldman, D. and W. Collins, 2012: Characteristics of Observing Systems that Differentiate Climate Models According to Their Low-Cloud Feedback Strengths, Abstract A21I-07, presented at 2012 Fall Meeting, AGU, San Francisco, CA.

96. Gunn, L.N. and W. Collins, 2012: Longwave radiative forcing due to dust aerosols: Observations and climatology comparisons, Abstract A13K-0334, presented at 2012 Fall Meeting, AGU, San Francisco, CA.

97. Jones, A.D. W. Collins, M.S. Torn and K.V. Calvin, 2012: Climate implications of including albedo effects in terrestrial carbon policy, Abstract GC11B-0982, presented at 2012 Fall Meeting, AGU, San Francisco, CA.

98. O'Brien, T.A. W. Collins, F. Li, S. Rauscher, T. Ringler, M.A. Taylor, S.M. Hagos, and L. Leung, 2012: Observational Constraints on Scale Awareness: Illumination of Scale Incognizance in CAM, Abstract A43G-0233, presented at 2012 Fall Meeting, AGU, San Francisco, CA.

99. Roberts, Y., P. Pilewskie, B.C. Kindel, D. Feldman, and W. Collins, 2012: Temporal Variability of Observed and Simulated Hyperspectral Earth Reflectance, Abstract A23E-0280, presented at 2012 Fall Meeting, AGU, San Francisco, CA.

100. Thornton, P.E., J.A. Edmonds, W. Collins, A.C. Janetos, G.C. Hurtt, X. Shi, J. Mao, A.M. Thomson, K.V. Calvin, B.P. Bond-Lamberty, and L.P. Chini, 2012: Influence of human-climate system feedbacks on predicted 21st century land use/land cover trajectories, fossil fuel emissions, and climate change, Abstract GC11D-1037, presented at 2012 Fall Meeting, AGU, San Francisco, CA.

101. Prabhat, M., M.F. Wehner, S. Byna, O. Ruebel, F. Li, W. Bethel, and W. Collins, 2012: 13 TB, 80,000 cores and TECA: The search for extreme events in climate datasets, Abstract IN52A-02, presented at 2012 Fall Meeting, AGU, San Francisco, CA.

102. Thomson, A.M. J.A. Edmonds, W. Collins, P.E. Thornton, G.C. Hurtt, A.C. Janetos, A. Jones, J. Mao, L.P. Chini, K.V. Calvin, B.P. Bond-Lamberty, and X. Shi, 2012: Advancing coupled human-Earth system models: The integrated Earth System Model Project, Abstract GC11D-1033, presented at 2012 Fall Meeting, AGU, San Francisco, CA.

103. Du, E., A.V. Di Vittorio, and W. Collins, 2013: Performance evaluation and uncertainty analysis of hydrologic components of the CESM/iESM, Abstract H21C-1053 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

104. Feldman, D., W. Collins, and X. Liu, 2013: Shortwave and Longwave Hyperspectral Satellite Instrument Simulations Based on High and Low Sensitivity CMIP5 Models and Applications to Existing and Planned Measurement Systems, Abstract A43K-01 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

105. Holm, J.A., J.Q. Chambers, and W. Collins, 2013: Impacts of continual and periodic disturbances on a Central Amazonian forest: Lessons from a gap model for future model improvement, Abstract B51L-07 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

106. Jeon, S., M. Prabhat, S. Byna, W. Collins, and M.F. Wehner, 2013: Event Detection and Spatial Analysis for Characterizing Extreme Precipitation, Abstract H41J-1364 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

107. Jones, A.D., W. Collins, and M.S. Torn, 2013: Pattern scaling of land-use change climate response relationships, Abstract GC42A-07 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

108. O'Brien, T.A., W. Collins, S. Rauscher, and T. Ringler, 2013: Fractal behavior drives resolution dependent vertical velocity fields, Abstract NG41A-1659 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

109. Paige, J., D. Feldman, and W. Collins, 2013: An Assessment of Arctic Cloud-Albedo Feedbacks in the CMIP5 Archive and Prospects for Satellite Instrument Constraint, Abstract A21B-0032 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

110. Prabhat, M., S. Byna, V. Vishwanath, W. Bethel, W. Collins, and M.F. Wehner, 2013: TECA: Extreme Climate Analytics on Petascale Platforms, Abstract IN53B-1568 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

111. Roberts, Y., P.C. Taylor, C. Lukashin, D. Feldman, P. Pilewskie, and W. Collins, 2013: Climate Model Validation Using Spectrally Resolved Shortwave Radiation Measurements, Abstract A43K-07 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

112. Wang, H., W.J. Riley, and W. Collins, 2013: Evaluating terrestrial ecosystem model performance: An application of uncertainty in eddy covariance CO_2 flux measurements, Abstract B11E-0397 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

113. Wehner, M.F., C.J. Paciorek, M. Prabhat, H. Krishnan, W. Collins, and W. Bethel, 2013: Extreme value statistics of large climate modeled and observed datasets, Abstract IN24A-03 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

114. Williams, I.N., M.S. Torn, W.J. Riley, M.F. Wehner, and W. Collins, 2013: Climate extremes and ecosystem productivity in global warming simulations, Abstract B13M-03 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

115. Benedict, J.J., W. Collins, and H. Johansen, 2013: Organized Tropical Convection in a High-Order Finite-Volume GCM Dynamical Framework with Adaptive Mesh Refinement, Abstract A33B-0217 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

116. Feldman, D.R., and W.D. Collins, 2014: Shortwave and Longwave Hyperspectral Satellite Instrument Simulations With Models of Varying Climate Sensitivity and Applications to Existing and Planned Measurement Systems. Abstract EGU2014-4586, presented at the 2014 EGU General Assembly, 27 April – 2 May, Vienna, Austria.

117. Holm, J., J.Q. Chambers, W.D. Collins, and N. Higuchi, 2014: Forest response to increased disturbance in the Central Amazon and comparison to Western Amazonian forests, Abstract B11G-0114 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

118. Jones, A., K.V. Calvin, W.D. Collins, and J. Edmonds, 2014: Regionally Differentiated Scenarios of Future Albedo Forcing from Anthropogenic Land Cover Change, Abstract GC13J-0826 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

119. Shi, X., J. Mao, P.E. Thornton, A.V. Di Vittorio, B.P. Bond-Lamberty, J.E. Truesdale, L.P. Chini, A.M. Thomson, W.D. Collins, J. Edmonds, and G.C. Hurtt, 2014: Investigating the biogeophysical impacts of land cover change on future climate, Abstract GC13J-0829 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

120. Ferguson, J., C. Jablonowski, H. Johansen, R.E. English, P. McCorquodale, P. Colella, J.J. Benedict, W.D. Collins, J.N. Johnson, and P.A. Ullrich, 2014: Assessing Grid Refinement Strategies in the Chombo Adaptive Mesh Refinement Model, Abstract A13M-06 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

121. Pincus, R., B.B. Stevens, P. Forster, W.D. Collins, and V. Ramaswamy, 2014: The Radiative Forcing Model Intercomparison Project (RFMIP): Assessment and characterization of forcing to enable feedback studies, Abstract A21H-3130 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

122. Mao, J., X. Shi, A.V. Di Vittorio, P.E. Thornton, S. Piao, X. Yang, J.E. Truesdale, B.P. Bond-Lamberty, L.P. Chini, A.M. Thomson, G.C. Hurtt, W.D. Collins, and J. Edmonds, 2014: Dynamics of global vegetation biomass simulated by the integrated Earth System Model, Abstract B23C-0210 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

123. Du, E., A.V. Di Vittorio, and W.D. Collins, 2014: Improvement of hydrologic simulations in CLM4 by modified soil properties, Abstract H33F-0907 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

124. Martin, D., X. Asay-Davis, S.F. Price, S.L. Cornford, M.E. Maltrud, E.G. Ng, and W.D. Collins, 2014: Response of the Antarctic ice sheet to ocean forcing using the POPSICLES coupled ice sheet-ocean model, Abstract C33A-0376 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

125. Ng, E., D.F. Martin, X. Asay-Davis, S.F. Price, and W.D. Collins, 2014: High-resolution coupled ice sheet-ocean modeling using the POPSICLES model, Abstract GC33A-0498 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

126. O'Brien, T., K. Kashinath, and W.D. Collins, 2014: A New Framework for Systematically Characterizing and Improving Extreme Weather Phenomena in Climate Models, Abstract GC33A-0490 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

127. Wehner, M.F., Mr. Prabhat, F. Li, C.J. Paciorek, and W.D. Collins, 2014: The effect of horizontal resolution of the simulation of precipitation extremes in the Community Atmospheric model version 5.1, Abstract GC33A-0488 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

128. Pall, P., C.M. Patricola, M.F. Wehner, D.A. Stone, C.J. Paciorek, and W.D. Collins, 2014: Diagnosing Possible Anthropogenic Contributions to Heavy Colorado Rainfall in September 2013, Abstract GC33H-04 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

129. Collins, W.D., D. Feldman, and D.D. Turner, 2014: Surface Forcing from CH_4 at the North Slope of Alaska and Southern Great Plains Sites, Abstract A34C-06 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

130. Asay-Davis, X., D.F. Martin, S.F. Price, M.E. Maltrud, and W.D. Collins, 2014: Present-day Circum-Antarctic Simulations using the POPSICLES Coupled Ice Sheet-Ocean Model, Abstract C34B-07 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

131. Di Vittorio, A., L.P. Chini, B.P. Bond-Lamberty, J. Mao, X. Shi, J.E. Truesdale, A. Craig, K.V. Calvin, A.D. Jones, W.D. Collins, J. Edmonds, G.C. Hurtt, P.E. Thornton, and A.M. Thomson, 2014: From Land Use to Land Cover: Restoring the Afforestation Signal in a Coupled Integrated Assessment Earth System Model and the Implications for CMIP5 RCP Simulations, Abstract GC41F-0660 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

132. Jeon, S., C.J. Paciorek, Mr. Prabhat, S. Byna, W.D. Collins, and M.F. Wehner, 2014: Uncertainty Quantification for Characterizing Spatial Tail Dependence under Statistical Framework, Abstract GC41F-0644 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

133. Feldman, D., W.D. Collins, X. Huang, X. Chen, and Von Patrick Walden, 2014: Far-Infrared Surface Emissivity Impacts on Climate and the Potential for a Positive Feedback, Abstract A42E-08 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

134. Fildier, B., and W.D. Collins, 2014: The role of sunshine absorption on rainfall increase, Abstract A43F-3347 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

135. Benedict, J., M.S. Pritchard, and W.D. Collins, 2014: MJO Sensitivity to the Indian Ocean Dipole in the Superparameterized CAM, Abstract A51L04 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

136. Du, E., A.V. Di Vittorio, and W. Collins, 2014: Potentials of improving hydrologic simulations in CLM4.5 by adding interflow process and modified soil properties, presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

137. Wehner, M.F., P. Pall, M. Duffy, D. Stone, C. Paciorek, W.D. Collins, 2015: Uncertainty quantification of daily precipitation extremes. Abstract 590, 95th AMS Annual Meeting, Phoenix, 4-8 January.

138. O'Brien, T.A., and W.D. Collins, 2015: Analyzing and leveraging self-similarity for variable resolution atmospheric models. Abstract EGU2015-1572, European Geosciences Union General Assembly, Vienna, Austria, 12-17 April.

139. Di Vittorio, A., L. Chini, B. Bond-Lamberty, J. Mao, X. Shi, J. Truesdale, A. Craig, K. Calvin, A. Jones, W. Collins, J. Edmonds, G. Hurtt, P. Thornton, and A. Thomson, 2015: From land use to land cover: Restoring the afforestation signal in a coupled integrated assessment Earth system model and the implications for CMIP5 RCP simulations. Abstract EGU2015-4016, European Geosciences Union General Assembly, Vienna, Austria, 12-17 April.

140. Kashinath, K., T.A. O'Brien, and W.D. Collins, 2015: Changes in tropical climate due to bifurcations of radiative-convective equilibrium. Abstract EGU2015-4259, European Geosciences Union General Assembly, Vienna, Austria, 12-17 April.

141. Collins, W.D., H. Johansen, J. Benedict, D. Rosa, T.A. O'Brien, J. Johnson, E. Goodfriend, and N. Keen, 2015: Adaptive non-hydrostatic dynamics for exploring multiscale climate interactions. Abstract EGU2015-13505-3, European Geosciences Union General Assembly, Vienna, Austria, 12-17 April.

142. Pall, P., C. Patricola, M.F. Wehner, D. Stone, C. Paciorek, W.D. Collins, 2015: Diagnosing possible anthropogenic contributions to heavy Colorado rainfall in September 2013. Abstract EGU2015-12532, European Geosciences Union General Assembly, Vienna, Austria, 12-17 April.

143. Martin, D., X. Asay-Davis, S. Cornford, S. Price, E. Ng, and W.D. Collins, 2015: A Tale of Two Forcings: Present-Day Coupled Antarctic Ice-sheet/Southern Ocean dynamics using the POPSICLES model. Abstract EGU2015-7564, European Geosciences Union General Assembly, Vienna, Austria, 12-17 April.

144. Jones, A.L., D. Paynter, S. Freidenreich, D. Feldman, V. Ramaswamy, and W.D. Collins, 2016: Reducing the Spread in Modeled Aerosol Radiative Forcing with a Global, Scattering Line-by-Line Model as Part of RFMIP. Abstract A11I-0124, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

145. Collins, W.D., D. Feldman, T. Daniels, and M.G. Mlynczak, 2016: Major Uncertainties in Shortwave Forcing by Methane: Sources and Implications for Climate Change. Abstract A11I-0128, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

146. Feldman, D., T. Daniels, M.G. Mlynczak, M.J. Alvarado, E.J. Mlawer, and W.D. Collins, 2016: Methane longwave radiative forcing uncertainty and its thermodynamic dependence. Abstract A11I-0129, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

147. Kratz, D.P., M.G. Mlynczak, E.J. Mlawer, T. Daniels, D. Feldman, W.D. Collins, M.J. Alvarado, J.E. Lawler, L.W. Anderson, D.W. Fahey , L.A. Hunt, and J.C. Mast 2016: The Spectroscopic Foundation of Radiative Forcing of Climate by Carbon Dioxide. Abstract A11I-0130, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

148. Fildier, B., W.D. Collins, and H. Parishani, 2016: Contributions from Synoptic and Convective Motions to Changes in Tropical Precipitation Extremes. Abstract A11T-07, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

149. Rhoades, A., P.A. Ullrich, H. Johansen, C.M. Zarzycki, Z. Xu, and W.D. Collins, 2016: Understanding California Mountain Wintertime Hydroclimate Trends using an Ensemble of High-Resolution Variable-Resolution CESM Simulations. Abstract A21F-0132, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

150. Courtade, S., T.J. Immel, D. Feldman, S.R. Lorentz, L.P. Dyrud, and W.D. Collins, 2016: Measuring Earth's Radiation Imbalance using Cubesat Constellations. Abstract A41H-0160, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

151. Leroy, S.S., W.D. Collins, D. Feldman, R.D. Field, Y. Ming, S. Pawson, B. Sanderson, and G.A. Schmidt, 2016: Toward a Climate OSSE for NASA Earth Sciences. Abstract GC12B-07, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

152. O'Brien, T.A., W.D. Collins, S. Rauscher, K. Kashinath, O. Rübel, S. Byna, J. Gu, H. Krishnan, and P.A. Ullrich, 2016: Understanding the resolution dependence of precipitation statistical fidelity in hindcast simulations. Invited Abstract A14D-03, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

153. O'Brien, T.A., W.D. Collins, S. Rauscher, K. Kashinath, O. Rubel, S. Byna, J. Gu, H. Krishnan, P.A. Ullrich, and L. Donner, 2016: A case for missing cloud physics in climate models. Invited Abstract A31M-01, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

154. Prabhat, Mr., Y. Liu, E. Racah, K. Kunkel, D.A. Lavers, M.F. Wehner, and W.D. Collins, 2016: Classification and Localization of Extreme Weather Patterns with Deep Learning. Invited Abstract IN14A-01, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

155. Wielicki, B.A., and the CLARREO Science Definition Team, 2016: CLARREO Pathfinder Mission to ISS: Demonstrating Greatly Increased Accuracy for Reflected Solar Space-Based Observations: Calibration and Intercalibration. Invited Abstract, presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

156. Collins, W.D., Prabhat, E. Racah, Y. Liu, M.F. Wehner, J. Correa, A. Khowroshahi, D. Lavers, and K. Kunkel, 2017: "Application of Neural Networks to Detect Extreme Weather in Climate Datasets", American Meteorological Society Annual Meeting, Abstract J3.1, Seattle, WA. Jan. 23-25, 2017.

157. Paynter, D., A. Jones, S. Freidenreich, D. Feldman, V. Ramaswamy, and W.D. Collins, 2017: Global Line-by-Line Calculations of Aerosol Radiative Forcing: A Demonstration of the RFMIP Aerosol-IRF Protocol., European Geophysical Union Congress, Vienna, Austria, Abstract EGU2017-10636, Session CL2.04, Apr. 23-27, 2017.

158. Prabhat, E. Racah, J. Biard, Y. Liu, M. Mudigonda, K. Kashinath, C. Beckham, T. Maharaj, S. Kahou, C. Pal, T.A. O'Brien, M.F. Wehner, K. Kunkel, and W.D. Collins, 2017: IN11A-0022: Deep Learning for Extreme Weather Detection (Invited), AGU Fall Meeting, New Orleans, LA, December, 2017.

159. Prabhat, J. Biard, S. Ganguly, S. Ames, K. Kashinath, S.K. Kim, S. Kahou, T. Maharaj, C. Beckham, T.A. O'Brien, M.F. Wehner, D.N. Williams, K. Kunkel, and W.D. Collins, 2017: IN13E-01: ClimateNet: A Machine Learning dataset for Climate Science Research (Invited), AGU Fall Meeting, New Orleans, LA, December, 2017.

160. Charn, A. B., and W. D. Collins, 2017: A31J-2311: Microphysical Sensitivity of Precipitation Extremes in the Continental US Using a Super-Parameterized Community Atmosphere Model (CAM), AGU Fall Meeting, New Orleans, LA, December, 2017.

161. Feldman, D., W. D. Collins, B. A. Wielicki, Y. Shea, M. G. Mlynczak, C. Kuo, and N. Nguyen, 2017: GC41F-05: How Continuous Observations of Shortwave Reflectance Spectra Can Narrow the Range of Shortwave Climate Feedbacks, AGU Fall Meeting, New Orleans, LA, December, 2017.

162. Ferguson, J. O., C. Jablonowski, H. Johansen, P. McCorquodale, P. A. Ullrich, W. Langhans, and W. D. Collins, 2017: A31J-2321: Capturing Multiscale Phenomena via Adaptive Mesh Refinement (AMR) in 2D and 3D Atmospheric Flows, AGU Fall Meeting, New Orleans, LA, December, 2017.

163. Fildier, B., and W. D. Collins, 2017: A43K-04: Predictive Power of Extreme Precipitation Scaling Formulas Across Spatial and Temporal Scales, AGU Fall Meeting, New Orleans, LA, December, 2017.

164. Jones, A. L., D. Feldman, S. Freidenreich, D. Paynter, V. Ramaswamy, and W. D. Collins, 2017: A53M-07: Characterizing Radiative Parameterization Uncertainty in Modeled Aerosol Instantaneous Radiative Effect as part of RFMIP, AGU Fall Meeting, New Orleans, LA, December, 2017.

165. Joseph, R., P. J. Gleckler, F. M. Hoffman, W. D. Collins, D. N. Williams, and G. L. Geernaert, 2017: TH23C: Coordinated Model Evaluation Capabilities (CMEC) for CMIP DECK and Historical simulations, AGU Fall Meeting, New Orleans, LA, December, 2017 (Conveners).

166. Mahesh, A., T. A. O'Brien, M. Prabhat, W. D. Collins, and Y. Liu, 2017: IN11E-06: Assessing Uncertainty in Deep Learning Techniques that Identify Atmospheric Rivers in Climate Simulations, AGU Fall Meeting, New Orleans, LA, December, 2017.

167. Thornton, P.E., K.V. Calvin, A.D. Jones, A.V. Di Vittorio, B.P. Bond-Lamberty, L.P. Chini, X. Shi, J. Mao, W.D. Collins, J. Edmonds, and G.C. Hurtt, 2017: B53J-06: Biospheric feedback effects in a synchronously coupled model of human and Earth systems, AGU Fall Meeting, New Orleans, LA, December, 2017.

168. Timmermans, B., W. D. Collins, T. A. O'Brien, and M. D. Risser, 2017: GC21E-0979: Parameter uncertainty in simulations of extreme precipitation and attribution studies, AGU Fall Meeting, New Orleans, LA, December, 2017.

169. Xu, Z., A. Rhoades, H. Johansen, P. A. Ullrich, and W. D. Collins, 2017: A24F-03: An intercomparison of GCM and RCM dynamical downscaling for characterizing the hydroclimatology of California and Nevada, AGU Fall Meeting, New Orleans, LA, December, 2017.

170. Mahesh, A., T. A. O'Brien, M. Prabhat, and W. Collins, 2018: 2.5 Assessing Uncertainty in Deep Learning Techniques that Identify Atmospheric Rivers in Climate Simulations, American Meteorological 97th Annual Meeting, Jan. 22–26, Seattle, WA.

171. O'Brien, T.A., K. Kashinath, H. Inda Diaz, and W. Collins, 2018: 552 Convective Aggregation and the Size Distribution of Updrafts, American Meteorological 97th Annual Meeting, Jan. 22–26, Seattle, WA.

172. Collins, W.D, D. Feldman, B. A. Wielicki, Y. L. Shea, M. G. Mlynczak, C. Kuo, N. Nguyen, and X. Liu, 2018: 6B.3A Shortwave Spectral Climate Change Signals of Earth Systems with Low, Medium, and High Climate Sensitivity, American Meteorological 97th Annual Meeting Seattle, WA, Jan. 22–26, 2018.

173. Feldman, D.R., W.D. Collins, B.A. Wielicki, Y.L. Shea, M. Mlynczak, C. Kuo, N. Nguyen, and X. Liu, 2018: Shortwave Spectral Climate Change Signals of Earth Systems with Low, Medium, and High Climate Sensitivity, AMS Annual Meeting, January 11, 2018, Austin, Texas.

174. Kashinath, K., M. Prabhat, M. Mudigonda, A. Mahesh, S. Kyung Kim, Y. Liu, S. Kahou, B.A. Toms, E. Racah, C. Beckham, C. Pal, T. Maharaj, J. Biard, K. Kunkel, D.N. Williams, T.A. O'Brien, M.F. Wehner, W.D. Collins, 2018: Deep Learning recognizes weather and climate patterns (Invited). Abstract IN14A–07, presented at 2018 AGU Fall Meeting, Washington, D.C., 10–14 Dec.

175. Mahesh, A., T.A. O'Brien, W.D. Collins, M.F. Wehner, M. Prabhat, K. Kashinath, and M. Mudigonda, 2018: Probabilistic detection of extreme weather using deep learning methods (Invited). Abstract U14B–12, presented at 2018 AGU Fall Meeting, Washington, D.C., 10–14 Dec.

176. Prabhat, M., T. Kurth, S. Treichler, J. Romero, M. Mudigonda, M. Fatica, M. Houston, A. Mahesh, K. Kashinath, M. Matheson, M. Shankar, T.A. O'Brien, M.F. Wehner, and W.D. Collins, 2018: Towards Exascale Deep Learning for Climate Science (Invited). Abstract IN11A–01, presented at 2018 AGU Fall Meeting, Washington, D.C., 10–14 Dec.

177. Prabhat, M., K. Kashinath, T. Kurth, M. Mudigonda, M.F. Wehner, and W.D. Collins, 2018: Lessons learnt from applying Deep Learning to Scientific problems at NERSC (Invited) . Abstract IN12A–07, presented at 2018 AGU Fall Meeting, Washington, D.C., 10–14 Dec.

