

Curriculum Vitae - Jennifer E. Kay

University of Colorado, Boulder (CU Boulder)

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Prof. Kay researches climate variability and change. Her work connects atmospheric and oceanic circulations with cloud, precipitation, and sea ice processes.

Appointments

Fellow, Cooperative Institute for Research in Env. Science (CIRES), CU Boulder, Jan. 2014-present

Associate Director, Cryospheric and Polar Processes CIRES, CU Boulder, Sept. 2021-present

Associate Professor, Dept. Atmospheric and Oceanic Sciences (ATOC), CU Boulder, Aug. 2019-present

Assistant Professor, ATOC, CU Boulder, Jan. 2014-July 2019

Invited Researcher, Ecole Polytechnique and Laboratoire Meteorologie Dynamique (LMD), Palaiseau, France, May 2017, May 2018, June 2020 (cancelled due to COVID)

Visiting Professor, Laboratoire de Glaciologie et Geophysique de l'Environnement (LGGE), Grenoble, France, May 2013

Visiting Scientist, LGGE/LMD/Stockholm University (SU) Stockholm, Sweden, Spring 2012

Project Scientist, National Center for Atmospheric Research (NCAR), 2009-2013

Affiliate Faculty, Dept. Atmospheric Sciences, Colorado State University (CSU), 2008-2011

Postdoctoral Fellow, NCAR CGD and CSU Dept. Atmospheric Sciences, 2007-2009

Education

Ph.D., Earth and Space Sciences, University of Washington-Seattle, 2006

M.S., Geological Sciences, University of Washington-Seattle, 2002

B.A. Magna Cum Laude with Honors, Economics & Geological Sciences, Brown University, 1999

Awards and Honors

- Clarivate/Web of Science Highly Cited Researcher (2021)
- ATOC Faculty Service Award, for graduate admissions (2020)
- University of Colorado Provost's Faculty Achievement Award (2018)
- American Geophysical Union (AGU) Future Horizons in Climate Science: Turco Lectureship (2018) *"In recognition of seminal interdisciplinary scientific research discoveries or advancements through observations or analyses and addressing key questions or uncertainties in the broad and dynamic field of climate science"*
- American Meteorological Society (AMS) Henry G. Houghton Award (2017) *"given to promising young or early-career scientists who have demonstrated outstanding ability"*, Award given *"for the innovative use of observations and global climate models to better understand the rapidly evolving climate of the polar regions"*
- National Science Foundation (NSF) CAREER Award (2016), *"the National Science Foundation's most prestigious award in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations"*

Awards and Honors (continued)

- Community Earth System Model (CESM) Distinguished Achievement Award (2016), Award given “for leadership and management of the CESM Large Ensemble project, one of NCAR's most significant contributions to the US climate research community”