178. Charn, A.B., W.D. Collins, H. Parishani, M.D. Risser, and T.A. O'Brien, 2018: Microphysical Sensitivity of Superparameterized Precipitation Extremes in the Continental US Due to Feedbacks on Large–scale Circulation. Abstract A23N–3105, presented at 2018 AGU Fall Meeting, Washington, D.C., 10–14 Dec.

179. Collins, W.D., D. Feldman, D.D. Turner, M. Shupe, R. Bennartz, and V.P. Walden, 2018: Direct Observations of the Greenhouse Effect of CO_2 and CH_4 over Greenland. Abstract A52B–01, presented at 2018 AGU Fall Meeting, Washington, D.C., 10–14 Dec.

180. Collins, W.D., D. Feldman, D. Turner, M. Shupe, R. Bennartz, and V.P. Walden, 2019: Direct Observations of the Greenhouse Effect of CO_2 and CH_4 over Greenland. Abstract

EGU2019-95, Session CL2.01/AS4.34, EGU General Assembly 2019, Vienna, Austria, 7-12 April.

181. Feldman, D. Paynter, A.L. Jones, S. Freidenreich, W.D. Collins, and V. Ramaswamy, 2018: Using Native Error Diagnostics to Identify Sources of Aerosol Radiative Forcing Error in GCMs and Understand Their Implications. Abstract A43G-07, presented at 2018 AGU Fall Meeting, Washington, D.C., 10–14 Dec.

182. Feldman, D., W.D. Collins, C. Kuo, N. Nguyen, 2018: Strong Regional Gradients in Shortwave Greenhouse Gas Radiative Forcing and Implications for Radiative Transfer Parameterizations, 15th AMS Conference on Radiation, Vancouver, BC, July 11, 2018.

183. Fildier, B., and W.D. Collins, 2018: Effects of Shallow Convective Mixing on Convective Organization and Heavy Precipitation Statistics. Abstract A11O-2482, presented at 2018 AGU Fall Meeting, Washington, D.C., 10–14 Dec.

184. Jones, A.L., S. Freidenreich, D. Paynter, V. Ramaswamy, W.D. Collins, and R. Pincus, 2018: Errors and Uncertainty in Absorbed Solar Radiation and the Hydrological Cycle. Abstract A44D–08, presented at 2018 AGU Fall Meeting, Washington, D.C., 10–14 Dec.

185. Kashinath, K., M. Prabhat, M. Mudigonda, A. Mahesh, S. Kim, J. Wu, A. Albert, A. Rupe, A. Fernandez, T.A. O'Brien, M.F. Wehner, and W.D. Collins, 2019: J6.1 Deep Learning recognizes climate and weather patterns and emulates complex processes critical to the modeling of Earth's climate. 99th Annual Meeting of the American Meteorological Society, 6-10 January 2019, Phoenix, AZ.

186. Mahesh, A., T.A. O'Brien, W.D. Collins, M.F. Wehner, M. Prabhat, K. Kashinath, and M. Mudigonda, 2018: Using deep learning for probabilistic detection of extreme weather. Abstract IN13C–0682, presented at 2018 AGU Fall Meeting, Washington, D.C., 10–14 Dec.

187. O'Brien, T.A., M.D. Risser, J.P. O'Brien, C.M. Patricola, and W.D. Collins, 2018: Chance Rather than Trends in the Unusual 2017 California Wet Season. Abstract GC21E–1136, presented at 2018 AGU Fall Meeting, Washington, D.C., 10–14 Dec.

188. Mahesh, A., T.A. O'Brien, W.D. Collins, M. Prabhat, K. Kashinath, and M. Mudigond, 2019: 3A.2 Probabilistic Detection of Extreme Weather Using Deep Learning Methods. 99th Annual Meeting of the American Meteorological Society, 6-10 January 2019, Phoenix, AZ.

189. O'Brien, T.A., A. Mahesh, M.D. Risser, C.J. Paciorek, M.F. Wehner, C.M. Patricola, J.P. O'Brien, M. Prabhat, and W.D. Collins, 2019: J2.4 Probabilistic AR Detection for Understanding Western Coastal Hydroclimate. 99th Annual Meeting of the American Meteorological Society, 6-10 January 2019, Phoenix, AZ.

190. Paynter, D., S.M. Freidenreich, A.L. Jones, D. Feldman, V. Ramaswamy, W.D.Collins, 2018: Global Line-by-Line Calculations of Aerosol Radiative Forcing: Understanding Sources of

Error in GCM Radiation Codes, 15th AMS Conference on Radiation, Vancouver, BC, July 11, 2018.

191. Prabhat, M., T. Kurth, S. Treichler, J. Romero, M. Mudigonda, A. Mahesh, T.A. O'Brien, M. Fatica, M. Houston, K. Kashinath, M. Matheson, M. Shankar, M.F. Wehner, and W.D. Collins, 2019: 2B.1 Exascale Deep Learning for Climate Science. 99th Annual Meeting of the American Meteorological Society, 6-10 January 2019, Phoenix, AZ.

192. Prabhat, M., K. Kashinath, T. Kurth, M. Mudigonda, A. Mahesh, B.A. Toms, J. Biard, S.K. Kim, S. Kahou, B. Loring, J. Stewart, S. Ganguly, T.A. O'Brien, K. Kunkel, M.F. Wehner, and W.D. Collins, 2018: ClimateNet: bringing the power of Deep Learning to the climate community via open datasets and architectures. Abstract ED53E–0758, presented at 2018 AGU Fall Meeting, Washington, D.C., 10–14 Dec.

6.2 Conference Presentations and Talks

1. Collins, W.D., J.T. Kiehl, J. Wang, and G.J. Zhang, 1996: Validation of the NCAR community climate model with TOGA COARE observations. *Eighth Conference on Air-Sea Interaction*, 76th AMS Annual Meeting, Jan. 28–Feb. 2, 1996, Atlanta, Georgia (American Meteorological Society, Boston).

2. Zhang, G.J., J.T. Kiehl, W.D. Collins, and J. Wang, 1996: Sensitivity of surface evaporation in the tropical Pacific to treatment of convection in the NCAR climate model. *Eighth Conference on Air-Sea Interaction*, 76th AMS Annual Meeting, Jan. 28–Feb. 2, 1996, Atlanta, Georgia (American Meteorological Society, Boston).

3. Zender, C.S., S. Pope, B. Bush, W.D. Collins, J.T. Kiehl, F.P.J. Valero, and J. Vitko, 1997: Atmospheric absorption during ARESE. *Ninth Conference on Atmospheric Radiation*, 77th AMS Annual Meeting, Feb. 2–7, 1997, Long Beach, California (American Meteorological Society, Boston).

4. Collins, W.D., 1998: A global signature of enhanced shortwave absorption by clouds. Gordon Conference on Solar Radiation and Climate, Plymouth State College, Jun. 15–19, 1998, Plymouth, New Hampshire.

5. Collins, W.D., 1998: The atmospheric radiative heating rate during COARE: Estimation from observations and model simulations. *Proceedings of a conference on the TOGA Coupled Ocean-Atmosphere Response Experiment (COARE)* (World Climate Research Program, Geneva), WCRP-107, WMO/TD-No. 940, Jul. 7–14, 1998, Boulder, Colorado.

6. Collins, W.D., P.J. Rasch, and B.E. Eaton, 1999: Forecasting aerosols using a CTM with assimilation of satellite aerosol retrievals. Workshop on Mineral Dust, Jun. 9–11, 1999, Boulder, Colorado.

7. Collins, W.D., P.J. Rasch, and B.E. Eaton, 1999: A prototype global aerosol analysis using assimilation of satellite retrievals of aerosol optical thickness. NCAR ACD Workshop on

Chemical Data Assimilation and Applications to Satellite Observations, Nov. 8–9, 1999, Boulder, Colorado.

8. Valero, F.P.J., S.K. Pope, and W.D. Collins, 2000: ScaRaB, GOES-8, aircraft and surface observations of the absorption of solar radiation by clouds. Gordon Conference on Solar Radiation and Climate, Connecticut College, Jun. 24–29, 2000, New London, Connecticut.

9. Collins, W.D., 2001: New treatments of radiative processes in the NCAR Community Climate Model. 8th Scientific Assembly of the International Association of Meteorology and Atmospheric Sciences, Jul. 10–18, 2001, Innsbruck, Austria.

10. Collins, W.D, 2001: Improved estimates of global atmospheric shortwave absorption by aerosols in clear and cloudy atmospheres. Chapman Conference on Atmospheric Absorption of Solar Radiation, Aug. 13–17, 2001, Estes Park, Colorado.

11. Fillmore, D.W., and W.D. Collins, 2001: Evidence for enhanced shortwave absorption over the tropical Pacific from collocated satellite and buoy observations. Chapman Conference on Atmospheric Absorption of Solar Radiation, Aug. 13–17, 2001, Estes Park, Colorado.

12. Collins, W.D. and D.W. Fillmore, 2002: Effects of clouds on direct radiative forcing by absorptive aerosols. *11th Conference on Atmospheric Radiation*, Jun. 3–7, 2002, Ogden, Utah (American Meteorological Society, Boston).

13. Collins, W.D., 2002: Overview of aerosol/climate interactions and radiative forcing: Parts I and II. NCAR ASP Summer Colloquium, "Interactions among Aerosols, Climate, and the Hydrological Cycle," Jul. 8–19, 2002, Boulder, Colorado.

14. Collins, W.D., 2002: Techniques of aerosol assimilation. NCAR ASP Summer Colloquium, "Interactions among Aerosols, Climate, and the Hydrological Cycle," Jul. 8–19, 2002, Boulder, Colorado.

15. Mlynczak, M., D. Johnson, K. Jucks, W. Traub, G. Bingham, P. Yang, C. Mertens, L. Gordley, B. Smith, W. Collins, C.R. Hyde, and S. Wellard, 2003: The Far-Infrared Spectroscopy of the Troposphere (FIRST) Project–A new instrument for AURA validation. AURA Validation Workshop, Mar. 18–21, 2003.

16. Mlynczak, M., D. Johnson, K. Jucks, W. Traub, G. Bingham, D. Kratz, P. Yang, C. Mertens, L. Gordley, B. Smith, W. Collins, J. Harries, R. Rizzi, C.R. Hyde, and S. Wellard, 2003: The Far-Infrared Spectroscopy of the Troposphere (FIRST) Project. Advanced Infrared Technology (AITA) Workshop, Sep. 2003, Pisa, Italy.

17. Collins, W.D., 2003: Effects of aerosols on regional and global climate. Workshop on Global Aerosol Measurements for Climate Studies: Present and Future, Sep. 17, 2003, Paris, France.

18. Collins, W.D., P.J. Rasch, A. Conley, and D. Fillmore, 2003: Regional and global effects of anthropogenic aerosols on the hydrological cycle. International Conference on Earth System Modeling, Sep. 19, 2003, Hamburg, Germany.

19. Collins, W.D., 2004: Cloud feedbacks in the NCAR Community Climate System Model CCSM3. Joint WGCM CFMIP/IPCC expert meeting on Climate Sensitivity and Feedbacks, Apr. 19–22, 2004, Exeter, UK.

20. Collins, W.D., 2004: Estimates of regional and global forcing: How good are our models? Aspen Global Change Institute symposium, "Aerosols and the Hydrological Cycle," Jul. 11–17, 2004, Aspen, Colorado.

21. Collins, W.D., D.W. Fillmore, V. Ramaswamy, and M.D. Schwarzkopf, 2004: Comparison of radiative forcings from GCMs and line-by-line models. IPCC Workshop on Climate Sensitivity, Jul. 26–29, 2004, Paris, France.

22. Collins, W.D., 2004: Radiative transfer and forcing. IPCC Workshop on Climate Sensitivity, Jul. 26–29, 2004, Paris, France.

23. Charlock, T.P., F.G. Rose, D. Rutan, D.W. Fillmore, and W.D. Collins, 2004: All-sky aerosol direct forcing to SW and LW at TOA and surface using CERES Terra and the MATCH assimilation. International Radiation Symposium 2004, "Current Problems in Atmospheric Radiation," Aug. 23–28, 2004, Busan, South Korea.

24. Lamarque, J.F., J. Kiehl, G. Brasseur, T. Butler, P. Cameron-Smith, W.D. Collins, W.J. Collins, C. Granier, D. Hauglustaine, P. Hess, E. Holland, L. Horowitz, M. Lawrence, D. McKenna, P. Merilees, L. Mickley, M. Prather, P. Rasch, D. Rotman, D. Shindell, and P. Thornton, 2004: Nitrogen deposition evolution in the 21st century under the A2-scenario: A multi-model multi-climate analysis. Eighth International Global Atmospheric Chemistry Conference, Sep. 4–9, 2004, Christchurch, New Zealand.

25. Holland, E.A, J.-F. Lamarque, J. Sulzman, G. Brasseur, T. Butler, P. Cameron-Smith, W.D. Collins, W.J. Collins, P. Hess, D. Hauglustain, J. Kiehl, D. McKenna, M. Lawrence, H. Levy, D. Shindell, 2004: Evaluation of nitrogen deposition in precipitation: A multi-model comparison with EMEP and NADP measurements. Eighth International Global Atmospheric Chemistry Conference, Sep. 4–9, 2004, Christchurch, New Zealand.

26. Collins W.D., G.A. Meehl, T.M.L. Wigley, and H. Teng, 2005: Simulations of committed climate change and sea-level rise through 2400 AD. US Climate Change Science Program (CCSP) Workshop "Climate Science in Support of Decision-Making," Nov. 14–16, 2005, Arlington, Virginia.

27. Bader, D.C., J. Hack, D. Randall, and W. Collins, 2005: Climate simulation for climate change studies. Workshop on Frontiers of Extreme Computing, Oct. 17, 2005, Santa Cruz, California.

28. Collins, W.D., and A.J. Conley, 2006: New methods for representing transmission in radiative parameterizations. EGU General Assembly, Apr. 2–7, 2006, Vienna, Austria.

29. Sun, D.Z., T. Zhang, C. Covey, S. Klein, W. Collins, J.J. Hack, J. Kiehl, G.A. Meehl, I.M. Held, and M. Suarez, 2007: Atmospheric Feedbacks Over the Pacific Cold-Tongue: Results From Models and Observations. 3rd WGNE Workshop on Systematic Errors in Climate and NWP Models, Feb. 12–16, 2007, San Francisco, California.

30. Iacono, M., W. Collins, and P. Rasch, 2008: Evaluating the Impact of RRTMG/McICA in the NCAR CAM3.5 Climate Model, ARM Science Team Meeting, Mar. 10–14, 2008, Norfolk, Virginia.

31. Collins, W.D., 2009: "Climate modeling." Carbon cycle 2.0 Retreat, Oct. 12–13, 2009, Chaminade Resort and Spa, Santa Cruz, CA.

32. Kiparsky, M., W. Collins, D. Groves, M. Hanemann, B. Joyce, D. Purkey, and C. Young, 2009: "Hydrology And Water Operations Modeling for Climate Change Risk Assessment in California's Southern Central Valley". AWRA 2009 Spring Specialty Conference: Managing Water Resources Development in a Changing Climate. May 4–6, 2009, Anchorage, Alaska.

33. Kato, S., S. Sun-Mack, W.F. Miller, F.G. Rose, B.A. Wielicki, D.M. Winker, G. Stephens, P. Minnis, N.G. Loeb, T.P. Charlock, P.W. Stackhouse, K.-M. Xu, and W.D. Collins, 2009: "CALIPSO, CloudSat, CERES, and MODIS merged product." Earthcare Workshop, Kyoto, Japan, June 10–12, 2009.

34. Collins, W.D., 2010: "A future with(out) CC2.0." Carbon Cycle 2.0 Symposium, Feb.1 2010, LBNL.

35. de Boer, G., W.D. Collins, S. Menon, E. Hunke, and E.W. Eloranta, 2010: "Quantifying seasonal influence of stratiform mixed-phase clouds on Arctic sea ice growth rates," International Glaciological Society Symposium on Sea Ice in the Physical and Biogeochemical System, Tromso, Norway, May 30–June 4.

36. de Boer, G., W.D. Collins, S. Menon, E. Hunke, and E.W. Eloranta, 2010: "Quantifying seasonal influence of stratiform mixed-phase clouds on Arctic sea ice growth rates," International Polar Year Science Conference, Oslo, Norway, June 8–June 12.

37. Feldman, D.R., C.A. Algieri, J. Ong, and W.D. Collins, 2010: "Observational System Simulation Experiments of CLARREO Shortwave Reflectance Spectra." 11th International Meeting on Statistical Climatology, Edinburgh, Scotland, July 12–16, 2010.

38. Kato, S., F.G. Rose, S. Sun-Mack, W.F. Miller, Y. Chen, D.A. Rutan, B.A. Wielicki, D.M. Winker, G. Stephens, P. Minnis, N.G. Loeb, T.P. Charlock, P.W. Stackhouse, K.-M. Xu, and W. Collins, 2010: Computation of surface irradiances using CALIPSO, CloudSat and MODIS derived cloud and aerosol properties. NASA A-train Symposium, October 25–28, 2010, New Orleans, LA.

39. Collins, W.D., 2010: Quantifying Uncertainty in Climate and Integrated Assessments. National Climate Assessment Modeling and Scaling Workshop, Dec. 8, 2010, Washington, DC.

40. Nolan, L., and W. Collins, 2011: The Effects of Cloud-Scale Physics Uncertainty on Climate Prediction. WCRP Conference on Climate Research in Service to Society. 23–28 October 2011, Denver, Colorado.

41. Pressel, K., and W. Collins, 2011: Scaling of the First Order Structure Function of the AIRS Observed Water Vapor Field. WCRP Conference on Climate Research in Service to Society. 23–28 October 2011, Denver, Colorado.

42. Feldman, D., W. Collins, C. Algieri, and J. Ong, 2011: Using Observing System Simulation Experiments to Guide the Next Generation of NASA Earth-Observing Satellite Instrumentation, April 19, 2011, College of Oceanic and Atmospheric Sciences, Oregon State University, Corvallis OR.

43. Feldman, D., W. Collins, C. Algieri, J. Ong, Y. Roberts, and P. Pilewskie, 2011: MODTRAN 5.3 Simulations of Changes in Shortwave and Longwave Spectra from Climate Change in the 21st Century, June 14, 2011, 33rd Review of Atmospheric Transmission Models Meeting, National Heritage Museum, Lexington, MA.

44. Collins, W.D., K.G. Pressel, and A.R. Desai, 2012: A Comparison of the Scale Invariance of the Water Vapor Field Observed by the Atmospheric Infrared Sounder to the Scale Invariance of In Situ Observations from a Very Tall Tower. Poster EM-27, AGU Chapman Conference on Remote Sensing of the Terrestrial Water Cycle, 19–22 February 2012, Kona, Hawaii, USA.

45. Pressel, K.G., and W.D. Collins, 2012: Scale Invariance of the Water Vapor Field Observed by the Atmospheric Infrared Sounder, Poster EM-23, AGU Chapman Conference on Remote Sensing of the Terrestrial Water Cycle, 19–22 February 2012, Kona, Hawaii, USA.

46. Collins, W.D., and D.R. Feldman, 2012: The future evolution of the Earth's reflected shortwave spectrum. Planet Under Pressure Conference, Abstract 3416, May 26–29, 2012, London, UK.

47. Collins, W.D., T.A. O'Brien, and F. Li, 2012: Observational constraints on scale-awareness: Scale-incognizant parameterizations in the Community Atmosphere Model. Frontiers in Computational Physics: Modeling the Earth System, Abstract 178, 16–20 December, Boulder, Colorado.

48. O'Brien, T.A., W.D. Collins, L.C. Sloan, P.Y. Chuang, and I.C. Faloona, 2012: Sea Surface Temperatures Drive Fog Variability but not the Long-term Trend. 59th Annual Eastern Pacific Ocean Conference – EPOC 2012, 19–22 September, Timberline Lodge, Mt. Hood, Oregon.

49. Gauss, M., W.D. Collins, and V. Aurora, 2012: The current state of methane modeling, AMAP Meeting September 28, Washington DC.

50. O'Brien, T.A., L.C. Sloan, P.Y. Chuang, I.C. Faloona, and W.D. Collins, 2012: Simulating the Recent Decline in Coastal Fog, Climate Change and California's Water Supply conference, 15 May, University of California, Davis.

51. Feldman, D.R., et al., 2012: Satellite Instrument Simulation for Mission Planning and Climate Model Evaluation, Physics Department Seminar Presentation, 7 November, Imperial College London,

52. Feldman, D.R., and W.D. Collins, 2013: Pan-Spectral Signatures of Climate Change and Prospects for Observational Constraints, 25th Conference on Climate Variability and Change, Annual American Meteorological Society Meeting, 10 January, Austin, TX.

53. Jones, A.D., K.V. Calvin, W.D. Collins and J. Edmonds, 2013: Towards a more consistent treatment of land-use change within climate assessment. Presented at the Impacts World 2013, International Conference on Climate Change Effects, 27–30 May, Potsdam.

54. Collins, W.D., T.A. O'Brien, and F. Li, 2013: Do projections of rainfall extremes converge with increasing model resolution? Abstract 1097, Davos Atmosphere and Cryosphere Assembly DACA-13, 8–12 July, Davos, Switzerland.

55. O'Brien, T.A., L.C. Sloan, P.Y. Chuang, I.C. Faloona, and W.D. Collins, 2013: The Recent Decline of Coastal Fog and the Drying of the Coastal Boundary Layer. Oregon State University Physics of Oceans and Atmospheres Seminar Series, 29 January, Corvallis, Oregon.

56. Asay-Davis, X.S., M. Maltrud, S.F. Price, W. Lipscomb, D. Martin, S. Cornford, and W. Collins, 2013: Ice sheet-ocean interactions in the Community Earth System Model (CESM). CAOS Colloquium. Courant Institute for Mathematical Sciences, 23 October, New York University, New York, NY.

57. Asay-Davis, X.S., M. Maltrud, S.F. Price, W. Lipscomb, D. Martin, S. Cornford, and W. Collins, 2013: Ice sheet-ocean interactions in the Community Earth System Model (CESM). In Ice sheet-Climate Coupling Workshop, Reading, UK, October 1, 2013.

58. Feldman, D.R., et al., 2013: Using Hyperspectral Observing System Simulation Experiments to Identify Observational Constraints for Climate Models, Climate and Radiation Laboratory Seminar Series, NASA Goddard Space Flight Center, Greenbelt, MD, 19 April.

59. O'Brien, T.A., L.C. Sloan, P.Y. Chuang, I.C. Faloona, and W.D. Collins, 2013: The Recent Decline of Coastal Fog and the Drying of the Coastal Boundary Layer. Pacific Northwest National Laboratory Climate Physics Seminar, 31 January, Richland, Washington.

60. O'Brien, T.A. W.D. Collins, F. Li, S.A. Rauscher, T.D. Ringler, M. Taylor, S.M. Hagos, and L.R. Leung, 2013: Observed Scaling in Clouds and Precipitation and Scale Incognizance in Regional to Global Atmospheric Models. Pacific Northwest National Laboratory Climate Physics Seminar, 1 February, Richland, Washington.

61. Feldman, D.R., et al., 2013: Developing Observational Constraints for Climate Models Using Hyperspectral Observing System Simulation Experiments, Lawrence Livermore National Laboratory Atmospheric Earth and Energy Division Atmospheric Seminar Series, Livermore, Calif., 26 February.

62. Asay-Davis, X.S., M. Maltrud, S.F. Price, W. Lipscomb, D. Martin, S. Cornford, W. Collins 2013: Ice sheet-ocean interactions in the Community Earth System Model (CESM). British Antarctic Survey, 25 September, Cambridge, UK.

63. Prabhat, S. Byna, M.F. Wehner, E.W. Bethel, and W.D. Collins, 2013: Pattern Detection for Large Climate Datasets. RIST/JAMSTEC Conference, LBNL, Berkeley, CA.

64. Collins, W.D., and K.G. Pressel, 2014: Scaling Behavior of Atmospheric Moisture from Cloud System to Synoptic Scales. The Latsis Symposium 2014 on Atmospheric and Climate Dynamics, 18–21 June, Zurich, Switzerland.

65. O'Brien, T.A., W.D. Collins, S.A. Rauscher, and T.D Ringler, 2014: Scale-dependent vertical mass flux and a possible deficiency in current parameterization suites. The Latsis Symposium 2014 on Atmospheric and Climate Dynamics, 18–21 June, Zurich, Switzerland.

66. Collins, W.D., D.R. Feldman, M.S. Torn, and P.J. Gero, 2014: Direct Measurements of Surface Forcing of Carbon Dioxide from 2000 to 2010. American Meteorological Society 14th Conference on Atmospheric Radiation, Abstract 2.4, Boston, Massachusetts, 7-11 July.

67. Feldman, D.R., W.D. Collins, and X. Huang, 2014: Far-Infrared Surface Emissivity: An Unconstrained Property that Impacts Atmospheric Radiation and Climate. American Meteorological Society 14th Conference on Atmospheric Radiation, Abstract 4.7, Boston, Massachusetts, 7-11 July.

68. Collins, W.D., 2014: The Spatial Scale Dependence of Water Vapor in Models, Satellite Data, and Tower Measurements. 7th International GEWEX conference, The Hague, the Netherlands, 14-17 July.

69. O'Brien, T.A., W.D. Collins, S.A. Rauscher, T.D. Ringler, M. Taylor, S.M. Hagos, and L.-R. Leung, 2014: Observed scaling in clouds and precipitation and scale incognizance in regional to global atmospheric models. 7th International GEWEX conference, The Hague, the Netherlands, 14-17 July.

70. Jones, A. D., W. D. Collins, M. S. Torn, K. V. Calvin, J. Edmonds, 2014: Land use scenarios to meet multiple needs for CMIP6, presented at Aspen Global Change Institute Workshop on Experimental Design for CMIP6: Aerosol, Land Use, and Future Scenarios, Aspen, CO, 5 Aug.

71. Jeon, S., Prabhat, S. Byna, W.D. Collins, and M.F. Wehner, 2014: Characterization of extreme precipitation under atmospheric river events. Joint Statistical Meeting, Boston, Massachusetts, 6 August.

72. Collins, W.D., H. Johansen, P. McCorquodale, P. Colella, and P. Ullrich, 2014: Nonhydrostatic adaptive mesh dynamics for multiscale climate models, Abstract SCI-PS243.01, World Weather Open Science Conference, Montreal, Canada, 16-21 August.

73. Martin, D.F., X. Asay-Davis, S.F. Price, S.L. Cornford, E.G Ng, and W.D. Collins, 2014: Response of the Antarctic ice sheet to ocean forcing using the POPSICLES coupled ice sheet-ocean model. 21st Annual West Antarctic Ice Sheet (WAIS) Initiative Workshop, Julian, California, 24-27 September.

74. Feldman, D.R., R. Pincus, W.D. Collins, V. Ramaswamy, D. Paynter, E.J. Mlawer, P. Forster, 2014: Diagnostics from the Radiative Forcing Model Intercomparison Project, 13th AEROCOM Workshop, Steamboat Springs, CO, 30 Sep – 2 Oct.

75. Collins, W.D., and the ACME Science Team, 2014: ACME Climate Science. DOE Energy-Climate Workshop, Washington, DC, 28-30 October.

76. Edmonds, J., W.D. Collins, P.E. Thornton, A. Thomson, A.D. Jones, and K. Calvin, 2014: Improving Representations of Human-Earth System Interactions: The iESM Project, Integrated Assessment Modeling Consortium Seventh Annual Meeting, College Park, Maryland, 17-19 November.

77. Jones, A. D, K. V. Calvin, W. D. Collins, and J. A. Edmonds (2014), Accounting for radiative forcing from albedo change in future land-use scenarios, presented at the 7th Annual Meeting of the Integrated Assessment Modeling Consortium, University of Maryland, College Park, MD, 17-19 Nov.

78. O'Brien, T.A., and W.D. Collins, 2014: Frontiers in climate modeling at the watershed scale. Invited presentation, 13th IWA Special Conference on Watershed and River Basin Management, San Francisco, 9-12 September.

79. Asay-Davis, X., D.F. Martin, S.F. Price, M.E. Maltrud, and W.D. Collins, 2014: Circum-Antarctic Simulations using the POPSICLES Ice Sheet-Ocean Model. Invited presentation, Workshop on Rising Coastal Seas on a Warming Earth, New York University Abu Dhabi, United Arab Emirates, 27-29 October.

80. O'Brien, T. A., W.D. Collins, M.F. Wehner, D.A. Stone, S.A. Rauscher, 2014: Calibrated and Systematic Characterization Attribution and Detection of Extremes: A Focus on Central America (invited). First Workshop on Climate Change, Variability, and Modeling over Central America and Mexico. Ensenada, Mexico, November.

81. Pall, P., M. Duffy, Wehner, M.F., D.A. Stone, C.J. Paciorek, H. Krishnan, W.D. Collins, 2015: Estimating the uncertainty in extreme precipitation due to sample size limitations. American Meteorological Society January.

82. Wehner, M.F., P. Pall, M. Duffy, D.A. Stone, C. Paciorek, W. D. Collins, 2015: Uncertainty quantification of daily precipitation extremes, American Meteorological Society Annual Meeting. Phoenix, AZ, January 8.

83. Collins, W.D., D.R. Feldman, J. Gero, M.S. Torn, E. Mlawer, and T. Shippert, 2015: Observational Determination of Surface Radiative Forcing by CO_2 and CH_4. Abstract BAPS.2015.MAR.D33.2, Session D33: The Physics of Climate II, APS March Meeting, San Antonio, 2-6 March.

84. Davis, A.B., F. Xu, W.D. Collins, 2015: Accounting for Sub-Pixel Variability of Clouds and/or Unresolved Spectral Variability, as needed, with Generalized Radiative Transfer Theory. Abstract HT4B.3, Fourier Transform Spectroscopy (FTS) and Hyperspectral Imaging and Sounding of the Environment (HISE) Meetings, Lake Arrowhead, California, 1-4 March.

85. Feldman, D., and W.D. Collins, 2015: Simulating hyperspectral satellite instruments in pursuit of an observational constraint for low-cloud feedbacks. Cloud Forcing Model Intercomparison Project (CFMIP) Meeting on Cloud Processes and Cloud Feedbacks, Asilomar Conference Center, Pacific Grove, California, 8-11 June.

86. Kashinath, K., T.A. O'Brien, and W.D. Collins, 2015: Changes in tropical climate due to bifurcations of radiative-convective equilibria. Cloud Forcing Model Intercomparison Project (CFMIP) Meeting on Cloud Processes and Cloud Feedbacks, Asilomar Conference Center, Pacific Grove, California, 8-11 June.

87. Wehner, M. P. Pall, D. Stone, and W.D. Collins, 2015: Diagnosing Possible Anthropogenic Contributions to Heavy Colorado Rainfall in September 2013. Abstract IUGG-0115, Session JH1 Extreme Hydrological Events, 26th International Union of Geodesy and Geophysics (IUGG), Prague, Czech Republic, 22 June – 2 July.

88. Collins, W.D., D. Feldman, J. Gero, M. Torn, E. Mlawer, and T. Shippert, 2015: Observational Determination of Surface Radiative Forcing by the Major Anthropogenic Greenhouse Gases. Abstract IUGG-1830, Session M16 Radiation in the Climate System, 26th International Union of Geodesy and Geophysics (IUGG), Prague, Czech Republic, 22 June – 2 July.

89. Asay-Davis, X., D. Martin, S. Cornford, S. Price, and W.D. Collins, 2015: Coupled ice sheet-ocean simulations with the POPSICLES model. Abstract IUGG-2864, Session C06 Ice Sheet and Ocean Interactions on Multiple Scales, 26th International Union of Geodesy and Geophysics (IUGG), Prague, Czech Republic, 22 June – 2 July.

90. Feldman, D.R., Y.L. Roberts, J.L. Paige, Z.M. Subin, Y. Liu, G. Pau, W.D. Collins, 2015: Simulating Hyperspectral Satellite Instrument Measurements in Pursuit of an Observational Constraint for Low-Cloud Feedbacks, CFMIP Meeting, Monterey, California, 8–11 June.

91. Collins, W.D., H. Johansen, C. Jablonowski, and J. Ferguson, 2017: "Demonstration of nonhydrostatic adaptive mesh dynamics for multiscale climate models," International Conference on Computational Science (ICCS), Zurich, Switzerland, Jun. 11-14, 2017.

92. Feldman, D.R., W.D. Collins, P.J. Gero, D.D. Turner, S. Biraud, E.J. Mlawer, M.S. Torn, 2015: Radiative Surface Forcing from CH_4 at the North Slope of Alaska and Southern Great

Plains Sites, Atmospheric Systems Research (ASR) Annual Science Team Meeting, Vienna, Va, 16-19 Mar.

93. Feldman, D.R., W.D.Collins, X. Huang, X. Chen, V. Walden, 2015: The Potential for a Positive Feedback from Far-Infrared Surface Emissivity. February 10, Texas A&M University.

94. O'Brien, T. A., Collins, W. D., 2015: Analyzing and leveraging self-similarity in climate models, UC Davis Atmospheric Science Seminar, 8 April.

95. O'Brien, T. A., Collins, W. D., 2015: Analyzing and leveraging self-similarity in climate models, San Jose State University Climate and Meteorology Seminar, 28 April.

96. Asay-Davis, X., D. Martin, S. Cornford, S. Price, and W.D., Collins, 2015: Coupled ice sheet-ocean simulations with the POPSICLES model. Invited talk, abstract IUGG-2864, Session C06 Ice Sheet and Ocean Interactions on Multiple Scales, 26th International Union of Geodesy and Geophysics (IUGG), Prague, Czech Republic, 22 June – 2 July.

97. Collins, W.D., B. Debusschere, S. Ghan, D. Lucas, P. Caldwell, L. Oliker, T. Ringler, and C. Woodward, 2016: "Multiscale methods for accurate, efficient, and scale-aware models of the Earth System," SciDAC QUEST Institute Science Team Meeting, SNL Livermore, Livermore, CA., Jul. 7, 2016.

98. Rhoades, A, H. Johansen, P. Ullrich, Z. Xu, C. Zarzycki, and W.D. Collins, 2016: Understanding Western US Mountain Hydroclimatology Under Present and Future Conditions Using A Next-Generation Variable-Resolution Global Climate Model. MtnClim 2016, 7th Mountain Climate Conference on "Mountains without Snow: What are the Consequences?", Sleeping Lady Resort, Leavenworth, Washington, Oct. 17-20, 2016.

99. Feldman, D.R., W.D. Collins, Y. Shea, N. Nguyen, X. Liu, B. Wielicki, (2016) Observing Climate Change With Both Shortwave and Longwave Hyperspectral Satellite Instrumentation, HISE Meeting, Leipzig, Germany, 14 Nov. (Invited).

100. Feldman, D.R., W.D. Collins, S.C. Biraud, M.D. Risser, C.Kuo, J. Shortridge, D.D. Turner, P.J. Gero, S. Xie, E.J. Mlawer, M.J. Alvarado, T.R. Shippert, L.D. Riihimaki, D. Helmig, (2016) Measuring and Modeling the Radiative Forcing from Carbon Dioxide and Methane, Princeton, NJ, 26 Oct. (Invited).

101. Fildier, B., H. Parishani, and W.D. Collins, 2017: Simultaneous Characterization of the Dynamics of Tropical Precipitation Extremes on Mesoscales and Convective Scales. Presentation 5.5, AMS 21st Conference on Atmospheric and Oceanic Fluid Dynamics 19th Conference on Middle Atmosphere, Marriott Portland Downtown Waterfront, 26–30 June 2017 Portland, Oregon.

102. Langhans, W. and W.D. Collins, 2017: The influence of an Eddy-Diffusivity/Mass-Flux (EDMF) turbulence parameterization on convective self-aggregation. Poster 41, AMS 21st

Conference on Atmospheric and Oceanic Fluid Dynamics 19th Conference on Middle Atmosphere, Marriott Portland Downtown Waterfront, 26–30 June 2017 Portland, Oregon.

103. Liu, Y., E. Racah, Prabhat, A. Khosrowshahi, D. Lavers, K. Kunkel, M. Wehner, W. Collins. 2016: Extreme Weather Pattern Detection Using Deep Convolutional Neural Network. Proceedings of the 6th International Workshop on Climate Informatics: CI 2016. NCAR Technical Note NCAR/TN-529+PROC, Sep 2016, 159 pp., doi:10.5065/D6K072N6.

104. Liu, Y. E. Racah, Prabhat, J. Correa, A. Khosrowshahi, D. Lavers, K. Kunkel, M. Wehner, and W. Collins, 2016: Application of Deep Convolutional Neural Networks for Detecting Extreme Weather in Climate Datasets. International Conference on Advances in Big Data Analytics July 25-28, 2016, Las Vegas, Nevada.

105. O'Brien, T.A., N.R. Cavanaugh, K. Kashinath, W.D. Collins, J.P. O'Brien, "A fast and objective multidimensional kernel density estimation method: fastKDE," 13th International Meeting on Statistical Climatology (IMSC), Canmore, Alberta, Canada, June 2016.

106. Pall, P., M. Duffy, M.F. Wehner, D.A. Stone, C.J. Paciorek, H. Krishnan, W.D. Collins, "On the uncertainty of generalized extreme value estimates of daily precipitation return values," 13th International Meeting on Statistical Climatology (IMSC), Canmore, Alberta, Canada, June 2016.

107. Pall, P, C.M. Patricola, M.F. Wehner, D.A. Stone, C.J. Paciorek, and W.D. Collins, 2017: Diagnosing Conditional Anthropogenic Contributions to Heavy Colorado Rainfall in September 2013. International Detection and Attribution Group (IDAG) meeting. March 14-16, 2017.

108. Feldman, D.R., W.D. Collins, S.C. Biraud, M.D. Risser, C.Kuo, J. Shortridge, D.D. Turner, P.J. Gero, S. Xie, E.J. Mlawer, M.J. Alvarado, T.R. Shippert, L.D. Riihimaki, D. Helmig, (2017) Measuring and Modeling the Radiative Forcing from Carbon Dioxide and Methane, Stanford, CA, 30 Jan. (Invited).

109. Feldman, D.R., Collins, W.D., C. Kuo, (2017) Measuring and Modeling the Radiative Forcing from Carbon Dioxide and Methane. Caltech GPS Seminar Series, Pasadena, CA, Jun. 20, 2017 (Invited).

110. Jones, A., S. Freidenreich, D. Paynter, D. Feldman, W.D. Collins, V. Ramaswamy, and R. Pincus, 2018: Errors in Absorbed SW Radiation and the Hydrological Cycle. Tri-MIP-Athlon at the University of Reading, June 14, 2018.

111. Mlynczak, M., T. Daniels, D. Kratz, D. Feldman, W. Collins, E. Mlawer, M. Alvarado, J. Lawler, L.W. Anderson, D. Fahey, L. Hunt, and J. Mast, 2018: The Spectroscopic Foundation of Radiative Forcing by Carbon Dioxide, Abstract F16.00001, March American Physical Society Meeting, Los Angeles, CA, March 5-9, 2018.

112. Johansen, H. W. Collins, J. Ferguson, and C. Jablonowski, 2017: Implications of 3D refinement in non-hydrostatic atmospheric flows, in session MS11a - Emerging methods for scalable atmosphere and ocean modelling, SciCADE 2017, International Conference on Scientific Computation and Differential Equations 2017, Bath, UK, September 11-15, 2017.

113. Langhans, W., J. Mueller, and W.D. Collins, 2018: Alternatives to the EDMF parameterization uncovered through parameter optimization, Naval Research Laboratory, Monterey, USA (invited), 2018.

114. Langhans, W., J. Mueller, and W.D. Collins, 2018: Alternatives to the EDMF parameterization uncovered through parameter optimization, California Institute of Technology, Pasadena, USA (invited), 2018.

115. Feldman, D.R., W.D. Collins, S. Freidenreich, P.J. Gero, D. Helmig, A. Jones, C. Kuo, E.J. Mlawer, N.H. Nguyen, D. Paynter, R. Pincus, M.D. Risser, M.S. Torn, D.D. Turner, and S. Xie, 2017: Using Observations and Comprehensive Calculations to Investigate Greenhouse Gas and Aerosol Radiative Forcing in Climate Models, Lawrence Livermore National Laboratory PCMDI Seminar, November 14, 2017 (Invited).

116. Feldman, D.R., W.D. Collins, S. Freidenreich, P.J. Gero, D. Helmig, A. Jones, C. Kuo, E.J. Mlawer, N.H. Nguyen, D. Paynter, R. Pincus, M.D. Risser, M.S. Torn, D.D. Turner, and S. Xie, 2018: Using Observations and Comprehensive Calculations to Investigate Greenhouse Gas and Aerosol Radiative Forcing in Climate Models, NASA Jet Propulsion Laboratory Climate Sciences Seminar, February 23, 2018 (Invited).

117. Collins, W.D., D. Feldman, C. Kuo, and N. Nguyen, 2018: Large Regional Shortwave Forcing by Anthropogenic Methane Enhanced by Clouds. Understanding and Modelling Atmospheric Process (UMAP), the 2nd pan-GASS conference sponsored by ARC Centre of Excellence for Climate System Science, Lorne, Victoria, Australia, Feb. 26 Mar. 2, 2018.

118. Collins, W.D., D. Feldman, C. Kuo, and N. Nguyen, 2018: Large Regional Shortwave Forcing by Anthropogenic Methane Informed by Jovian Observations. Abstract H46.00005, March American Physical Society Meeting, Los Angeles, CA, March 5–9, 2018.

119. Collins, W.D, and the CASCADE team, 2018: Emergent Extremes in the Downwelling Radiation at the Earth's Surface, 2018: Abstract 11025, Session CL2.01, European Geophysical Union General Assembly, Vienna, Austria, April 8-13, 2018.

120. Jones, A., S. Freidenreich, D. Paynter, D. Feldman, V. Ramaswamy, and W. Collins, 2018: Benchmark Global Shortwave Absorption Calculations Constrain Intermodel Spread in Aerosol Radiative Forcing and Hydrological Cycle Intensification, Abstract 10169, Session CL2.01, European Geophysical Union General Assembly, Vienna, Austria, April 8-13, 2018.

121. Feldman, D., A. Jones, D. Paynter, S. Freidenreich, W. Collins, 2018: Native Error Diagnostics Reveal Sources of Aerosol Radiative Forcing Error in Earth System Models, 2018:

Abstract Error in Earth System Models. Abstract, AOGS 15th Annual Meeting, Hawaii Convention Centre, Honolulu, HI, June. 3-8, 2018.

122. O'Brien, T.A., H. Inda-Diaz, K. Kashinath, and W.D. Collins, 2018: Convective Aggregation and the Intensity, Duration, Area, and Frequency of Precipitation, 8th GEWEX Open Science Conference: Extremes and Water on the Edge, Canmore, Canada, May 7-11, 2018.

123. O'Brien, T.A., J.P. O'Brien, M.D. Risser, C.M. Patricola, and W.D. Collins, 2018: A Weakening of Rainy Events in CA, International Detection and Attribution Group Workshop, Berkeley, CA, March 13-15, 2018.

124. Mahesh, A., T.A. O'Brien, Prabhat, W.D. Collins, and Y. Liu, 2018: Assessing Uncertainty in Deep Learning Techniques that Identify Atmospheric Rivers in Climate Simulations, 2nd ARTMIP Workshop, Gaithersburg, MD, April 23-24, 2018.

125. Mahesh, A., T.A. O'Brien, Prabhat, W.D. Collins, and Y. Liu, 2018: Assessing Uncertainty in Deep Learning Techniques that Identify Atmospheric Rivers in Climate Simulations, 2018 International Atmospheric Rivers Conference, La Jolla, CA, June 25-28, 2018.

126. Timmermans, B., W.D. Collins, T.A. O'Brien, and M.D. Risser, 2017: Parametric uncertainty in simulations of extreme weather events Statistical and Applied Mathematical Sciences Institute, Research Triangle Park, NC, July, 2017.

127. Timmermans, B., W.D. Collins, T.A. O'Brien, D. Stone, and M.D. Risser, 2018: Parameter uncertainty in simulations of extreme precipitation and attribution studies International Detection and Attribution Group Workshop, Berkeley, CA, March, 2018.

128. Jones, A., S. Freidenreich, D. Paynter, D. Feldman, W.D. Collins, V. Ramaswamy, and R. Pincus, 2018: Errors in Absorbed SW Radiation and the Hydrological Cycle. Tri-MIP-Athlon at the University of Reading, June 14, 2018.

129. Feldman, D.R., A. Jones, D. Paynter, S. Freidenreich, V. Ramaswamy, R. Pincus, and W.D. Collins, 2017: Rigorous and Comprehensive Greenhouse Gas and Aerosol Radiative Forcing Calculations for CMIP6, CFMIP Annual Meeting, September 25, 2017, Tokyo, Japan.

130. Feldman, D.R., S. Biraud, W. Collins, S. Freidenreich, P.J. Gero, A. Jones, D. Paynter, V. Ramaswamy, M. Risser, D. Turner, and S. Xie, 2019: A Critical Evaluation of Modeled Shortwave Radiative Forcing by Aerosols and Greenhouse Gases, NASA Ames Research Center Airborne Space Program Seminar, March 19, 2019.

131. Collins, W.D., V. Naik, and C. Kuo, 2019: Overview of Chapter 6. TriMipAthlon, Princeton University and the Geophysical Fluid Dynamics Laboratory (GFDL), Princeton, New Jersey, June 11, 2019.

132. Feldman, D., D. Paynter, A. Jones, S. Freidenreich, W. Collins, 2019: Details Matter: A High Level of Attention to Detail is Required for RFMIP-IRF-AER Error Diagnostics, Tri-MIP-Athlon, Princeton, NJ, June 13, 2019.

133. Feldman, D., W. Boos, R. Carroll, W. Collins, D. Gochis, S. Hubbard, R. Leung, T.A. O'Brien, K. Rasmussen, A. Rhoades, M. Skiles, P. Ullrich, K. Williams, 2018: Envisioning a Mountainous Surface Atmospheric Integrated field Laboratory (SAIL), Mountain Climate 2018, Rocky Mountain Biological Laboratory, CO., Sep. 17-21, 2018.

134. O'Brien, T., A. Mahesh, M. Risser, C. Paciorek, M. Wehner, C. Patricola, J. O'Brien, M. Prabhat, B. Loring, A. Elbashandy, and W. Collins, 2019: Uncertainty in the Detection of Weather Phenomena in Climate Datasets: A Critical Data Analysis Problem Requiring Novel Solutions. Data Analytics for Climate and Earth (DANCE) Conference, UCLA Lake Arrowhead Conference facility, Lake Arrowhead, CA., March 26-29, 2019.

135. Risser, M.D., C.J. Paciorek, M.F. Wehner, T.A. O'Brien, and W.D. Collins, 2018: Spatial statistics for improving collective estimates of extreme precipitation at weather stations. Joint Statistical Meetings, Vancouver, BC, Canada, August 2018.

136. Risser, M.D., C.J. Paciorek, T.A. O'Brien, M.F. Wehner, and W.D. Collins, 2019: Detected changes in precipitation extremes at their native scales derived from in situ measurements. International Meeting for Statistical Climatology, Toulouse, France. June 2019.

137. Patricola, C.M. I.N. Williams, J.P. O'Brien, M.D. Risser, A. Rhoades, T.A. O'Brien, P.A. Ullrich, D.A Stone and W.D. Collins, 2019: The Longitude of Tropical Pacific Deep Convection: A Perspective on ENSO Diversity and Implications for Western US Hydroclimate. Abstract GC24A-04, Fall AGU Meeting 9-13 December 2019, San Francisco, CA.

138. O'Brien, T.A., M.D. Risser, B. Loring, A. Elbashandy, C.J. Paciorek, A.B. Charn, H.A. Inda Diaz, A. Mahesh, J.P. O'Brien, C.M. Patricola, S. Arriaga-Ramirez, A. Rhoades, H. Krishnan, M.F. Wehner and W.D. Collins, 2019: The Importance of Uncertainty in the Detection of Weather Events: Probabilistic Detection of Atmospheric Rivers. Abstract A33K-3007, Fall AGU Meeting 9-13 December 2019, San Francisco, CA.

139. Risser, M.D., C.J. Paciorek, M.F. Wehner, T.A. O'Brien, C.M. Patricola and W.D. Collins, 2019: Historical Relationships Between Climate Forcings and Observed Extreme Precipitation. Abstract A42E-02, Fall AGU Meeting 9-13 December 2019, San Francisco, CA.

140. Fildier, B. and W.D. Collins, 2019: Could the Large-Scale Circulation Affect Extreme Rainfall? Comparison of Models with Parameterized Convection, Superparameterization and Cloud-Resolved Self-Aggregation. Abstract A53D-08, Fall AGU Meeting 9-13 December 2019, San Francisco, CA.

141. Prabhat, K. Kashinath, M.F. Wehner and W.D. Collins, 2019: Deep Learning for Extreme Weather Detection. Abstract GC33A-0, Fall AGU Meeting 9-13 December 2019, San Francisco, CA.

142. Risser, M.D., C.J. Paciorek, M.F. Wehner, T.A. O'Brien, and W.D. Collins, 2019: Detected changes in precipitation extremes at their native scales derived from in situ measurements. S01-O2: Session 1 Climate records: data homogenization, dataset creation, and uncertainty, 14th International Meeting on Statistical Climatology (IMSC), June 24-28, 2019, Toulouse, France.

143. O'Brien, T.A., M.D. Risser, A. Mahesh, C.J. Paciorek, C.M. Patricola, J,P. O'Brien, B. Loring, A. Elbashandy, H. Krishnan, M.F. Wehner, and W.D. Collins, 2019: Probabilistic Detection of Atmospheric Rivers. S07-P: Session 7 Statistical and machine learning in climate science, 14th International Meeting on Statistical Climatology (IMSC), June 24-28, 2019, Toulouse, France.

144. Timmermans, B., W.D. Collins, T.A. O'Brien, D, Stone, and M.D. Risser, 2019: Impact of parametric uncertainty on simulated climate extremes and attribution studies. S06-O: Session 6 Statistics for climate models, ensemble design, uncertainty quantification, model tuning, 14th International Meeting on Statistical Climatology (IMSC), June 24-28, 2019, Toulouse, France.

145. Collins, W.D., Prabhat, A. Mahesh, CASCADE SFA, The Gordon Bell Team, and NERSC Data and Analytics Services, 2019: Machine Learning for Climate Extremes: Training is Everything. 32nd NASA CERES Science Team Meeting, Oct. 29-31, 2019, Berkeley, CA.

146. Collins, W.D., and B. Fildier, 2019: Physical constraints and modeling uncertainties on the intensification of the global hydrologic cycle. Abstract IUGG19-1599, 27th General Assembly of the IUGG, July 10, 2019, M12b High-Impact Weather and Climate Extremes (IAMAS), Montreal, Canada.

147. Abel, A.J., A.J. Berliner, M. Mirkovic, W.D. Collins, A.P. Arkin, and D.S. Clark, 2019: Production capacity of solar cells on the Martian surface. International Conference on Environmental Systems (https://www.ices.space/), July 8-11, 2019, Boston, MA.

148. Abel, A.J., A.J. Berliner, M. Mirkovic, W.D. Collins, A.P. Arkin, and D.S. Clark, 2019: Solar cell production capacity on the Martian surface. The Ninth International Conference on Mars (https://www.hou.usra.edu/meetings/ninthmars2019/), July 22-25, 2019, Pasadena, CA.

149. Patricola, C.M., J.P. O'Brien, M.D. Risser, A.M. Rhoades, T.A. O'Brien, P.A. Ullrich, D.A. Stone, W. D. Collins. "Maximizing ENSO as a Source of Western US Hydroclimate Predictability." 3rd Atmospheric River Tracking Method Intercomparison Project (ARTMIP) Workshop, Lawrence Berkeley National Laboratory, Berkeley CA, Oct 2019.

150. Risser, M.D., M.F. Wehner.F., J.P. O'Brien, C.J. Paciorek, T.A. O'Brien, C.M. Patricola, and W.D. Collins, 2020: Historical relationships between climate forcings and observed extreme precipitation. Workshop on understanding intensification of short-duration rainfall extremes. Kavli Royal Society Centre, Buckinghamshire, England. (Invited poster)

151. Patricola, C.M., I.N. Williams, J.P. O'Brien, M.D. Risser, A.M. Rhoades, T. O'Brien, P. Ullrich, D. Stone,and W.D. Collins, 2020: The Longitude of Tropical Pacific Deep Convection: A Perspective on ENSO Diversity and Implications for Western U.S. Hydroclimate. Abstract 6B.4, 33rd Conference on Climate Variability and Change, 100th AMS Annual Meeting 12–16 January 2020 Boston, MA.

152. Mahesh, A., ClimateAI, T.A. O'Brien, K. Kashinath, M. Mudigonda, M. Prabhat, C.A. Shields, J.J. Rutz, L.R. Leung, A.E. Payne, F.M. Ralph, M. Wehner, and W.D. Collins, 2020: Using Deep Learning to Detect Atmospheric Rivers across Climate Datasets and Resolutions. Abstract 7B.2, 19th Conference on Artificial Intelligence for Environmental Science, 100th AMS Annual Meeting 12–16 January 2020 Boston, MA.

153. Timmermans, B. W.D. Collins, T.A. O'Brien, D.A. Stone, and M.D. Risser, 2020: Impact of parametric uncertainty in simulated climate extremes and attribution studies. EGU General Assembly, Online, May 6, 2020.

154. Risser, M.D., M.F. Wehner, J.P. O'Brien, C.J. Paciorek, T.A. O'Brien, C.M. Patricola, and W.D. Collins, 2020: Characterizing natural variability in observed extreme precipitation from the historical record. 2020 Meeting of the International ad hoc Detection and Attribution Group. Wellington, New Zealand.

155. Risser, M.D., C.J. Paciorek, T.A. O'Brien, M.F. Wehner, and W.D. Collins, 2020: Detected changes in precipitation extremes at their native scales derived from in situ measurements. Abstract 304128, Joint Statistical Meetings, Denver, CO.

156. Huanping Huang, C. M. Patricola, T. A. O'Brien, E. Bercos-Hickey, Y. Zhou, W. D. Collins, A. Rhoades, M. Risser, 2020: "Sources of subseasonal-to-seasonal predictability of atmospheric rivers and precipitation in the western United States", Abstract IARCS/051, IARC-Sponsored Symposium, 5-9 Oct., 2020.

157. Yang Zhou, T. A. OBrien, P. A. Ullrich, W. D. Collins, C. M. Patricola, and A. M. Rhoades, 2020: "Uncertainties in Atmospheric River Life Cycles by Detection Algorithms: Climatology and Variability", Abstract IARCS/017, IARC-Sponsored Symposium, 5-9 Oct., 2020.

158. Travis A. OBrien, Y. Zhou, C. A. Shields, A. E. Payne , J. J. Rutz, W. D. Collins, 2020: "Uncertainty in Current and Projected Atmospheric Rivers: A call for process-oriented constraints on AR detection", Abstract IARCS/086, IARC-Sponsored Symposium, 5-9 Oct., 2020.

159. Mahesh, A., T. A. O'Brien, A. Elbashandy, B. Guan, K. Kashinath, L. Ruby Leung, J. M. Lora, B. Loring, M. Mudigonda, Mr. Prabhat, and W. D. Collins, 2020: "Probabilistic Detection of Atmospheric Rivers Across Climate Datasets and Resolutions with Neural Networks", Abstract A199-02, American Geophysical Union Fall Meeting, 1-17 Dec. 2020.

160. Risser, M. D., M. F. Wehner, J. P. O'Brien, C. M. Patricola, T. A. O'Brien, W. D. Collins, C. J. Paciorek, and H. Huang, 2020: "High-Resolution Detection and Attribution for Extreme Precipitation over the Contiguous United States", Abstract A009-0010, American Geophysical Union Fall Meeting, 1-17 Dec. 2020.

161. Molter, E. M., W. D. Collins, and M. D. Risser, 2020: "Quantitative Precipitation Estimation of Extremes over the Continental United States with Radar Data", Abstract A042-0014, American Geophysical Union Fall Meeting, 1-17 Dec. 2020.

162. O'Brien, T. A., Y. Zhou, C. A. Shields, A. E. Payne, J. J. Rutz, and W. D. Collins, 2020: "Uncertainty in Current and Projected Atmospheric Rivers: A Call for Process-Oriented Constraints on AR Detection", Abstract A179-0005, American Geophysical Union Fall Meeting, 1-17 Dec. 2020.

163. Zhou, Y., T. A. O'Brien, P. A. Ullrich, W. D. Collins, C. M. Patricola and A. Rhoades, 2020: "Uncertainties in Atmospheric River Life Cycles by Detection Algorithms: Climatology and Variability", Abstract A179-0006, American Geophysical Union Fall Meeting, 1-17 Dec. 2020.

164. Huang, H., C. M. Patricola, T. A. O'Brien, E. Bercos-Hickey, Y. Zhou, W. D. Collins, A. Rhoades, and M. D. Risser, 2020: "Sources of Subseasonal-to-seasonal Predictability of Atmospheric Rivers and Precipitation in the Western United States", Abstract A179-0012, American Geophysical Union Fall Meeting, 1-17 Dec. 2020.

165. Molter, E. M., W. D. Collins, and M. D. Risser, 2021: "Quantitative Precipitation Estimation of Extremes over the Continental United States with Radar Data", Abstract 2A.1, Session 35 Hydro, American Meteorological Society 101st Annual Meeting, 10-15 Jan. 2021.

166. Risser, M.D., Collins, W.D., Wehner, M.F., OBrien, J.P., Paciorek, C.J., OBrien, T.A. (2021). A discussion on statistics and climate research. Monthly Seminar Series, EnviBayes section of International Society for Bayesian Analysis. Virtual. (Invited presentation)

167. Risser, M.D., Collins, W.D., Wehner, M.F., OBrien, J.P., Paciorek, C.J., OBrien, T.A., Patricola, C.M., Huang, H. (2021). Characterizing local statistics of extreme precipitation and their changes over time from in situ measurements. Modelling extreme rainfall and floods: sharing perspectives of extreme value theory and climate science, University of Melbourne, Melbourne, Australia. (Invited presentation)

168. Risser, M.D., Collins, W.D., Wehner, M.F., O'Brien, J.P., Paciorek, C.J., O'Brien, T.A., Patricola, C.M., Huang, H. (2021). A regional detection and attribution formula for historical precipitation over the United States. WCRP workshop on attribution of multiannual to decadal changes in the climate system, virtual.

169. Risser, Mark D., William D. Collins, Michael F. Wehner, J.P. O'Brien, Christopher J. Paciorek, Christina M. Patricola, Travis A. O'Brien, Huanping Huang, 2021: "A Method

for Detection and Attribution of Regional Precipitation Change Using Granger Causality," Climate / Statistics Journal Club, 5. Nov., 2021, UCLA, Los Angeles, CA.

170. Risser, Mark Daniel; Collins, William Drew; Wehner, Michael F.; O'Brien, Travis Allen; Paciorek, Christopher J.; O'Brien, John P; Patricola, Christina M.; Huang, Huanping; Ullrich, Paul Aaron; Loring, Burlen, 2021: "Detection and Attribution of Regional Precipitation Change with Granger Causality: Overcoming Limited Observations, Modeling Uncertainty, and Large Internal Variability," Abstract A12D-02, American Geophysical Union Fall Meeting, 13–17 Dec. 2021.

171. Szopa, Sophie; Naik, Vaishali; Adhikary, Bhupesh; Artaxo, Paulo; Berntsen, Terje; Collins, William Drew; Fuzzi, Sandro; Gallardo, Laura; Kiendler-Scharr, Astrid; Klimont, Zbigniew; Liao, Hong; Unger, Nadine; Zanis, Prodromos; Kuo, Chaincy, 2021: "Short-Lived Climate Forcers (Invited)," Abstract U13B-06, American Geophysical Union Fall Meeting, 13–17 Dec. 2021.

172. Collins, William Drew; Risser, Mark Daniel; Wehner, Michael F.; O'Brien, Travis Allen; Paciorek, Christopher J.; O'Brien, John P; Patricola, Christina M.; Huang, Huanping; Ullrich, Paul Aaron; Loring, Burlen, 2021: "Detection and Attribution of Regional Precipitation Change with Granger Causality: Approaches to Short- and Long-Lived Climate Forcers," Abstract A15H-1742, American Geophysical Union Fall Meeting, 13–17 Dec. 2021.

173. Diaz, Hector Alejandro Inda; O'Brien, Travis Allen; Zhou, Yang; Collins, William Drew, 2021: "Characterizing the size of Atmospheric Rivers using a perspective independent from the detection algorithm," Abstract A15H-1746, American Geophysical Union Fall Meeting, 13–17 Dec. 2021.

174. Zhou, Yang; O'Brien, Travis Allen; Collins, William Drew, 2021: "Contrasting Windy and Wet Atmospheric Rivers: Characteristics and Variability," Abstract A15H-1747, American Geophysical Union Fall Meeting, 13–17 Dec. 2021.

175. Huang, Huanping; Collins, William Drew, 2021: "The Influence of Ocean Coupling on Simulated and Projected Tropical Cyclone Precipitation in the HighResMIP–PRIMAVERA Simulations," Abstract A45K-2006, American Geophysical Union Fall Meeting, 13–17 Dec. 2021.

176. Molter, Edward Mischel; Collins, William Drew; Loring, Burlen; Ullrich, Paul Aaron, 2021: "A Storm-Resolving Data Set for Analysis of Precipitation at its Native Scale, Diagnosis of Cloud-Resolving Models, and Development of Next-Generation Parameterizations," Abstract A45Q-2082, American Geophysical Union Fall Meeting, 13–17 Dec. 2021.

177. Mahesh, Ankur; Collins, William Drew, 2021: "Constraining Future Projections of Atmospheric Rivers using Moist Static Energy Transport," Abstract A53G-04, American Geophysical Union Fall Meeting, 13–17 Dec. 2021.

178. Siirila-Woodburn, Erica; Rhoades, Alan; Hatchett, Benjamin; Huning, Laurie; Szinai, Julia; (Naomi) Tague, Christina; Nico, Peter; Feldman, Daniel; Jones, Andrew; Collins, William; Kaatz, Laurna, 2021: "Evidence of a low-to-no snow future and its impacts on water resources in the western United States," Abstract H52A-04, American Geophysical Union Fall Meeting, 13–17 Dec. 2021.

179. Mahesh, Ankur; Collins, William D.; O'Brien, Travis A., 2022: "Testing Neural Network Atmospheric River Detections Using Idealized Climate Simulations", Abstract 6A.3, Session 6A, 21st Conference on Artificial Intelligence for Environmental Science, American Meteorological Society 102nd Annual Meeting, Houston, Texas, 23–27 Jan. 2022.

180. Risser, Mark D.; Collins, William D.; Wehner, Michael F.; O'Brien, Travis A.; Paciorek, Christopher J.; O'Brien, John P.; Patricola, Christina M.; Huang, Huanping; Ullrich, Paul A.; and Loring, Burlen, 2022: "Detection and Attribution of Regional Precipitation Change with Granger Causality: Overcoming Limited Observations, Modeling Uncertainty, and Large Internal Variability", Abstract 13D.1, Session 13D, 35th Conference on Climate Variability and Change, American Meteorological Society 102nd Annual Meeting, Houston, Texas, 23–27 Jan. 2022.

181. Collins, William D.; Risser, Mark D.; Wehner, Michael F.; O'Brien, Travis A.; Paciorek, Christopher J.; O'Brien, John P.; Patricola, Christina M.; Huang, Huanping; Ullrich, Paul A.; and Loring, Burlen, 2022: "Detection and Attribution of Regional Precipitation Change with Granger Causality: Approaches to Short- and Long-Lived Climate Forcers", Abstract 13D.2, Session 13D, 35th Conference on Climate Variability and Change, American Meteorological Society 102nd Annual Meeting, Houston, Texas, 23–27 Jan. 2022.

182. Feldman, Daniel R., Allison Aiken, William Boos, Rosemary Carroll, William Collins, Jessie Creamean, Paul DeMott, Jiwen Fan, Alejandro Flores, David Gochis, Matt Kumjian, Mark Raleigh, Alan Rhoades, and Will Rudisill, 2022: "First Light from the Surface Atmosphere Integrated Field Laboratory and their Implications for Atmosphere-through-Bedrock Science in a mountainous watershed," 20th AMS Conference on Mountain Meteorology, 27 Jun. to 1 Jul., 2022, Park City, UT.

6.3 Invited Presentations

6.3.1 Departmental seminars

1. Collins, W.D., 1995: The interaction of convection and the greenhouse effect in the tropical climate. University of North Carolina, Mar. 24, 1995, Rayleigh, North Carolina.

2. Collins, W.D., 1997: A global signature of enhanced shortwave absorption by clouds. University of Colorado, May 2, 1997, Boulder, Colorado.

3. Collins, W.D., 1997: A global signature of enhanced shortwave absorption by clouds. University of Utrecht, Jun. 13, 1997, Utrecht, The Netherlands.

4. Collins, W.D., 1997: A global signature of enhanced shortwave absorption by clouds. Scripps Institution of Oceanography, Sep. 9, 1997, La Jolla, California.

5. Collins, W.D., 1997: A global signature of enhanced shortwave absorption by clouds. State University of New York, Oct. 22, 1997, Stony Brook, New York.

6. Collins, W.D., 1997: A global signature of enhanced shortwave absorption by clouds. Colorado State University, Nov. 20, 1997, Fort Collins, Colorado.

7. Collins, W.D., P.J. Rasch, and B.E. Eaton, 2000: Assimilation of atmospheric aerosol observations. University of Utrecht, Sep. 12, 2000, Utrecht, The Netherlands.

8. Collins, W.D., 2001: Modeling of aerosols with assimilation of satellite and surface aerosol observations. Geophysical Fluid Dynamics Laboratory, Princeton University, Apr. 5, 2001, Princeton, New Jersey.

9. Collins, W.D., 2002: Climate sensitivity to radiative effects of upper tropospheric water vapor. University of California, Los Angeles, May 8, 2002, Los Angeles, California.

10. Collins, W.D., 2002: Modeling aerosols with assimilation of observations. University of California, Los Angeles, May 10, 2002, Los Angeles, California.

11. Collins, W.D., 2002: Modeling aerosols with assimilation of observations. University of Miami, May 15, 2002, Miami, Florida.

12. Collins, W.D., 2002: Climate sensitivity to radiative effects of upper tropospheric water vapor. University of Miami, May 16, 2002, Miami, Florida.

13. Collins, W.D., 2002: Future prospects and challenges for global aerosol modeling. California Institute of Technology, Nov. 13, 2002, Pasadena, California.

14. Collins, W.D., 2002: Future prospects and challenges for global aerosol modeling. Stanford University, Nov. 19, 2002, Palo Alto, California.

15. Collins, W.D., 2003: Atmospheric response to natural and anthropogenic aerosols. Colorado State University, Mar. 27, 2003, Fort Collins, Colorado.

16. Collins W.D., A.J. Conley, and RTMIP coauthors, 2006: The range of climate forcing and response in global change projections: Problems and prospects for the next IPCC assessment. School of Earth and Environment, University of Leeds, Sep. 5, 2006, Leeds, UK.

17. Collins W.D., A.J. Conley, and RTMIP coauthors, 2006: The range of climate forcing and response in projections of global change: Problems and prospects for the next IPCC assessment. Sixth Atmospheric Sciences Symposium, Sep. 29, 2006, University of California, Berkeley, California.

18. Collins W.D., A.J. Conley, and RTMIP coauthors, 2006: Radiative Forcing by Greenhouse Gases and its Representation in Global Models. University of Wisconsin Department of Atmospheric and Oceanic Sciences, Nov. 6, 2006, Madison, Wisconsin.

19. Collins W.D., A.J. Conley, and RTMIP coauthors, 2006: Radiative Forcing by Greenhouse Gases and its Representation in Global Models. Oxford University Department of Physics, Nov. 13, 2006, Oxford, UK.

20. Collins W.D., A.J. Conley, and RTMIP coauthors, 2006: Radiative Forcing in Global Climate Models: Problems and Prospects. Harvard University, Nov. 16, 2006, Harvard, Massachusetts.

21. Collins, W.D., 2007: The roles of solar absorption in climate and climate change, Dept. of Earth and Planetary Science, University of California, Sep. 20, 2007, Berkeley, California.

22. Collins, W.D., 2007: The credibility of climate model predictions for future climate change, Dept. of Environmental Engineering, University of California, Sep. 28, 2007, Berkeley, California.

23. Collins, W.D., 2008: Constructive methods for climate forcing. Dept. of Mathematics, University of California, Feb. 6, 2008, Berkeley, California.

24. Collins, W.D., 2010: "On Climate Modeling." Physics Research Progress Meetings at LBNL, May 18, 2010, LBNL.

25. Collins, W.D., 2010: Computational Frontiers in Climate Change. Nov. 19, 2010, UC Berkeley Wireless Research Center, Berkeley, CA.

26. Collins, W.D., 2012. The Need for Scale Invariance in Climate Models. Math Department Seminar Series, 29 February, UC Berkeley, Berkeley, CA.

27. Collins, W.D., A. Thompson, J. Edmonds, T. Janetos, and P.E. Thornton, 2012: The Integrated Earth System Model (iESM): Development and Diagnostic Tests. Energy Modeling Forum, May 3, 2012, Stanford University, Stanford, CA.

28. Collins, W.D., D. Feldman, C. Kuo, and N. Nguyen, 2018: New Measurements and Modeling informed by Jovian Observations, Department of Geophysical Sciences, University of Chicago, April 13, 2018 (Invited).

29. Collins, W.D., D. Feldman, M. Mlynczak, and A. Jones, 2018: The Radiative Drivers of Climate Change: Known Knowns and Known Unknowns, University of California, Berkeley, ESPM Graduate Symposium, April 30, 2018. (Invited).

30. Collins, W.D., D.R. Feldman, M. Mlynczak, et al., 2018: The Radiative Drivers of Climate Change: Known Knowns and Known Unknowns. Atmospheric and Oceanic Sciences (ATOC) Distinguished lecture series, University of Colorado, Boulder, CO., Sep. 26, 2018.

31. Collins, W.D., D.R. Feldman, M. Mlynczak, et al., 2018: The Radiative Drivers of Climate Change: Known Knowns and Known Unknowns. University of California, Berkeley Physics Colloquium, Berkeley, CA., Oct. 15, 2018.

32. Collins, W.D., D.R. Feldman, M. Mlynczak, et al., 2018: The Radiative Drivers of Climate Change: Known Knowns and Known Unknowns. Sonoma State Department of Physics, Rohnert Park, CA., Feb. 27, 2019.

33. Collins, W.D., 2020: The Radiative Drivers of Climate Change: Known Knowns and Known Unknowns. Feb 5, 2020, Caltech, Pasadena, CA.

34. Collins, William D., 2021: "Machine learning for detection of climate extremes: New approaches to uncertainty quantification," Earth System Science Interdisciplinary Center (ESSIC) Seminar, 25 Jan 2021, U. Maryland, College Park, MD.

35. Collins, William D., 2021: "Granger causality framework for detection and attribution of changes in regional precipitation: Application to historical United States rainfall," Berkeley Atmospheric Sciences Center (BASC) Seminar, 25 Aug., 2021, UC Berkeley, Berkeley, CA.

36. Collins, William D., 2021: "IPCC AR6: Insiders' perspectives," Berkeley Atmospheric Sciences Center (BASC) Seminar, 8 Sep., 2021, UC Berkeley, Berkeley, CA.

37. Collins, William D., 2022: "Glimmers of Hope: Paths Forward on Climate Change," Department of Physics Robert Hofstadter Memorial Public Lecture, 11 Apr., 2022, Stanford University, Palo Alto, CA.

6.3.2 Colloquia

38. Collins, W.D., 1998: Statistics of Clouds. Conference on Statistics for Understanding the Atmosphere and Ocean, NCAR Geophysical Statistics Project, Jul. 18–24, 1998, Boulder, Colorado.

39. Collins, W.D., 1999: Unresolved issues in atmospheric solar absorption. Robert Cess Symposium, "Frontiers in the Science of Climate Modeling," University of California, San Diego, Oct. 19–21, 1999, San Diego, California.

40. Collins, W.D., 2004: Climate models: Principles and applications. NCAR ASP Summer Colloquium, "Climate and Health," Jul. 21–28, 2004, Boulder, Colorado.

41. Collins. W.D., 2006: An Introduction to CCSM. Art of Climate Modeling Advanced Study Program (ASP) workshop, Jun. 5, 2006, Boulder, Colorado.

42. Collins W.D., 2006: An Introduction to Climate Modeling. Climate Change and Human Health Advanced Study Program (ASP) workshop, Jul. 17, 2006, Boulder, Colorado.

43. Collins, W.D., 2008: "What is a Climate Model? And what can it do?" Summer School on Climate, Mathematical Sciences Research Institute (MSRI), July 25, 2008, Berkeley, California.

44. Collins, W.D., 2009: "The Science of Climate Change." Helios Solar Energy Research Center (SERC) Student Retreat, Aug. 10, 2009, Marconi Conference Center, Marshall, California.

45. Collins, W.D., 2011, Advancing Climate Science for a Sustainable Energy Future. Transatlantic Science Conference, 25–27 October 2011, David Brower Center, Berkeley, CA.

46. Collins, W.D., 2012, Understanding the interactions between Arctic ecosystems, microbial communities, and climate change: Prospects and Challenges, Peder Sather organizational meeting, October 24, University of California, Berkeley.

47. Collins, W.D., 2013: Water and climate – Projections of the IPCC AR5 Report. 2013. Philomathia Symposium on Water, Climate, and Society: Strategies in a Rapidly Changing World. 1 November, David Brower Center, Berkeley, California.

48. Collins, W.D., 2017: "Going Down the Up Escalator of Climate Change", Cal Future Lab Forum, University of California, Berkeley, May 12, 2017.

49. Collins. W.D. and A.D. Jones, 2018: Hyperion / CASCADE, Stanford/DOE Energy Modeling Forum, Snowmass CO., July 17-20, 2018.

50. Collins, W.D., 2019: Climate at the Crossroads: Choosing our Planet's Future. California Collaborative for Climate Change Solutions (C4S) meeting on Bending the Curve, Overarching Solutions for a Rapidly Warming California A Public-Private Brainstorm, Nov. 18, 2019, UC San Diego, San Diego, CA.

51. Collins, William D., 2021: "Key Messages of the 6th IPCC Assessment Report: The Physical Science Basis," in Climate Change: Global Perspectives on Carbon Neutrality for the U.S. and China, a joint colloquium by the UC Berkeley California-China Climate Institute and the Cheung Kong Graduate School of Business, 27 Aug., 2021.

52. Collins, William D., 2022: "Prospects for estimating Transient Climate Response to Greenhouse Gases using the Fluctuation Dissipation Theorem," Department of Physics Robert Hofstadter Memorial Colloquium, 12 Apr., 2022, Stanford University, Palo Alto, CA.

53. Collins, William D., 2022, "Prospects for physics-informed training," Aspen Global Change Institute on *Exploring the frontiers in Earth system modeling with machine learning and big data*, Aspen Center for Environmental Studies, Aspen, CO, 5–10 June 2022.

6.3.3 Corporate or public meetings

54. Collins, W.D., 2005: Future climate change. Scripps Howard Institute on the Environment, May 19, 2005, Boulder, Colorado.

55. Collins, W.D., 2007: Our Changing World: A Scientific Assessment, St. Andrews Academy, March 29, 2007, Jackson, Mississippi.

56. Collins, W.D., 2007: Global warming: A scientific assessment of our changing world, ex-Ls luncheon, Aug. 16, 2007, Berkeley, California.

57. Collins, W.D., 2007: An overview of climate models: Applications to climate change, Chevron Fellows METamorphosis Conference, Oct. 17, 2007, League City, Texas.

58. Collins, W.D., 2007: Reducing our carbon footprint: Frontiers in climate forecasting, Berkeley Lab series Science at the Theater, Oct. 22, 2007, Berkeley Repertory Theatre, Berkeley, California.

59. Collins, W.D., 2008: Climate change: Past, present, and future, East Bay Municipal Utility District Headquarters, Feb. 27, 2007, Oakland, California.

60. Collins, W.D., 2008: Climate change: Past, present, and future, Association of California Water Agencies (ACWA) Region 5 Program Financial Impacts of Climate Change Apr. 7, 2008, San Francisco, California.

61. Collins, W.D., 2008: Reducing our carbon footprint: Frontiers in climate forecasting, St. Stephens Episcopal Church, Apr. 8, 2008, Orinda, California.

62. Collins, W.D., 2010: Advancing Climate Science for a Sustainable Energy Future. Berkeley International Symposium on Energy and Climate Science (Philomathia), Oct. 1, 2010, Berkeley Repertory Theater, Berkeley, CA.

63. Collins, W.D., 2011: The Dawn of the Anthropocene: A Grand Challenge for Science, Society, and Education. California Institute for Biodiversity, 24 September, Oakland, CA.

64. Collins, W.D., 2014: Water and Climate – Projections of the IPCC AR5 Report. Operation Sierra Storm TV-Meteorologist Conference, 8–11 January, South Lake Tahoe, CA.

65. Collins. W.D. and A.D. Jones, 2019: Improving the decision-relevance of climate science for adaptation planning. UC Center Sacramento Speaker Series Panel, UC Center, Sacramento, CA., May 15, 2019.

66. Collins. W.D. and A.D. Jones, 2019: Improving the decision-relevance of climate science for adaptation planning. GSPP California Green Bond Market Development Committee Meeting, Faculty Club, University of California, Berkeley, June 4, 2019.

67. Collins, W.D., 2018: The Accelerator: A Joint Venture of UC Berkeley and Lawrence Berkeley National Laboratory. Plenary on Call to Action: Initiatives to Catalyze and Support Climate Action, University of California Science to Action Day Panel, Governor's Climate Summit, Exploratorium, San Francisco, CA., Sep. 6, 2018.

68. Collins, W.D, 2020: Climate Risks to Urban Infrastructure. Urban Land Institute (ULI) San Francisco: The Climate Challenge: Reality, Risks, and Real Estate, Feb. 13, 2020. Perkins Coie, San Francisco, CA.

6.3.4 Governmental organizations

69. Collins, W.D., 2000: Near-infrared/visible albedo ratio: Implications for climate. National Academy of Sciences Triana Review, Jan. 10, 2000, Washington, DC.

70. Collins, W.D., 2001: Aerosols, clouds, and the global environment: New techniques for modeling. National Science Foundation, May 11, 2001, Ballston, Maryland.

71. Collins, W.D., 2005: Simulations of global climate change commitment for the IPCC AR4. United Nations Framework Convention on Climate Change (UNFCCC) 22nd session of the subsidiary bodies, May 26, 2005, Bonn, Germany.

72. Collins, W.D., 2005: The Community Climate System Model. NRC Panel on Climate Variability and Change, Oct. 24–26, 2005, Washington, DC.

73. Collins, W.D., 2007: The Future Radiative Forcing of the Earth's Climate System. DOE Scientific Discovery through Advanced Computing (SciDAC), Jun. 24–28, 2007, Boston, Massachusetts.

74. Collins, W.D., 2007: The future of California's climate from a global perspective, Fourth CEC California Climate Change Conference, Sep. 11, 2007, Sacramento, California.

75. Collins, W.D., 2008: Radiation and clouds: Major challenges in forcings and feedbacks, Identifying Outstanding Grand Challenges in Climate Change Research: Guiding DOE's Strategic Planning, Mar. 25–27, 2008, Arlington, Virginia.

76. Collins, W.D., 2008: Extreme climate change: Scaling laws and scale invariance, ASCR workshop on Mathematics for Analysis of Petascale Data (MAPD), Jun. 3–5, 2008, Rockville, Maryland.

77. Collins, W.D, 2008: "Current state of climate change modeling," National Security and Climate Change Workshop, U.S. Climate Change Science Program Office, November 18, 2008, Washington, DC.

78. Collins, W.D., 2009: "Transformation of Climate Change Science: Challenges and Prospects." DOE Climate Change Science Focus Group, July 27–28, 2009, Washington DC.

79. Collins, W.D., 2010: "Climate Change." Visit of Environment Industry Study Group, Industrial College of the Armed Forces, National Defense University. April 7, 2010, LBNL.

80. Collins, W.D., 2010: "Abrupt climate change from methane hydrate destabilization." Distinguished lecture series, NSF, May 10, 2010, Arlington, VA.

81. Collins,W.D., 2012: Action on Climate, Environment, and Society (ACES). Bay Area Joint Policy Committee workshop "Preparing the Bay Area for a Changing Climate," 7 June, MTC/ABAG Metro Center, Oakland, CA.

82. Collins, W.D., 2014: Communicating Climate Science. DOE Office of Biological and Environmental Research (BER) Earth System Modeling (EaSM) Science Team Meeting, 27–29 January, USDA Conference and Training Center, Washington DC.

83. Collins, W.D., 2014: Projecting our Climate's Future. DOE Office of Biological and Environmental Research (BER) Brownbag Seminar Series, 29 January, Germantown, MD.

84. Collins, W.D. et al., 2019: Machine Learning for Climate Extremes: Training is Everything, NOAA Workshop on Leveraging AI in the Exploration of Satellite Earth Observations & Numerical Weather Prediction, National Center for Environmental Prediction, April 23-25, College Park, MD.

85. Collins, W.D., and B. Fildier, 2018: Physical constraints and modeling uncertainties on the intensification of the global hydrologic cycle. Joint BER Modeling Science Team Meeting, Bolger Center, Potomac, MD., Nov 5-8, 2018.

86. Collins, William D., 2022: Artificial Intelligence for Earth System Predictability (AI4ESP): Challenges and Opportunities, USA-Norway Artificial Intelligence: Joint Working Group Meeting 2022, Embassy of Norway, Washington, DC, June 2-3, 2022.

6.3.5 National/international research labs and centers

87. Collins, W.D., and V. Ramanathan, 1991: Thermodynamic regulation of ocean warming by cirrus clouds during the 1987 El Niño. NASA Langley Research Center, Apr. 26, 1991, Hampton, Virginia.

88. Collins, W.D., 1991: Analysis of satellite data for global climate studies. Los Alamos National Laboratory, Dec. 3, 1991, Los Alamos, New Mexico.

89. Collins, W.D., 1998: A global signature of enhanced shortwave absorption by clouds. Seventeenth CERES Science Team Meeting, NASA Langley Research Center, Apr. 21–23, 1998, Hampton, Virginia.

90. Collins, W.D., 1999: Effects of enhanced shortwave absorption on simulations of the tropical Pacific climate system. NASA Goddard Space Flight Center, May 25, 1999, Greenbelt, Maryland.

91. Collins, W.D., 2001: Aerosol assimilation in a GCM. Twenty-third CERES Science Team Meeting, NASA Langley Research Center, Jan. 23–25, 2001, Hampton, Virginia.

92. Collins, W.D., 2001: Modeling aerosols with assimilation of observations. NASA Goddard Space Flight Center, Nov. 28, 2001, Greenbelt, Maryland.

93. Collins, W.D., 2002: Water vapor, clouds, and the Earth radiant energy balance. Goddard Space Flight Center Graduate Student Summer Program, June 11, 2002, Greenbelt, Maryland.

94. Collins, W.D., 2004: The Community Climate System Model. U.S. GLOBEC SSC Meeting, Nov. 4–5, 2004, Boulder, Colorado.

95. Collins, W.D., 2006: Challenges and Prospects for Earth System Modeling. Lawrence Berkeley National Laboratory, Oct. 12, 2006, Berkeley, California.

96. Collins, W.D., 2007: Where do we go from here? Mathematical Science Research Institute Symposium on Climate Change: From Global Models to Local Action, Apr. 12–13, 2007, Berkeley, California.

97. Collins W.D., 2007: The computational frontiers of Earth system modeling. Town hall meeting, Department of Energy's Simulation and Modeling at the Exascale for Energy, Ecological Sustainability, and Global Security (E3SGS), Apr. 17–18, 2007, Berkeley, California.

98. Collins, W.D., 2007: The Future of the Earth's Climate: Frontiers in Forecasting. Lawrence Berkeley Laboratory Summer Lecture Series, July 11, 2007, Berkeley, California.

99. Collins, W.D., 2008: Earth system simulation for climate change: Challenges and prospects, NASA Ames Research Center GREEN Seminar, Apr. 17, 2007, Moffett Field, California.

100. Collins, W.D., A. Conley, D. Fillmore, and P. Rasch, 2009: "The role of solar absorption in climate and climate change," Pacific Northwest National Laboratory, June 8, 2009, Richland, Washington.

101. Collins, W.D., 2009: "Radiative Processes." Community Atmosphere Tutorial, July 29, 2009, NCAR, Boulder, Colorado.

102. Collins, W.D., D. Rosa, and Wei-Chun Hsieh, 2011: Chemical Transport in the Multi-scale Modeling Framework: Tests and Implications for Climate. Center for Multiscale Modeling of Atmospheric Processes Meeting, Jan. 11–13, 2011, UC Berkeley, Berkeley, CA.

103. Collins, W.D, D. Feldman, C. Algieri, J. Ong, Y. Roberts, and P. Pilewskie, 2011: The future evolution of the Earth's reflected shortwave spectrum. May 4, 2011, Jet Propulsion Laboratory, Pasadena, CA.

104. Collins, W.D, 2011: Adding Integrated Assessments to the Community Earth System Model: Progress and prospects. Societal Dimensions of Earth System Modeling, May 25, 2011, NCAR, Boulder, CO.

105. Collins, W.D., 2011: A future with(out) climate mitigation. EPA-LBNL workshop on CO_2 Geological sequestration and water resources, June 1, Berkeley, CA.

106. Collins, W.D, etc. 2011: Quantifying Uncertainty in Climate and Integrated Assessments. CESM annual meeting, June 21–23, Breckenridge, Colorado.

107. Collins, W.D., 2011: Aerosol Particles: The Big Picture. International Cooperative in Aerosol Prediction Workshop on Aerosol Emission and Removal Processes and Satellite Data for Aerosol Prediction. ESA/ESRIN, Frascati, 14–17 May.

108. Collins, W.D., 2012: Cross-cutting Uncertainty Quantification Research towards Climate Science for a Sustainable Energy Future. First Annual CESM Uncertainty Quantification and Analysis Interest Group Meeting, 30–31 January 2012, National Center for Atmospheric Research, Boulder, CO.

109. Cameron-Smith, P.C.S., and W.D. Collins, 2012: Update on plans for global CESM methane simulations. Land Model Working Group meeting, 29 February 2012, National Center for Atmospheric Research, Boulder, CO.

110. Collins, W.D., 2012: Multiscale methods for enabling scale-aware capability in CESM. 17th Annual CESM Workshop, 18–12 June 2012, Breckenridge, CO.

111. Collins, W.D., 2012: Earth System Models and Uncertainty, IMAGe Topic of the Year (TOY) – Uncertainty in Climate Change Research: An Integrated Approach, August 13, NCAR, Boulder, Colorado.

112. Collins, W.D., D.R. Feldman, C. Algieri, J. Ong, Y. Roberts, and P. Pilewskie, 2013: Early detection of critical climate feedbacks from hyperspectral observations, May 16, NASA GSFC, Greenbelt, MD.

113. Collins, W.D., 2014: Modeling the Changing Earth System: Prospects and Challenges. National Energy Research Supercomputing Center (NERSC) 2014 User Group, 40th Anniversary Workshop, 3–6 February, Berkeley, CA.

114. Collins, W.D., and D.R Feldman, 2014: Trends in Climate Modeling. NASA Langley Research Center, 27–28 May, Hampton, VA.

115. Collins, W.D., D.R. Feldman, M.S. Torn, and J. Gero, 2014: Observational determination of climate forcing by carbon dioxide. Invited presentation, All-hands meeting of the Center for Gas Separation, Claremont Hotel, Berkeley, 4 December.

116. Collins, W.D., D.R. Feldman, and C. Kuo, 2017: "Shortwave Methane Climate Forcing: Big Enough to Matter?", Geophysical Fluid Dynamics Laboratory (GFDL), Princeton, New Jersey, Mar. 1-3, 2017.

117. Collins. W.D., D. Feldman, M. Mlynczak, and A. Jones, 2018: The Radiative Drivers of Climate Change: Known Knowns and Known Unknowns, Stanford Linear Accelerator Center, Palo Alto, CA, April 4, 2018.

118. Collins, W.D., D.R. Feldman, M. Mlynczak, et al., 2018: The Radiative Drivers of Climate Change: Known Knowns and Known Unknowns. National Center for Atmospheric Research, Boulder, CO., Sep. 25, 2018.

119. Collins, W.D., 2019: Climate at the Crossroads: Choosing our Planet's Future. Deutsches Elektronen-Synchrotron (DESY) Science Day, Oct. 16, 2019, Hamburg, Germany.

120. Collins, W.D., Mark D. Risser, Ankur Mahesh, Chris J. Paciorek, Christina M. Patricola, John P. OBrien, Burlen Loring, Abdelrahman Elbashandy, Harinarayan Krishnan, and Michael F. Wehner, Machine learning for detection of climate extremes: New approaches to uncertainty quantification, Session 19: AI/ML for Environmental Data, Image, and Signal Processing, Part 2, The 2nd NOAA Workshop on Leveraging AI in Environmental Sciences, 12. Nov. 2020.

121. Collins, William D., 2021, "Fundamental Scientific Challenges Posed by Negative Emissions Technologies,", Session 1A, Outlook and Technologies for Green Energy, Molecular Foundry Annual User Meeting, 10-20 Aug., 2021, LBNL, Berkeley, CA.

6.3.6 National/international society conferences

122. Collins, W.D., and P.J. Rasch, 2000: Assimilation of atmospheric aerosol observations. 2000 Spring Meeting, American Geophysical Union. *Eos. Trans. AGU*, **81** (no. 19), p. S98.

123. Collins, W.D., 2000: Sources of uncertainty in climate-change simulations from coupled climate models. 2000 Fall Meeting, American Geophysical Union. *Eos. Trans. AGU*, **81** (no. 48), p. F21.

124. Collins, W.D., 2003: Radiative balance of the Earth's atmosphere. AAAS Annual Meeting, Feb. 13–18, 2003, Denver, Colorado.

125. Collins, W.D, 2003: Effects of aerosols on regional and global climate. EGS-AGU-EUG General Assembly. *EGS Newsletter*, p. 526.

126. Collins W.D., A.J. Conley, D.W. Fillmore, and P.J. Rasch, 2004: Regional and global response of the climate to aerosol radiative forcing. International Radiation Symposium 2004, "Current Problems in Atmospheric Radiation," Aug. 23–28, 2004, Busan, South Korea.

127. Collins, W.D., W.M. Washington, and G.A. Meehl, 2004: Effects of aerosols on the climate and ecosystem of northern Eurasia: Results from global models. 2004 Fall Meeting, American Geophysical Union, *Eos Trans. AGU*, 85(47), Fall Meet. Suppl., abstract A24C-06.

128. Collins, W.D. V. Ramaswamy, Q. Fu, M.D. Schwarzkopf, and D.W. Fillmore, 2005: Radiative forcing by well-mixed greenhouse gases: Estimates from GCMs in the IPCC AR4. *Sixteenth Conference on Climate Variability and Change*, 85th Annual AMS Meeting, Jan. 10–13, 2005, San Diego, California (American Meteorological Society, Boston), abstract 6.4.

129. Collins, W.D., 2005: Prospects for an Earth system model to study global climate change. American Physical Society March Meeting, Mar. 21–25, 2005, Los Angeles, California.

130. Collins, W.D., 2005: Radiative Forcing by Well-Mixed Greenhouse Gases: Comparison of IPCC Models. International Association of Meteorology and Atmospheric Sciences (IAMAS) 2005 Conference, Aug. 8, 2005, Beijing, China.

131. Collins, W.D. and D.W. Fillmore, 2005: An aerosol analysis using NASA Aqua and Terra satellite observations. American Association for Aerosol Research (AAAR) 2005 annual conference, Oct. 17–21, 2005, Austin, Texas.

132. Collins, W.D., 2007: The role of climate benchmark records in climate-change attribution and projection, 2007 Fall Meeting, American Geophysical Union, *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., abstract A54D-02.

133. Collins, W.D., 2007: The role of climate benchmark records in climate-change attribution and projection, 2007 Fall Meeting, American Geophysical Union, Eos Trans. AGU, 88(52), Fall Meet. Suppl., abstract A54D-02.

134. Collins, W.D., 2008: Scaling laws, scale invariance, and climate prediction, talk 1035-60-1976, SIAM Minisymposium, Joint Mathematics Meeting, Jan. 7, 2008, San Diego, California.

135. Collins, W.D., 2008: Computational Challenges for Dynamic Earth System Models, Symposium 180-071: Transforming Our Ability To Predict Climate Change and Its Effects, American Association for the Advancement of Science Annual Meeting, Feb. 16, 2008, Boston, Massachusetts.

136. Collins, W.D., V. Ramaswamy, A. Conley, and M. Iacono, 2008: "The significance of shortwave methane forcing for climate change," Session GC13, "Regional-Scale Forcing of Climate," Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract GC23A-0740.

137. Collins, W., 2011: Uncertainty across the CMIP5 ensemble of climate projections: Connecting cause and effect, Abstract GC13D-01, presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5–9 Dec.

138. Collins, W., M. Anitescu, D.C. Bader, B. Debusschere, J. Gattiker, P. Hovland, G. Johannesson, G. Lin, D. Lucas, H. Najm, Y. Qian, and L. Swiler, 2012: The Role of Uncertainty Quantification in Climate Science for a Sustainable Energy Future, Abstract GC32A-01, presented at 2012 Fall Meeting, AGU, San Francisco, CA.

139. Collins, W., J.A. Edmonds, P.E. Thornton, A. Craig, G.C. Hurtt, A.C. Janetos, A. Jones, C.D. Koven, W.J. Riley, and J. Truesdale, 2012: Prospects for projecting the impact of Earth system processes on Integrated Assessment, Abstract A54A-08, presented at 2012 Fall Meeting, AGU, San Francisco, CA.

140. Collins, W.D., 2012: Computing and climate: The Road Ahead. DOE Computing Townhall, Session TH38, AGU Fall 2012 Meeting, San Francisco, CA.

141. Collins, W.D., 2013: The integrated Earth System Model: A Next-Generation Tool for Exploring Energy-Climate Interactions. DOE IA Townhall, 93rd AMS Annual Meeting, 6–10 January, Austin, Texas.

142. Collins, W.D., 2013: Multi-scale Behaviors of the Water Cycle, DOE Water Workshop Townhall, 93rd AMS Annual Meeting, 6–10 January, Austin, Texas.

143. Collins, W.D., 2013: Climate modeling from first principles: Feasibility and prospects. APS March Meeting, Abstract N4.00005, 20 March, Baltimore, Maryland.

144. Collins, W., H. Johansen, P. McCorquodale, P. Colella, and P.A. Ullrich, 2013: Nonhydrostatic adaptive mesh dynamics for multiscale climate models, Abstract A31H-03 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

145. Collins, W., K. Chowdhary, B. Debusschere, and D. Lucas, 2013: The Central Role of Uncertainty Quantification in Multiscale Earth System Models, Abstract GC34C-02 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9–13 December.

146. Collins, W., D. A Harder Rain is Going to Fall, 2014: Challenges for Actionable Projections of Extremes, Abstract GC32A-06 presented at the 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

147. Collins, W.D., 2015: Progress Towards Projecting Climate Change at Storm Scales. Invited talk, Session on "Imaging Earth," 181st AAAS Meeting, San Jose, 12-16 February.

148. Collins, W.D., D. Feldman, J. Gero, M. Torn, E. Mlawer, T. Shippert, 2015: Observational Determination of Surface Radiative Forcing by the Major Anthropogenic Greenhouse Gases. Invited talk, abstract IUGG-1830, Session M16 Radiation in the Climate System, 26th International Union of Geodesy and Geophysics (IUGG), Prague, Czech Republic, 22 June – 2 July.

149. Collins, W.D., D.R. Feldman, and C. Kuo, 2017: "First Global Estimates of Anthropogenic Shortwave Forcing by Methane," European Geophysical Union Congress, Vienna, Austria, Invited abstract EGU2017-3948, Session CL2.04, Apr. 23-27, 2017.

150. Collins, W.D., M. Wehner, Prabhat, T. Kurth, N. Satish, I. Mitliagkas, J. Zhang, E. Racah, M. Patwary, N. Sundaram, and P. Dubey, 2017: Deep Learning 15 Petaflops/second: Semi-supervised pattern detection for 15 Terabytes of climate data. Abstract NG42A-02, Fall 2017 Meeting of the American Geophysical Union, New Orleans, LA, Dec. 11-15, 2017.

151. Collins, W.D., W. Collins, J. Baird, K. Kashinash, K. Kunke, Y. Liu, T. O'Brien, C. Pal, Prabhat, E. Racah, and M. Wehner, 2018: Deep Learning for Detecting Extreme Weather and Climate Patterns. Abstract TJ17.1, American Meteorological 97th Annual Meeting, Seattle, WA, Jan. 22-26, 2018.

152. Collins, W.D, 2019: Revealing the Radiative Forcing by Well-Mixed Greenhouse Gases: From Derivation and Detection to Future Discoveries. Tyndall History of Global Environmental Change Lecture, Abstract GC34E-01, Fall AGU Meeting 9-13 December 2019, San Francisco, CA.

153. Collins, William D., 2022: "Survey of the IPCC consensus," Special public session honoring this years Nobel Prize in Physics recipients, APS March Meeting, 13-18 Mar., 2022, Chicago, IL.

154. Collins, William D., 2022, "The Path to the next IPCC Assessment: Known Knowns and Known Unknowns," Abstract: A10.00001, APS March Meeting, 13-18 Mar., 2022, Chicago, IL.

6.3.7 National/international workshops

155. Collins, W.D., 1993: Satellite data for diagnostics and for validation of model simulations. *Proceedings of the EUCREX/NOCLIMP Workshop, 24–26 May, 1993* (Department of Meteorology Report, Stockholm University), pp. 19–28.

156. Collins, W.D., 1998: Effects of enhanced shortwave absorption on simulations of the tropical Pacific Ocean/atmosphere system. GCSS-WGNE *Workshop on Cloud Processes and Cloud Feedbacks in Large-Scale Models* (World Climate Research Program, Geneva), WCRP-110, WMO/TD-No. 993, Nov. 9–13, 1998, ECMWF, Reading, England.

157. Collins, W.D., 2003: Aerosols: What are the links with climate and how well are we modeling them? NCAR Chemistry-Climate Interactions Workshop, Feb. 10–12, 2003, Santa Fe, New Mexico.

158. Collins, W.D., 2003: Understanding the role of aerosols in climate through synthesis of models and observations. Gordon Conference on Solar Radiation and Climate, Colby-Sawyer College, Jul. 13–18, 2003, New London, Connecticut.

159. Collins, W.D., 2003: The Community Climate System Model. Keynote address, Computing in the Atmospheric Sciences Workshop 2003 (CAS2K3), Sep. 8, 2003, Annecy, France.

160. Collins, W.D., V. Ramaswamy, Q. Fu, M.D. Schwarzkopf, Y. Sun, R. Portmann, and D.W. Fillmore, 2005: Radiative forcing by well-mixed greenhouse gases: Estimates from GCMs in the IPCC AR4. Atmospheric Radiation Measurement Meeting, Mar. 15–16, 2005, Daytona Beach, Florida.

161. Collins, W.D., 2005: Issues of upscaling and downscaling research – A GCM perspective. WRF-RCM Workshop, Mar. 22–23, 2005, Boulder, Colorado.

162. Collins, W.D., 2005: Status of CCSM. Computing in the Atmospheric Sciences Workshop 2005 (CAS2K5), Sep. 11–14, 2005, Annecy, France.

163. Collins, W.D., 2006: Regional effects of aerosol emissions. Conference on Climate Change and Urban Areas. Apr. 3–4, 2006, University College London, London, United Kingdom.

164. Collins, W., and J. Wolfe, 2006: The Community Climate System Model CCSM3. Geoscience Application Requirements for Petascale Architectures (GARPA) workshop, Jun. 1–2, 2006, Arlington, Virginia.

165. Collins, W.D., 2006: Modeling the Changing Earth System: Prospects and Challenges. IBM System Scientific Computing User Group meeting SCICOMP-12, Jul. 17, 2006, Boulder, Colorado.

166. Collins W.D., A.J. Conley, and RTMIP coauthors, 2006: Radiative Forcing by Greenhouse Gases and its Representation in Global Models. 2006 Solar Radiation and Climate Experiment (SORCE) Science Meeting, Sep. 20–22, 2006, Eastsound, Washington.

167. Collins, W.D., 2007: Radiation errors in climate models. 3rd WGNE Workshop on Systematic Errors in Climate and NWP Models, Feb. 12–16, 2007, San Francisco, California.

168. Collins, W.D., 2007: CLARREO: A climate model prediction perspective, University of Maryland, Jul. 16, 2007, College Park, Maryland.

169. Collins, W.D., 2008: Collaboration in climate research: The age of assessments, Berkeley Conference on Climate Research Management, Apr. 24, 2008, Berkeley, California

170. Collins, W.D., 2008: "What is a climate model? And what can it do?" Amphibia Tree (ATree) Species Distribution Modeling Workshop, University of California, Berkeley, December 5, 2008, Berkeley, California.

171. Collins, W.D., 2008: Computational challenges for dynamic Earth system models, The International Supercomputing Conference, Jun. 18, 2008, Dresden, Germany.

172. Collins, W.D., 2008: "Abrupt and Extreme Climate Change: Implications for Water," XVII International Conference on Computational Methods in Water Resources (CMWR 2008), July 6–10, 2008, San Francisco, California.

173. Collins, W.D, V. Ramaswamy, A. Conley, and M. Iacono, 2009: "The significance of shortwave methane forcing for climate change," Joint IPCC-WCRP-IGBP Workshop: New Science Directions and Activities Relevant to the IPCC AR5, March 4, 2009, University of Hawaii, Honolulu, Hawaii.

174. Collins, W.D., and D. Bader, 2009: "Exascale applications in climate science," 2009 U.S. / Japan Climate Change and Sustainability Workshop, March 17, 2009, Oak Ridge, Tennessee.

175. Collins, W.D., 2010: "Abrupt Climate Change from Methane Hydrate Destabilization," Current Challenges in Computing 2010: Climate Modeling, Aug. 31, 2010, The Meritage Resort and Spa, Napa California.

176. Collins, W., J. Edmonds, A. Janetos, A. Jones, A. Thompson, and P. Thornton, 2012: Land use, water, and carbon in the integrated Earth System Model (iESM). Energy Modeling Forum, 23 July, Snow Mass, Colorado.

177. Collins, W., 2012: Aerosol Particles: The Big Picture. Energy Modeling Forum, 23 July, Snow Mass, Colorado.

178. Collins, W.D., 2012: Opportunities for Simulating Cloud-Aerosol-Radiation Interactions in the Era of Cloud-system-scale Modeling, Global Atmospheric System Studies (GASS) Meeting, 13 September, NCAR, Boulder, Colorado.

179. Collins, W.D., 2012: Linking IAMs to Earth System Models: Lessons from Historical Aerosols in CMIP5, Integrated Assessment Modeling Consortium (IAMC) meeting, November, Utrecht, the Netherlands.

180. Collins, W.D., 2013: "Long-Term (Decadal and Beyond) Climate Simulation and Projection," CIMMS 2nd US-China Symposium on Meteorology, Qingdao, 25–27 June.

181. Collins, W.D., J. Edmonds, G. Hurtt, and the iESM Team, 2013: Interactions of IAMs, ESMs, and EMICs. Aspen Global Change Institute, 8–13 August, Aspen, CO.

182. Collins, W.D, J. Edmonds, P.E. Thornton, A. Thompson, and the iESM Team, 2013: The integrated Earth System Model (iESM). Fourth Annual Global Change Assessment Model (GCAM) Community Modeling Meeting, 2–4 October, College Park, MD.

183. Collins, W., P. Caldwell, B. Debusschere, S. Ghan, D. Lucas, L. Oliker, T. Ringler, and C. Woodward, 2013: Multiscale methods for enabling scale-aware capability in Earth System Models. Institute for High-Performance Computational Science with Structured Meshes and Particles (HPCS-SMP) Workshop, 14–16 October, University of Berkeley, Berkeley, CA.

184. Collins, W.D., 2014: Aerosol and radiation: CMIP6 model evaluation needs. Observations for Climate Model Intercomparisons (OBS4MIPs) workshop, 29 April to 1 May, NASA Headquarters, Washington DC.

185. Collins, W.D., J. Edmonds, P. Thornton, G. Hurtt, and the iESM Team, 2014: The integrated Earth System Model (iESM). Invited presentation, Combined JGCRI Integrated Assessment Technical Workshop and GCAM Community Modeling Meeting, College Park, Maryland, 20-23 October.

186. Collins, W.D., P. McCorquodale, P. Colella, P. Ullrich, J. Ferguson, and C. Jablonowski, 2014: Advances in Climate Modeling at Extreme Scales. Invited presentation, International Workshop on Co-Design. Guangzhou, China, 6-8 November.

187. Collins, W.D., K. Evans, H. Johansen, C. Woodward, and P. Caldwell, 2015: Progress in Fast, Accurate Multi-scale Climate Simulations. Abstract 141, Keynote Presentation, Session on Numerical and computational developments to advance multi-scale Earth System Models (MSESM), International Conference on Computational Science, Reykjavik University, Reykjavik, Iceland, 1-3 June.

188. Collins, W.D., 2016: "Climate Simulation at Impactful Scales: Charge for a New Physics Paradigm," AXICCS Conference, Rockville, MD. , Sept. 11-13, 2016.

189. Collins, W.D., K. Calvin, A.D. Jones, J. Edmonds, and the iESM Team, 2016: "Coupling for ESM: The integrated Earth System Model (iESM)," Energy Modeling Forum, Snowmass XXII Energy Modeling Forum Workshop, Snowmass, CO., July. 24-29, 2016.

190. Collins, W.D., 2017: Aerosols and Cloud Interactions. Aspen Global Change Institute on Earth System Model Evaluation to Improve Process Understanding, Aspen, CO, Jul. 30 – Aug. 4, 2017.

191. Collins, W.D., 2019: Forcing by Greenhouse Gases in Earth System Models: Minding the Gap Between Process and Parameterization. Gordon Research Conference on Radiation and Climate, "Bridging Spatial and Temporal Scales in Radiation and Climate," July 21-26, 2019, Bates College, Lewiston, ME.

AWARDS:

7 Academic Recognition

- Contributor (lead author) for the Fourth Assessment Report by the Intergovernmental Panel on Climate Change, co-recipient of the 2007 Nobel Peace Prize.
- NASA Group Achievement Award to the CLARREO Mission Concept Team, 2012.
- Lawrence Award for best Earth science paper at NASA Langley for CLARREO mission paper in the Bulletin of the American Meteorological Society (BAMS), 2014.
- U.S. Department of Energy Secretary's Achievement Award, for launch of the ACME Project, awarded on May 7, 2015.
- NASA Langley Reid Award for best scientific or technical paper, 2015.
- Fellow of the American Association for the Advancement of Science (AAAS), 2015 – present.
- Fellow of the American Physical Society, 2017 – present.
- James and Katherine Lau Chair in Sustainability, University of California, Berkeley, 2018 – 2020.
- American Geophysical Union's Tyndall History of Global Environmental Change Lecturer, 2019.
- Fellow of American Geophysical Union, 2020 – present.
- Named a Five Sigma Physicist Awardee by the American Physical Society, 2022.
- Election to Full Membership of Sigma Xi, 2022 – present.

PROFESSIONAL ACTIVITIES, TEACHING, AND SERVICE:

8 Service Activities (last 15 years)

8.1 National and international assessment activities

- Lead and collaborating author, IPCC Working Group I Fourth Assessment Report, 2004–2007.
- Expert reviewer, IPCC Working Group I Fourth Assessment Report, 2005–2006.
- Lead author, IPCC Working Group I, Fifth Assessment Report, 2010–2013.
- Lead participant, discussion of IPCC Radiative Forcing Model Intercomparison Project (RFMIP), Max Planck Institute for Meteorology, Hamburg, Germany, September 3-5, 2014.
- Champion for IPCC WG1 Chapter 7 on Energy Budget, Radiative Forcing, and Climate Sensitivity for AR6 at request of WG1 Bureau.

- Participation in RFMIP contributing to the IPCC Coupled Model Intercomparison Project CMIP6.
- Development of partnership with the Aerosol Chemistry Model Intercomparison Project (AeroChemMIP) for CMIP6 at the Fall AEROCOM STM, Steamboat Springs, Colorado, October 2, 2014.
- Invited participant, IPCC 6th Assessment Scoping Meeting, UN ECA, Addis Ababa, Ethiopia, Apr. 28 – May 6, 2017.
- Invited participant, IPCC Expert Meeting on Short-Lived Climate Forcers, World Meteorological Organization, Geneva, Switzerland, May 28-31, 2018.
- Coordinating Lead Author (CLA) for Chapter 6 on Short-Lived Climate Forcers for the Intergovernmental Panel on Climate Change (IPCC) 6th Assessment Report (AR6) for Working Group I on "The Physical Science Basis," 2018–2021.

8.2 Institutional advisory/committee activities

- Chair, NCAR CCSM Scientific Steering Committee, 2003 – 2005.
- Member, NCAR's Computational and Information Systems Laboratory Advisory Panel, 2005 – 2011.
- Member, CCSM Scientific Steering Committee, 2006 – 2013.
- Member, search committee for NCAR Atmospheric Chemistry Division Director, 2006 – 2007.
- Member, Selection committee, NCAR Advanced Study Program Early Career Scientists, 2006 – 2007.
- Member, LBNL Earth Sciences Division Council, LBNL, 2007 – 2015.
- Alternate Chancellor's faculty seat, Chancellor's Advisory Committee on Sustainability, 2008 – 2009.
- Member, NCAR Earth Observing Laboratory (EOL) Advisory Panel, 2009 – 2010.
- Member, Steering Committee, LBNL Carbon Cycle 2.0 Initiative, 2009 – 2013.
- Affiliated member, UC Berkeley Energy and Resources Group, 2009 – present.
- Chair, UCB/LBNL search for joint climate faculty/scientist, 2010 – 2011.
- Member, LBNL search for Computational Research Division director, 2010 – 2011.
- Member, UCB VCR's search committee for BIE director, 2011 – 2012.
- Member, LBNL Earth Science Division Staff Committee, 2011 – 2015.
- LBNL Chair, UCD / LBNL faculty search committee, 2012 – 2015.
- Member, LBNL Earth Science Division Director Search Committee, 2012 – 2013.
- Member, Advisory Board, Peder Sather Center (UCB), 2012 – 2015.
- Member, Berkeley Global Change Biology (BiGCB) steering committee, 2012 – 2015.

- Briefing to UC Regents on UC DOE Lab Climate Research, Sacramento, May 15, 2013.
- Briefing to UC President Napolitano re LBNL climate research on 15 October 2013.
- Member, LBNL Earth and Environmental Sciences Area Council, LBNL, 2015 – present.
- ACME Lab Management Advisory Committee, Bolger Center, Washington Grove, MD., Jun. 4-6, 2017.
- Member, Center for Robust Decision-making on Climate and Energy Policy (RDCEP) External Advisory Group, University of Chicago, Chicago, Illinois, Jan. 17-18, 2017.
- Chair, LBNL search committee for new Laboratory Director for Strategic Communications, 2017.
- Member, LBNL Diversity, Equity, and Inclusion Senior Leadership Council, 2017 2020.
- Invitation to serve as C4S report co-chair, a top UCOP priority as a key UC contribution to the University Climate Change Coalition (UC3), May 23, 2019.
- Accepted invitation from Dean David Ackerly to the Academic Steering Committee for UCB's California-China Climate Policy Institute (CCCPI), Jan. 10, 2019.

8.3 External advisory/committee activities

- Contributing author, NASA Conference on Uncrewed Aerospace Vehicles, 1996.
- Panelist, NSF Globe Proposal Review Panel, 1998.
- Member, AMS Committee on Atmospheric Radiation, 1999 – 2006.
- Chair, AMS Committee on Atmospheric Radiation, 2002 – 2006.
- Panelist, United Nations Environmental Program panel on the Asian Brown Cloud, 2001.
- Panelist, NASA ESSP-3 Lidar Algorithms Peer Review, 2001.
- Chair, NASA Radiation and Climate Peer Review, 2002.
- Panelist, National Academy Climate Sensitivity Workshop, 2003.
- Invited participant, Joint WGCM CFMIP/IPCC expert meeting on Climate Sensitivity and Feedbacks, 2004.
- Member, NASA Earth-Sun System Subcommittee, 2005.
- Member, Joint ASCAC-BERAC subcommittee, Computational and Informational Technology Rate Limiters to Climate Change Science, 2007.
- Panelist, Review of NOAA's Climate Research and Modeling Program for NOAA Climate Working Group of the NOAA Scientific Advisory Board, 2008.
- Member at Large, AAAS Atmospheric Sciences Section, 2009 – 2010.
- Reviewer, U.S. Climate Change Science Program, 2009.
- Chair, NASA Goddard Global Modeling and Assimilation Office Review, 2009.
- Member, LANL Energy Security External Advisory Board, 2009 – 2011.
- Member, UK Met Office / Hadley Centre Science Review Group, 2009 – 2012.

- Member, PNNL Fundamental and Computational Sciences Board, 2009 – 2011.
- Invited participant, BERAC 20-year Climate Vision Workshop, 2010.
- Invited participant, BER Climate Research Roadmap Workshop, 2010.
- Panelist and reviewer, DOE Regional Modeling Climate Panel review, 2010.
- Steering Group, National Climate Assessment Modeling and Scaling Workshop, 2010.
- Member, ASCR Panel, ORNL Leadership Computing Facility (OLCF-3) Titan Application Readiness Review, 2010.
- Chair, DOE ASCR INCITE allocation panel for climate applications, 2010.
- Participant, NRC Workshop on Climate Modeling, 2011.
- Launch and co-chairmanship of Societal Dimensions Working Group, CESM Project.
- Advisory Board of the Center for Climate Sciences at JPL, 2012 – 2015.
- Invited participant and panelist, DOE Financial services workshop, AAAS, Washington DC, June 3–4, 2013.
- Member, Committee of Visitors for DOE's Climate and Environmental Sciences Division, July 8–10, 2013.
- Invited member, Aspen Global Change Institute workshop on CMIP6 and IPCC AR6, 4–9 August 2013.
- Invited participant, Arctic Monitoring and Assessment Program, 2013 – 2014.
- Member, ASCR-appointed organizing committee for conference, and co-author of white-paper, on: "Extreme-scale Scientific Application Software Productivity", 16 September 2013, Germantown, MD.
- Invited speaker and participant, APS special meeting on the APS statement on climate change, New York University, New York, New York, 8 January 2014.
- LBNL lead for development of DOE Big Idea's white paper on climate, and participant in the DOE Big Ideas Summit, 30–31 January 2014, Crystal City, VA.
- Invited participant, breakout lead, and white paper author for DOE's Water-Energy Tech Team (WETT) workshop, 5–6 May 2014, Washington, DC.
- Invited participant and speaker, workshop on ACME-Energy and BER's research in human dimensions of climate change, Washington DC, October 28-30, 2015.
- Invited participant and speaker, BERAC meeting on urban Integrated Field Laboratories, Germantown, January 29-30, 2015.
- Invited participant, ASCR-BER summit on computing for climate, Germantown, January 23, 2015.
- Invited participant, US Global Change Research Group's (USGCRP's) Interagency Group on Integrative Modeling (IGIM) Climate Forum on US participation in CMIP6, NCEP, College Park, Maryland, February 11, 2015.
- Lead author role for report from the USGCRP IGIM Climate Forum, Spring, 2015.

- Member, NASA Earth Observations Assessment for OSTP, Spring 2016.
- Co-Organizer, ASCR-BER Exascale Requirements Meeting, March 29-31, 2016.
- Invited Participant, University of California 1.5C Initiative Kick-off meeting, San Diego Supercomputer Center, UCSD, San Diego, CA., Oct. 19-21, 2016.
- Invited participant, ASCR Exascale Climate Meeting and Exascale Requirements Crosscut Review, Tyson's Corner, VA. Mar. 8-10, 2017.
- Member, US CLIVAR Process Study and Model Improvement (PSMI) panel, four-year term, 2017 2020.
- Steering Committee, Air Miners, Scripps Institution of Oceanography, Feb. 22, 2018.
- Invited member, Biological and Environmental Advisory Committee (BERAC) Subcommittee on User Research Facilities Working Meeting, Gaithersburg, MD, April 23-24, 2018.
- Member, National Center for Atmospheric Research (NCAR) Climate and Global Dynamics (CGD) Laboratory Advisory Board, 2018 – present.
- Past Chair, American Physical Society Topical Group on the Physics of Climate, 2020.
- Chair, American Physical Society Panel on Public Affairs, 2020.
- Member, APS POPA Energy and Environment Subcommittee, 2018 – present.
- Member, APS POPA Steering Committee, 2020 – present.
- Author and organizer, California Collaborative for Climate Change Solutions (C4S) Climate Risk Report.
- Statutory member, APS Physics Policy Committee, 2021–2021.
- Vice Chair, APS Ethics Committee, 2022–2025.
- Chair, Energy and Environment Subcommittee, APS Panel on Public Affairs (POPA), 2022–present.

8.4 Service to national, state, and local agencies

- Briefing to California Assembly member Robert Bonta regarding LBNL climate science on 21 March 2014.
- Briefing to California Assembly member Nancy Skinner regarding the Climate Readiness Institute on 3 April 2014.
- Briefing regarding the Climate Readiness Institute to meetings of local leaders in climate adaptation and mitigation hosted by the Association of Bay Area Governments (ABAG) and ABAG Joint Policy Committee on 15 November 2013 and 3 June 2014.
- Briefing to CEC Commissioner Hochschild on LBNL climate research, July 1, 2014.
- LBNL Lead, climate demonstration, National Laboratory Day on US Capitol Hill, September 16, 2014.

- Briefing on LBNL Climate Program to State Senator Mark DeSaulnier, September 26, 2014.
- Briefing to Assembly-member Bill Quirk on CRI during LBNL protocol visit, February 6, 2015.
- Testimony to California Assembly Budget Subcommittee on water crisis, Sacramento, April 7, 2015.
- Testimony to information hearing of the California Senate Environmental Quality Committee on the future of California's water supply, Oakland City Hall, May 29, 2015.
- Meeting with Governor Brown and Executive Secretary Christiana Figueres of the UNFCCC (UN Framework Convention on Climate Change) regarding California's efforts in support of the 21st session of the Conference of the Parties (COP) starting November 30 in Paris, Natural History Museum of Los Angeles, June 15, 2015.
- Discussion of LBNL's research portfolio in climate with the Western Governors' Association, Aug. 5, 2015.
- Presentation on "Climate Readiness Institute" to Laurie Ten Hope, Deputy Director, Energy Research and Development Division (CEC), LBNL, Aug. 7, 2015.
- Presentation on LBNL climate research on "Actionable hydroclimate predictions for California" to John Laird, CA Secretary of Natural Resources, August 26, 2015.
- Briefing on LBNL climate research to visiting delegation from Bangladesh at request of US State Department, October 17, 2015.
- Talk on climate modeling developments to California State Senator Stern, Lawrence Livermore National Laboratory, Sept. 28, 2017.
- Presentation on "Advances in Climate Modeling" to staffers from the California State Assembly, LBNL, Nov. 6, 2017.
- Invited Participant, California Collaborative for Climate Change Solutions (C4S), Sacramento, CA, April 4, 2018.
- Talk on climate modeling developments to California State Senator Stern, LBNL, Sep. 28, 2017.
- Presentation on "Advances in Climate Modeling" to staffers from the California State Assembly, LBNL, Nov. 6, 2017.
- Presentation on "Advances in Climate Modeling" to members of San Francisco British Embassy, LBNL, Nov. 7, 2017.
- Presentation to California Council on Science and Technology regarding the CA DOE lab's capabilities in climate prediction, NERSC, July 10, 2018.
- Presentation to dignitaries attending the Governor's Climate Summit regarding the CA DOE lab's capabilities in climate prediction, NERSC, Sep. 12, 2018.
- Invited panelist, Governor's Climate Summit Science to Action Day, An Affiliate Event of the Global Climate Action Summit, September 11, 2018, Exploratorium, San Francisco, CA.

- Invited participant, California-China Climate Policy Institute (CCCPI) Meeting with Gov. Jerry Brown, California Hall, UC Berkeley, May 20, 2019.
- Facilitator for faculty roundtable with Congresswoman Kathy Castor (D-FL), Durant Hall, UC Berkeley, Feb. 21, 2019.
- Briefings regarding LBNL's climate modeling capabilities with David Garcia, Senate EQ; Senator Henry Stern; Lawrence Lingbloom, Assembly Natural Resources; Katerina Robinson, Legislative Director for Senator Nancy Skinner; Samantha Huynh, Legislative Assistant, Assembly member Buffy Wicks; and Tina Andolina, Senator Ben Allen, Sacramento, CA., May 15, 2019.
- Briefing on Wildfire Projections for State Senator Ben Allen, LBNL, Aug 22, 2019.
- Participant, APS Congressional Visits Day and Ceremony, US Capitol, Washington DC, Jan. 28, 2020.
- Briefing with Alex Ruane and Claudia Tebaldi to U.S. Government representatives engaged in review of the IPCC AR6 WGI Second Order Draft (SOD), May 21, 2020.
- Participant, APS Congressional Visits Day and Ceremony, virtual, Washington DC, Feb. 3, 2021.
- Participant, APS Congressional Visits Day and Ceremony, virtual, Washington DC, Jan. 26, 2022.

8.5 Editorial service

- Editor, *Journal of Climate*, 2007 – 2008.
- Associate Editor, *Reviews of Modern Physics*, 2017 – present.
- co-Editor in Chief, *International Journal of Climatology*, 2021 – present.

8.6 Professional meeting organizer

- Organizer, ASP Summer Colloquium, "Interactions between Aerosols, Climate, and the Hydrological Cycle," Jul 2002, Boulder, Colorado.
- Co-chair, Aspen Global Change Institute, "Aerosols and the Hydrological Cycle," Jul. 2004, Aspen, Colorado.
- Vice-chair, Gordon Research Conference on Solar Radiation and Climate, Jul. 2005, Waterville, Maine.
- Co-chair, Joint AMS Clouds and Radiation meeting, Jul. 2006, Madison, Wisconsin.
- Chair, Gordon Research Conference on Solar Radiation and Climate, Jul. 2007, New London, New Hampshire.
- Appointment, vice-chair for DOE's Workshop on Community Modeling and Long-Term Predictions of the Integrated Water Cycle, Sep. 24–26, 2012.
- Co-Chair, Aspen Global Change Institute "Workshop on Machine Learning and Climate Models," 5–10 Jun., 2022, Aspen, CO.

8.7 Professional meeting session chair

- Session chair, Chapman Conference on "Atmospheric Absorption of Solar Radiation," Aug. 13–17, 2001, Estes Park, Colorado.
- Session chair, 11th AMS Conference on Atmospheric Radiation, Jun. 2–7, 2002, Ogden, Utah.
- Member, Organizing Committee, IPCC Working Group I Workshop on Climate Sensitivity, Jul. 2004, Paris, France.
- Session chair, International Radiation Symposium 2004, Aug. 23–28, 2004, Busan, South Korea.
- Poster session chair, Fourth Gordon Conference on Radiation and Climate, Jul. 24–29, 2005, Waterville, Maine.
- Session chair, Annual American Association for Aerosol Research (AAAR) Conference, Oct. 17–21, 2005, Austin, Texas.
- Co-convener, AGU Fall meeting Union session, Dec. 5–9, 2005, San Francisco, California.
- Session chair, 12th AMS Conference on Atmospheric Radiation, Jul. 9–14, 2006, Madison, Wisconsin.
- Session chair, NASA SOlar Radiation and Climate Experiment (SORCE) Meeting, Sep. 20–22, 2006, Eastsound, Washington.
- Co-convener and session chair, AGU Fall meeting session GC19, SI-Traceable Climate Measurements From Space, Dec. 15–19, 2008, San Francisco, California.
- Session Co-convener, AGU sessions GC12A and GC13A, Coastal and Near-Term Climates in a Changing World, 2010 Fall AGU Meeting, San Francisco, CA. December 13–17, 2010.
- Session chair, 23rd Conference on Climate Variability and Change, 91st American Meteorological Society Annual Meeting, Seattle, WA. January 27, 2011.
- Session chair, Gordon Research Conference on Radiation and Climate, July 2011, Colby Sawyer College.
- Session chair for GC31C, "Climatology and Trends of Extreme Events in Climate Models Capable of Resolving Regional-Scale Processes I," AGU Fall 2014 meeting.
- Session chair for GC33A, "Climatology and Trends of Extreme Events in Climate Models Capable of Resolving Regional-Scale Processes II Posters," AGU Fall 2014 meeting.
- Co-chair, Regional and Global Climate Model Analysis Science Team Meeting, Rockville, Maryland, Nov. 28 Dec. 2, 2016.
- Co-Convener, with R. Joseph, P.J. Gleckler, F.M. Hoffman, D.N. Williams, and G.L. Geernaert, "TH23C: Coordinated Model Evaluation Capabilities (CMEC) for CMIP DECK and Historical simulations", AGU Fall Meeting, New Orleans, LA, December, 2017.
- Chair, "GC33F Protecting Earth's Climate for the Next Centennial II Posters", 9-13 December 2019, Fall AGU Meeting, San Francisco, CA.

- Co-organizer, "GC32B Protecting Earth's Climate for the Next Centennial I", 9-13 December 2019, Fall AGU Meeting, San Francisco, CA.

8.8 Courses taught

- University of California, San Diego (Scripps Institution of Oceanography), "Introduction to Atmospheric Radiation," Spring 1994.
- University of Colorado (Program in Atmospheric and Oceanic Sciences), ATOC 4710/5710, "Introduction to Atmospheric Physics," Spring 2002.
- University of California, Berkeley (Earth and Planetary and Geography), EPS C181 / GEOG C139, "Atmospheric Physics and Dynamics," CCN 19123, Fall 2008.
- University of California, Berkeley (Earth and Planetary and Geography), EPS C181 / GEOG C139, "Atmospheric Physics and Dynamics," CCN 19072, Fall 2010.
- University of California, Berkeley (Earth and Planetary and Geography), EPS 230, "Radiation and its Interactions with Climate," CCN 19251, Fall 2013.
- University of California, Berkeley (Earth and Planetary Sciences), EPS 230, "Radiation and its Interactions with Climate," Spring 2016.
- University of California, Berkeley (Earth and Planetary Sciences), EPS 230, "Radiation and its Interactions with Climate," CCN 46299, Fall 2017.
- University of California, Berkeley (Earth and Planetary Sciences), EPS 230, "Radiation and its Interactions with Climate," CCN 30881, Fall 2019.
- University of California, Berkeley (Earth and Planetary Sciences), EPS 230, "Radiation and its Interactions with Climate," CCN 24778, Fall 2021.

8.9 Masters committees

- Nabig Chaudhry (Energy and Resources Group, Department of Environmental Science, Policy, and Management, University of California, Berkeley), Changing Climate Impacts: Analytics to Characterize Extreme Temperature Events in California, 2020 – 2022 [masters committee].

8.10 PhD committees

- Lansing Madry (Program in Atmospheric and Oceanic Sciences, University of Colorado, Boulder), Sea salt aerosols in global models, 2002 – 2007 [dissertation committee].
- Nicole Schlegel (Department of Geography, University of California, Berkeley), 2007 – 2011. Dissertation: "Determining Greenland Ice Sheet sensitivity to regional climate change: One-way coupling of a 3-D thermo-mechanical ice sheet model with a mesoscale climate model," UMI Dissertation #3469489, 2011. [dissertation committee].

- Alexander Stine (Department of Earth and Planetary Science, University of California, Berkeley), 2007 – 2010. Dissertation: "Climate Change at Annual Timescales," UMI Dissertation #3561357, 2010. [dissertation committee].
- Frida Bender (Meteorological Institute, Stockholm University), 2008 – 2009. Thesis: "Earth's Albedo in a Changing Climate." [Ph.D. dissertation disputation opponent]
- Michael Kiparsky (Energy and Resources Group, University of California, Berkeley), 2008 – 2010. Thesis: "Risk Analysis for Water Resources Under Climate Change, Population Growth, and Land Use Change," UMI Dissertation #3555762, 2010. [dissertation committee].
- Abigail Swann, (Department of Earth and Planetary Science, University of California, Berkeley), 2008 – 2010. Thesis: "Ecoclimate: Variations, Interactions, and Teleconnections," UMI Dissertation #3527296, 2010. [dissertation committee].
- Andrew Rollins, (Department of Chemistry, University of California, Berkeley), 2010 – 2010. Thesis: "Formation mechanisms and quantification of organic nitrates in atmospheric aerosol," UMI Dissertation #3413471, 2010. [dissertation committee]
- Andrew Jones, (Energy and Resources Group, University of California, Berkeley), 2010 – 2012. Thesis: "Land Use Change is a Critical Influence on the Climate Effects of Climate Policies." [dissertation committee].
- Zack Subin, (Energy and Resources Group, University of California, Berkeley), 2010 – 2012. Thesis: "Interactions of Water and Energy Mediate Responses of High-Latitude Terrestrial Ecosystems to Climate Change," UMI Dissertation #3594001, 2012. [dissertation committee].
- Andrew Friedman, (Department of Geography, University of California, Berkeley), 2010 – 2014. Thesis: "The changing interhemispheric temperature difference: mechanisms and impacts." [dissertation committee].
- Nadir Jeevanjee, (Department of Earth and Planetary Science, University of California, Berkeley), 2012 – 2016. Thesis: "Cold Pools, Effective Buoyancy, and Atmospheric Convection," UMI Dissertation #10150827 (ProQuest document #1847568025), 2016. [dissertation committee].
- Jacob Edman, (Department of Earth and Planetary Science, University of California, Berkeley), 2013 – 2017. Thesis: "Convection and Gravity Waves in the Tropical Atmosphere," ProQuest Document #2031543341 [dissertation committee].
- Jacob Seeley, (Department of Earth and Planetary Science, University of California, Berkeley), 2017 – 2019. [dissertation committee]. .
- Zeke Hausfather (Energy and Resources Group, University of California, Berkeley), 2017 – 2020. Thesis: "Improving the observational temperature record," ProQuest Document # not yet available (as of 4 July, 2020). [dissertation committee].
- Frank Errickson (Energy and Resources Group, University of California, Berkeley), Integrated assessment modeling, 2018 – 2020 [dissertation committee].

- Hector Inda Diaz (Land and Water Resources, University of California, Davis), Atmospheric rivers and climate extremes, 2019 – present [dissertation committee].
- Aaron Berliner (Dept. of Bioengineering, University of California, Berkeley), terraforming Mars, 2019 – present [dissertation committee].
- Seth Seidel (Land and Water Resources, University of California, Davis), 2020 – present. [dissertation committee].
- Quentin Nicholas (Department of Earth and Planetary Science, University of California, Berkeley), 2021 – present. [dissertation committee].
- Zhongqi Miao (Department of Environmental Science, Policy, and Management, University of California, Berkeley), 2022 – 2022. [dissertation committee].
- Roger Roglans (Space Sciences Laboratory, Department of Physics, University of California), 2022 – present. [dissertation committee].
- Nabig Chaudhry (Energy and Resources Group, Department of Environmental Science, Policy, and Management, University of California, Berkeley), 2022 – present.

8.11 PhD students

- Richard van Hees (University of Utrecht), 1995 – 2000. Thesis: "Detection of deep convection in the atmosphere using infrared satellite data." [co-promoter].
- David Fillmore, (Program in Atmospheric and Oceanic Sciences, University of Colorado, Boulder), 2000 – 2005. Thesis: "Anthropogenic aerosols and the scattering and absorption of solar radiation – Estimates of the climatic impacts through a synthesis of models and satellite observations," UMI Dissertation #3168276, 2005. [dissertation advisor].
- Lindsey Nolan (Environmental Engineering, University of California, Berkeley), Climate-change prediction using perturbed physics, 2008 – 2011 [dissertation advisor].
- Kyle Pressel (Environmental Engineering, University of California, Berkeley), 2008 – 2012. Thesis: "Water Vapor Variability Across Spatial Scales: Insights for Theory, Parameterization, and Model Assessment," UMI Dissertation #3527150, 2012. [dissertation advisor].
- Juli Rubin (Environmental Engineering, University of California, Berkeley), 2009 – 2012. Thesis: "Investigation of Aerosol Sources, Lifetime and Radiative Forcing through Multi-Instrument Data Assimilation," UMI Dissertation #3555898, 2012. [dissertation advisor].
- Daniele Rosa (Department of Earth and Planetary Science, University of California, Berkeley), 2008 – 2014. Thesis: "Multiscale global atmospheric transport and convective precipitation." [dissertation advisor].
- Jordan Mizerak (Department of Earth and Planetary Science, University of California, Berkeley), 2014 – 2015 [prospective dissertation advisor].
- Alexander Charn (Department of Earth and Planetary Science, University of California, Berkeley), 2015 – 2020. [dissertation advisor].

- Ben Fildier (Department of Earth and Planetary Science, University of California, Berkeley), 2013 – 2019. Thesis: "Physical Constraints and Modeling Uncertainties on the Intensification of the Global Hydrologic Cycle," ProQuest Document #2296357802 [dissertation advisor].
- Mr. Prabhat (Department of Earth and Planetary Science, University of California, Berkeley), 2011 – 2020. Thesis: "Characterizing Extreme Weather in a Changing Climate," ProQuest Document # not available (as of 4 July 2020) [dissertation advisor].
- Edward Molter (Department of Astronomy, University of California, Berkeley), 2018 – 2022. Thesis: "Cloud Formation and Circulation in Planetary Tropospheres from Remote-Sensing Data," ProQuest Document # not available (as of 12 August 2022) [Co-chair, dissertation committee].
- Ankur Mahesh (Department of Earth and Planetary Science, University of California, Berkeley), 2020 – present [dissertation advisor].

8.12 Postdoctoral researchers

- Daniel Feldman (Department of Earth and Planetary Science, University of California, Berkeley), CLARREO (CLimate Absolute Radiance and Refractivity Observatory) Observing System Simulation Experiment, 2008 – 2011.
- Lara Gunn, (Department of Earth and Planetary Science, University of California, Berkeley), The Longwave Radiative Effects of Aerosols from Synthesis of A-train Observations, 2010 – 2012.
- Wei-Chun Hsieh, (Department of Earth and Planetary Science, University of California, Berkeley), Multiscale Modeling of Atmospheric Processes, 2009 – 2012.
- Fuyu Li, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Exploring and Quantifying Predictive Skill for Climate and its Extremes, 2010 – 2012.
- Lisa Murphy, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Improving the Representation of Human-Earth System Interactions, 2010 – 2012.
- Gijs de Boer (Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory), Measurement of cloud radiative effects on Arctic climate, 2010 – 2012.
- Andrew Jones, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Interactions of land use, land cover, and climate change, 2012 – 2013.
- Travis O'Brien, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Multiscale atmospheric dynamics and climate extremes, 2011 – 2013.
- Huei-Jin Wang, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Measurement of carbon exchanges with terrestrial ecosystems, 2012 – 2014.
- James Benedict (Climate Sciences Department, Lawrence Berkeley National Laboratory), Multiscale interactions of Indian Ocean and Madden Julian Oscillations, 2012 – 2015.

- Enhao Du, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Impacts of terrestrial hydrology on anthropogenic climate change, 2013 – 2015.
- Soyoung Jeon, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Spatial statistics of climate extremes, 2012 – 2015.
- Jennifer Holm, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Implications of forest ecosystem dynamics for the carbon cycle, 2012 –2014.
- Mark Risser, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Statistics of extreme climate change, 2015 – 2017.
- Wolfgang Langhans, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Multiscale modeling of atmospheric dynamics, 2015 – 2017.
- Yinghui Lu, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Global precipitation as a measure of climate model fidelity, 2015 – 2017.
- Benjamin Timmermans, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Risk ratios of extreme precipitation, 2016 – 2018.
- Huanping Huang, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Interactions between climate variability and climate extremes, 2020 – present.

- Yang Zhou, (Climate Sciences Department, Lawrence Berkeley National Laboratory), Interactions among the Madden-Julian Oscillation, the El Niño Southern Oscillation, and climate extremes, 2020 – present.

8.13 Guest lectures (since 2007)

- "Changes in Climate Extremes: History and Projections for the 21st Century," Boalt Law 272.3 (CCN 49711), Climate Change: Law and Policy, Sep. 4, 2007.
- "Global climate change: History and projections for the 21st century," Molecular And Cell Biology (MCELLBI) 90, Freshman Seminar, Sep. 25, 2007.
- "The Health Implications of Climate Change," Public Health 298.38 (CCN 76642), Global Environmental Change for Health Scientists, Feb. 22, 2008.
- "Global climate change: History and projections for the 21st century," Molecular And Cell Biology (MCELLBI) 15.001 (CCN 57709), Current Topics in the Biological Sciences, Apr. 8, 2008.
- "Radiative Forcing by Greenhouse Gases and its Representation in Global Models," Chemistry 122.001 (CCN 11450), Quantum Mechanics and Spectroscopy, Apr. 7, 2008.
- "Aerosols' Role in Radiative Transfer," Chemistry 122.001 (CCN 11450), Quantum Mechanics and Spectroscopy, Apr. 9, 2008.
- "What is a Climate Model (and what can it do?)," Environmental Science 10.001 (CCN 30403), Introduction to Environmental Sciences, Apr. 24, 2008.

- "The Global Greenhouse: Welcome to the Anthropocene," Earth and Planetary Science 3.001 (CCN 19003), The Water Planet, May 5, 2008.
- "Climate extremes: The future impacts of strange weather," Earth and Planetary Science 3.001 (CCN 19003), The Water Planet, May 7, 2008.
- "Changes in Climate Extremes: History and Projections for the 21st Century," Boalt Law 272.3 (CCN 49688), Climate Change and the Law, Aug. 8, 2008.
- "Radiative processes in climate and climate models," Research in Earth Science, EPS 260, 11/10/08.
- "What is a Climate Model? (And what can it do?)," Physical Science, L&S 70B, 2/24/09.
- "The global greenhouse: Welcome to the Anthropocene," "The Water Planet," EPS 3, 4/29/09.
- "Climate extremes: The future impacts of strange weather," "The Water Planet," EPS 3, 5/4/09.
- "Radiative processes." Geog. 171 (CCN 36601), Jan. 28, 2010.
- "What is a climate model, and what can it do?" ES (Environmental Sciences) 10 (CCN 30803), Feb. 12, 2010.
- "From climate change to climate action." Invited presenter for the Dept. of Earth and Planetary Science, Calday, April 17, 2010, UC Berkeley.
- "The global greenhouse: Welcome to the Anthropocene." EPS 3 (CCN 19003), April 26, 2010.
- "The Future of the Earth's Climate: Frontiers in Forecasting," ERG C200 and Public Policy C284, "Energy and Society," CCN 27425, Nov. 30, 2010.
- "What is a Climate Model? (And what can it do?)," Geography 171, "Special Topics in Physical Geography," CCN 36520, Mar. 3, 2011.
- "The Global Greenhouse: Welcome to the Anthropocene," EPS 3, "The Water Planet," CCN 19003, Apr. 20, 2011.
- "What is a Climate Model? (And what can it do?)," CE 195, "Chemical Engineering – Special Topics," CCN 10491, Sep. 13, 2011.
- "What is a Climate Model? (And what can it do?)," EPS 10, "Introduction to Environmental Science," CCN 30803, Sep. 24, 2011.
- "The Trajectory of the Earth's Climate," ChE 84, "The Science and Engineering of Sustainable Energy," CCN 10308, Mar. 1, 2012.
- "The Global Greenhouse: Welcome to the Anthropocene," EPS 3, "The Water Planet," CCN 19003, Apr. 23, 2012.
- "What is a Climate Model? (And what can it do?)," ERG 290, "Seminar in Energy and Resources," CCN 27430, Jan. 29, 2013.

- "The Global Greenhouse: Welcome to the Anthropocene," ESPM C10, "Environmental Issues," CCN 28856, Jan. 31, 2013.
- "The Global Greenhouse: Welcome to the Anthropocene," EPS 3, "The Water Planet," CCN 19003, Apr. 29, 2013.
- "Water and Climate Change," Political Science 179, "Undergraduate Colloquium in Political Science (Activism)," CCN 71877, 13 November 2013.
- "The Global Greenhouse: Welcome to the Anthropocene," EPS 3, "The Water Planet," CCN 19003, 18 April 2014.
- "Projections of Climate Change," ER 290, "Climate Change Adaption and Mitigation," CCN 27301, August 28, 2014.
- "Direct measurements of surface forcing of carbon dioxide from 2000 to 2010," EPS 260, "Research Seminar," CCN 19276, September 22, 2014.
- "The Global Greenhouse: Welcome to the Anthropocene," EPS 3, "The Water Planet," CCN 19003, April 29, 2015.
- "Climate Change Adaption and Mitigation" ER 290 (ERG) Seminar in Energy and Resources (CCN 27301), August 28, 2014.
- "Direct measurements of surface forcing of carbon dioxide from 2000 to 2010", EPS 260 Research Seminar (CCN 19276), September 22, 2014.
- "Welcome to the Anthropocene," EPS 3, "The Water Planet" (CCN 19003) on April 29, 2015.
- Guest lecture on "The IPCC Process", ESPM 290, "Special topics in Environmental, Science, Policy, and Management", (CCN 30947), Sep. 17, 2015.
- Guest lecture on "Direct Observations of the Anthropogenic Greenhouse Effect", EPS 260, 'Faculty Research Seminar', (CCN 19261), October 12, 2015.
- Guest Lecture on "Pathways for Bending the Curve" to Prof. V. Ramanathans Scripps Institution of Oceanography course SIO 209, "Bending the Curve", April 14, 2016.
- Guest Lecture on "The Global Greenhouse: Welcome to the Anthropocene" for Bill Dietrich's EPS 3, "The Water Planet", (CCN 19003), April 26, 2016.
- "Climate Change: How to Thrive in a Warmer World,"
  Business Administration 193B (class number 10736) / Letters and Science 126 (class number 44483), Energy and Civilization, Sept. 9, 2016.
- "Direct observations of the Earth's Greenhouse Effect," EPS 260 Research in Earth Science, Class #15021, Oct. 10, 2016.
- "The Global Greenhouse: Welcome to the Anthropocene," EPS 3, "The Water Planet" (CCN 39532) on April 17, 2018.
- Guest lecture to EPS 3 ("Water Planet") on "Welcome to the Anthropocene", UCB, April 19, 2019.

- "The Global Greenhouse: Welcome to the Anthropocene," EPS 3, "The Water Planet" (CCN 22925) on April 14, 2020.
- "The Global Greenhouse: Welcome to the Anthropocene," EPS 3, "The Water Planet" on April 8, 2021.

8.14 Public dissemination of scientific information

- Invited lecturer, NCAR Geophysical Statistics Conference, Jul. 18–24, 1998.
- Invited presentation, Boulder County Clear-Air Consortium, Nov. 14,2000.
- Invited lecturer, NASA Goddard Graduate Student Summer Program, Jun. 11, 2002.
- Invited lecturer, NCAR ASP Colloquium on "Climate and Health," Jul. 21–28, 2004.
- Invited lecturer, Scripps Howard Institute on the Environment, 2005.
- Invited lecturer, NCAR ASP Colloquium on "The Art of Climate Modeling," Jun. 5–16, 2006.
- Invited lecturer, NCAR ASP Colloquium on "Climate and Health," Jul. 17, 2006.
- Interview subject, programs on climate change by the Discovery Channel, CNN and HBO, 2005–2006.
- Lead author, *Scientific American* article on IPCC WG 1 findings, 2007.
- Invited lecture, "Our Changing Planet: A Scientific Assessment," Montgomery Bell Academy, October 30, 2008, Nashville.
- Invited panelist, "Humanity's Greatest Challenges," Singularity University, Jul. 9 2009, NASA Ames, Moffett Field, CA.
- Invited lecture, "Climate change: Surf's up in the Arctic," Nano High, Oct 19, 2009, University of California, Berkeley.
- Invited participant, Climategate panel discussion, Climate and Energy Policy Institute, Haas School of Business, UC Berkeley, Jan. 26, 2010.
- Invited panelist, "Berkeley Lab Goes Hollywood," Science at the Theater, Feb. 3, 2010, Berkeley Repertory Theater.
- IPCC Forum on the Fifth Assessment, ESPM, UC Berkeley, Nov. 28, 2012.
- Speaker, LBNL Science at the Theater presentation on "How Hot Will it Get," Berkeley Repertory Theater, California, April 22, 2013.
- Earth Day kickoff speaker on climate change, Lawrence Berkeley Laboratory, Berkeley, California, April 22, 2013.
- Co-organizer, Philomathia Symposium on Water, Climate, and Society: Strategies in a Rapidly Changing World. 1 Nov. 2013, David Brower Center, Berkeley, California.
- Chair, CRI kick-off summit, David Brower Center, 11 February 2014, Berkeley, California.
- Presentation on climate change to the Bentley Lab School on 25 February 2014.

- Lecture on "Water and Climate Change" on UC Berkeley Cal Day, 11 April 2014.
- Musical performance as a member of the Climate Music Project, Odd Fellows Building, 76 7th Street, San Francisco, September 27, 2014.
- Organizer, Climate Readiness Institute Workshop #1 with City of Berkeley and San Mateo County, Berkeley, California, December 9, 2014.
- Organizer, Climate Readiness Institute workshop on "Bay Area Water in a Changing Climate," Berkeley, California, June 10, 2015.
- Performance of the Climate Music Project at Chabot Space and Science Center on Nov. 21, 2015.
- Panel Event during AGU on Paris Accords? World Affairs Council, Dec. 15, 2015.
- Performance of the Climate Music Project at Chabot Space and Science Center on Feb. 19, 2016.
- Lecturer on "Short-Lived Climate Pollutants" and participant, Philomathia Forum panel discussion, UC Berkeley, Berkeley, CA. Feb. 18, 2016.
- Conversation with Jeff Miller on climate, Science at the Theater, Berkeley Rep, Mar. 24, 2016.
- City Age presentation on "Climate Readiness Institute" (with Prof. Kristina Hill) and panel organizer, San Francisco City Club, April 6, 2016.
- Lecture on "Climate Change: How to Survive in a Warmer World", Bay Area Teenage Students (BATS) Career Conference, San Francisco Zoo, April 9, 2016.
- Performance of the Climate Music Project at Grace Cathedral in San Francisco on June 3, 2016.
- Musical performance as a member of the Climate Music Project, San Jose Tech Museum, July 19, 2016.
- Invited lecture,"Climate Change: How to Thrive in a Warmer World," at Contra Costa College, San Pablo, CA., Sept. 9, 2016.
- Musical performance as a member of the Climate Music Project, Chabot Space and Science Museum, Sep. 24 and Oct. 7, 2016.
- Invited Participant, University of California 1.5C Initiative Kick-off meeting, San Diego Supercomputer Center, UCSD, San Diego, CA., Oct. 19-21, 2016.
- Advisory Board, The San Jose Tech Museum Tech and the Environment, to design major new installation on climate change, 2017.
- Two musical performances as a member of the Climate Music Project, Noh Space, San Francisco, April 28, 2017.
- Invited Speaker, Chinese Environmental Scholars Forum, Sibley Auditorium, UC Berkeley, May 20-21, 2017.
- Presentation to Berkeley Area Policy Professionals Inaugural Event, LinkedIn Headquarters, San Francisco, May 25, 2017.

- Invited Speaker, University of California, Berkeley Alumni, Homecoming 2017, "Going Down the Up Escalator of Climate Change," University of California, Berkeley, CA Oct. 21, 2017.
- Concert with the Climate Music Project, Swissnex, San Francisco, CA, Oct. 26, 2017.
- Presentation of climate change talk to World Conference of Science Journalists at invitation of Robert Sanders, Manager of Science Communications in UC Berkeley Media Relations, University of California, Berkeley, CA, Oct. 29, 2017.
- Presentation on "Modeling the Role of Ice Sheets in Sea Level Rise" to Secretary George Schultz, LBNL, Nov. 27, 2017.
- Panel with Climate Music Project showcase, Herbst Theatre, San Francisco, CA, Dec. 9, 2017.
- Scientific advisor, course at San Francisco Conservatory of Music taught by Taurin Barrera (TAC 311, Max/MSP 2) on sonifying climate data concluding with student concert, April 15, 2018.
- Invited participant, expert workshop on Future of Climate Action, hosted by World Bank Climate Investment Funds, Institute for the Future, Palo Alto, CA, May 10, 2018.
- Concert with the Climate Music Project for the World Bank Understanding Risk Forum, Mexico City, Mexico, May 16-18, 2018.
- Concert with the Climate Music Project, Noe Valley Ministry, San Francisco, CA, June 9, 2018.
- Selection of Climate Music Project for the Governor's Climate Summit side-event, Fall 2018.
- Invited panelist, Governor's Climate Summit Science to Action Day, An Affiliate Event of the Global Climate Action Summit, September 11, 2018, Exploratorium, San Francisco, CA.
- Scientific consultant, Climate Music Project's Play for the Planet, San Francisco Main Public Library, Wednesday, September 12th, 2018 in support of the Governor's Climate Summit.
- Featured scientist in "Stump A Climate Scientist", Youth Climate Action Summit, SJ Tech, San Jose, CA., Oct. 10, 2018.
- Screening and Q&A for Climate Music Project, 2019 Business Environmental Awards Ceremony, San Francisco, CA. May 22, 2019.
- Climate Music Project (CMP) Conversation, Aug. 21, 2019, Book Club of California, San Francisco, CA.
- Delivery of Glimmers of Hope: Paths Forward on Climate Change (invited public lecture), Sep. 11, 2019, Centennial Club, Nashville, TN.
- Climate Music Project (CMP) Live Performance of Climate, Sep. 19, 2019, The Exploratorium, San Francisco, CA.

- Climate Music Project (CMP) Live Performance of Climate, Sep. 29, 2019, San Francisco Conservatory of Music, San Francisco, CA.
- Climate Music Project (CMP) Live Performance of Icarus in Flight, Earth Day, Apr. 22, 2020, The National Academy of Sciences (via zoom), Washington, DC.
- Invited public talk on "Key Messages of the 6th IPCC Assessment Report: The Physical Science Basis," Orinda Country Club Speaker's Series, 23 Sep., 2021, Orinda, CA.

RESEARCH GRANTS:

9 Previous Research Support

1. Principal Investigator, "Improved Estimates of Clear-Sky Longwave Flux and Application to the Tropical Greenhouse Effect," Earth Science and Applications Division, NASA (NAGW-4777/S10144-X), 1996 – 2000, $127K.
2. Principal Investigator (with Guang J. Zhang, Scripps Institution of Oceanography), "Investigation of the Warm Pool Heat Budget and Validation of Atmospheric GCMs using TOGA COARE Data," Atmospheric Sciences Division, NSF (ATM95-25800), 1996 – 1999, $240K.
3. Principal Investigator, "Validation of the CERES Surface Radiation Budget Using Long-term Observations from the Indian Ocean Experiment (INDOEX)," Mission to Planet Earth Program Science Division, NASA (S-97889-F), 1997 – 2001, $265K.
4. Principal Investigator (with Brian Soden, GFDL/Princeton), "Improved Clear-Sky Top-of-Atmosphere Fluxes for Studies of the Greenhouse Effect and Aerosol Radiative Forcing," Office of Global Programs, NOAA (NA96GP0444), 1999 – 2003, $317K.
5. Co-Principal Investigator (with Philip Rasch, NCAR), "Aerosol Forecasting and Modeling for ACE-Asia," Climate Dynamics Program, NSF (NSF01 Special Funds), 2001 – 2002, $190K.
6. Co-Investigator (with Andrew Vogelmann, Scripps Institution of Oceanography), "Parameterization of Cloud Water Variability from EOS Observations and its Impact on GCM Climate Simulations," Office of Earth Science, NASA (GWEC-0000-0086), 2001 – 2004, unfunded collaboration.
7. Co-Investigator (with Martin Mlynczak, NASA Langley Research Center), "Far Infrared Spectroscopy of the Troposphere (FIRST)," Instrument Incubator Program, Office of Earth Science, NASA, 2001 – 2004, unfunded collaboration.
8. Principal Investigator, "Global Aerosol Modeling for Climate Studies Using Assimilation of EOS Satellite Observations," Atmospheric Chemistry Modeling and Analysis Project, Office of Earth Science, NASA (W-19942), 2001 – 2005, $444K.

9. Principal Investigator (with Francisco Valero, Scripps Institution of Oceanography), "Development of Radiative Modeling Capabilities for the Triana Satellite Program," Scripps Institution of Oceanography and Earth Science Enterprise, NASA (10189379), 2002 – 2004, $366K.

10. Co-Investigator (with Bob Malone, LANL, and John Drake, ORNL), "Collaborative Design and Development of the CCSM for Terascale Computers," DOE Scientific Discovery through Advanced Computing (SciDAC) program (DE-FG03-02ER63387), 2002 – 2007, $2.412M.

11. Principal Investigator, "Engineering the Community Climate System Model for Improved Portability," NSF (ATM-0404790 under Cooperative Agreement number ATM-0301213), 2003 – 2006, $281.9K.

12. Co-Investigator (with Bruce Wielicki, NASA Langley Research Center), "CERES (Clouds and the Earth's Radiative Energy System) Climate Data Records: Development, Maintenance, and Validation," Office of Earth Science, NASA (NNL04AA54I), 2004 – 2006, $230K.

13. Co-Investigator (with Cecelia Deluca, NCAR), "Common Modeling Infrastructure in Support of U.S. Climate Change Science," NASA Earth Science Enterprise (NNG06GB74G), 2005 – 2008, $405K.

14. Institutional Co-Principal Investigator (with lead PIs John Drake, ORNL, and Phil Jones, LLNL), "A Scalable and Extensible Earth System Model for Climate Change Research," DOE Scientific Discovery through Advanced Computing (SciDAC) program, 2006 – 2008, $4.085M.

15. Co-Investigator (with Scott Doney, WHOI), "Ocean Biological Feedbacks on Global Coupled Climate-Carbon Cycle Dynamics," NASA Interdisciplinary Science program, 2007 – 2007, $370.3K.

16. Co-Investigator (with David Randall, Colorado State University), "Center for Multiscale Modeling of Atmospheric Processes," NSF via sub-contract with Colorado State University (CSU-G-3045-16), 2007 – 2017, $533K (LBNL funding).

17. Co-Investigator (with Kuan-man Xu, NASA Langley Research Center), "Aerosol Indirect Effect: Unscrambling Dynamics and Aerosol Effect," NASA Interdisciplinary Science program (NNX07AU78G), 7/1/2007 – 6/30/2011, $195,000.

18. Co-Investigator (with Ricky Rood, University of Michigan), "Process-Based and Object-Based Investigation of Bias in the Simulations of the Physical Climate," NASA Earth System Science Research using Data and Products from the Terra, Aqua, and ACRIMSAT Satellites (UM-03000913901), 11/1/2007 – 6/30/2011, $57,237.

19. Principal Investigator, "Detection and Attribution of Spectral TOA Forcings and Feedbacks: a CLARREO Observing System Simulation Experiment," NASA (NNX08AT80G and NNX10AK27G) and UCSC (NAS-2-03144,), 2008 – 2011, $252,047.

20. Principal Investigator (with Irina Sokolik, Georgia Tech), "The Longwave Radiative Effects of Aerosols from Synthesis of A-train Observations," NASA Atmospheric Chemistry, Modeling, and Analysis Program (NNX08AK56G), 1/1/2008 – 12/31/2011, $359,819.

21. Laboratory Principal Investigator (with Rich Loft, NCAR), "Collaborative Research: PetaApps: New Coupling Strategies and Capabilities for Petascale Climate Modeling," NSF (OCI0749190), 3/1/2008 – 2/28/2011, $391,130.

22. Principal Investigator, (William Riley, LBNL; Margaret Torn, LBNL; Matt Reagan, LBNL; Philip Jones, LANL; William Lipscomb, LANL; Philip Cameron-Smith, LLNL; Robert Jacob, ANL; and Ruby Leung, PNNL), "Investigation of the Magnitudes and Probabilities of Abrupt Climate TransitionS (IMPACTS)," DOE, 7/1/2008 – 6/30/2013, $3,661,000.

23. Laboratory Principal Investigator (with David Bader, ORNL; Philip Jones, LANL; and Kenneth Sperber, LLNL), "Exploring and Quantifying Predictive Skill for Climate and Its Extremes on Decadal and Regional Scales", DOE BER, 6/1/2009 – 9/30/2009, $318,500.

24. Principal Investigator, "Continuous Evaluation of Fast Processes in Climate Models using ARM Measurements", DOE BER, 6/1/2009 09/30/2013, $150K/year.

25. Laboratory Co-Principal Investigator (with Philip Jones, LANL; Philip Rasch, PNNL; Steve Klein, LLNL; and Surabi Menon, LBNL), "Improving the Characterization of Clouds, Aerosols, and Cryosphere in Climate Models," DOE BER, 6/1/2009 – 5/1/2014, $1,660,411.

26. Laboratory Principal Investigator (with Jae Edmonds, PNNL and David Bader, ORNL), "Improving the Representations of Human-Earth System Interactions," DOE BER, 6/1/2009 – 9/30/2014, $3,275,056.

27. Laboratory Co-Principal Investigator (with Esmond Ng, LBNL), "High Performance Adaptive Algorithms for Ice Sheet Modeling," DOE ASCR, 9/1/2009 – 8/31/2013, $1,920,000.

28. Laboratory Principal Investigator (with David Bader, ORNL; Philip Jones, LANL; and Kenneth Sperber, LLNL), "Ultra High Resolution Global Climate Simulation to Explore and Quantify Predictive Skill for Climate Means, Variability and Extremes," DOE BER, 12/1/2009 – 9/30/2013, $2,949,324.

29. Laboratory Principal Investigator (with Ruby Leung, PNNL), "Development of Frameworks for Robust Regional Climate Modeling," DOE BER, 7/1/2010 – 6/30/2013, $1,650,000.

30. Laboratory Co-Principal Investigator (with Wes Bethel, LBNL), "Visual Data Exploration and Analysis of Ultra-large Climate," DOE BER, 7/1/2010 – 6/30/2013, $2,149,741.

31. Laboratory Co-Principal Investigator (with William Riley, LBNL), "Quantification and reduction of critical uncertainties associated with carbon," 7/1/2010 – 6/30/2013, $1,200,000.

32. Laboratory Principal Investigator (with John Weyant, Stanford University), "Integrated Assessment Model Development, Intercomparison and Diagnostics," DOE BER, 7/1/2010 – 6/30/2013, $375,000.

33. Principal Investigator, "Shortwave and Pan-Spectral Observing System Simulation Experiments in Support of the CLARREO Science Definition Team," NASA, 3/1/2011 – 3/1/2012, $225,301.

34. Principal Investigator, "Shortwave and Pan-Spectral Observing System Simulation Experiments in Support of the CLARREO Science Definition Team," National Aeronautics and Space Administration (NASA) NNX11AE65G, 3/07/2011 – 3/31/2015, $972K.

35. Laboratory Principal Investigator (with David Bader, LLNL), "Climate Energy for a Sustainable Energy Future (CSSEF)," DOE BER, 6/30/2011 – 3/31/2014, $625,000.

36. Laboratory Research Manager, "Climate and Earth System Modeling (CESM) Scientific Focus Area," DOE BER, 10/1/2011 – 3/31/2014, $9.7M.

37. Principal Investigator, "Towards Integrated Assessment of Energy/ Water/ Climate Interactions," DOE BER, 6/1/2012 – 5/31/2015, $1.152M.

38. Principal Investigator (multi-lab), "Multiscale: Multiscale Methods for Accurate, Efficient, and Scale-Aware Models of the Earth System," DOE/BER, 7/1/2012 – 6/30/2017, $5.742M (LBNL funding).

39. Laboratory Research Manager, "CASCADE: Calibrated and Systematic Characterization, Attribution, and Detection of Extremes Scientific Focus Area," DOE BER, 10/1/2013 – 9/30/2016, $6.6M.

40. Laboratory Principal Investigator (with PI George Hurtt, U. Maryland), "Collaborative: Quantification of Land-use/Land Cover Change as Driver of Earth System Dynamics," DOE SC/BER (SciDAC DE-FOA-0001036), 9/1/2014 – 8/31/2017, $197K (LBNL funding).

41. Laboratory Principal Investigator (with PI Joao Teixeira, UCLA and JPL), "An Integrative Parameterization of Boundary Layer and Convective Mixing: The Eddy-Diffusivity/Mass-Flux (EDMF) Approach," DOE SC/BER (SciDAC DE-FOA-0001036), 10/1/2014 – 9/30/2017, $225K (LBNL funding).

42. Laboratory Principal Investigator [Daniel R. Feldman, LBNL, co-PI] (with PI Robert Pincus, NOAA and CSU), "Centralized activities in support of the Radiative Forcing Model Intercomparison Project," DOE SC/BER (SciDAC DE-FOA-0001036), 11/1/2014 – 10/31/2017, $293K (LBNL funding).

43. Co-Investigator (with PI Andrew Jones, LBNL) , "Ultra High-Resolution Climate Projections to Support Climate Readiness in the San Francisco Bay Area", LBNL Laboratory Directed Research & Development (LDRD), 10/1/2015 – 9/30/2017, $200K.
44. Co-Investigator (with PI Hans Johansen, LBNL) , "Modeling the Earth's Hydrological Cycle from Watershed to Global Scales", LBNL Laboratory Directed Research & Development (LDRD), 10/1/2015 – 9/30/2017, $200K.
45. Laboratory Principal Investigator (with PI Xianglei Huang, U. Michigan), "Collaborative: More realistic representations of the longwave radiative interactions between surface and clouds in the Polar Regions in the global circulation model (GCM)," DOE SC/BER (SciDAC DE-FOA-0001036), 4/1/2015 – 3/31/2018, $180K (LBNL funding).
46. Laboratory Principal Investigator [Travis A. O'Brien, LBNL, co-PI] (PI Alex Hall, UCLA), "Collaborative: Developing Metrics to Evaluate the Skill and Credibility of Downscaling," DOE SC/BER (SciDAC DE-FOA-0001036), 8/1/2015 – 7/31/2018, $149K (LBNL funding).
47. Laboratory Research Manager, "CASCADE: Calibrated and Systematic Characterization, Attribution, and Detection of Extremes Scientific Focus Area," DOE BER, 10/1/2013 – 9/30/2019, $14M.
48. co-Investigator (with PI Paul Ullrich, UC Davis), "An Integrated Evaluation of the Simulated Hydroclimate System of the Continental US", DOE (SC/BER) SC-FOA-0001531, 9/1/2016 – 8/31/2019, $1.8M (total).
49. Principal Investigator, "Resources to Support Sea Level Rise Planning in California", State of CA OPC (Ocean Protection Council) and CNRA (California Natural Resources Agency), DOE (SC/BER) DE-FOA-0001285 10/13/2016 – 12/31/2018, $255K.
50. Laboratory Principal Investigator (with PI Ashok Gadgil, LBNL and UC Berkeley), "CERC for Water-Energy Solutions and Technologies (CERC WEST)", DOE (SC/BER) DE-FOA-0001285, 11/1/2015 – 10/31/2020, $625K (LBNL funding to Collins).
51. Principal Investigator, "Accelerator for Climate/Energy/Environment Solutions (ACE2S)," UCOP Contractor Fee and UC Berkeley, Vice Chancellor of Research, 1/1/2018 – 12/31/2020, $320K.
52. Principal Investigator, "Intergovernmental Panel on Climate Change," UCOP Management Fee, 10/1/2017 – 10/1/2020,

10 Current External Research Support

1. Laboratory Principal Investigator (Lead Lab PI: Dave Bader, LLNL), "Energy Exascale Earth System Model Scientific Focus Area (E3SM, formerly The ACME project)," DOE BER, 6/1/2014 – 9/30/2022, $14.69(M) (LBNL funding).

2. Laboratory Research Manager, "CASCADE: Calibrated and Systematic Characterization, Attribution, and Detection of Extremes Scientific Focus Area," DOE BER, 10/1/2019 – 9/30/2022, $8.25M.

3. Co-Principal Investigator (transferred once original co-PI Travis O'Brien became affiliate), "Monsoon Extremes: Impacts, Metrics, and Synoptic-Scale Drivers," DOE SC/BER, $121K/year.

4. Co-Principal Investigator (transferred once original co-PI Christina Patricola became affiliate), "Assessing the influence of background state and climate variability on tropical cyclones using initialized ensembles and mesh refinement in E3SM," DOE SC/BER, $76K/year.

5. Co-Investigator (with institutional PI Daniel Feldman), "Earth System Venture Libera," NASA, $76K/year

11 Pending External Research Support

1. Laboratory Principal Investigator (with lead PI Patrick Chuang, University of California, Santa Cruz), "Identifying and quantifying changes in extreme events," DOE SC/BER Reaching a New Energy Sciences Workforce (RENEW): DE-FOA-0002757, 12/01/2022 – 11/30/2026, $20K/year.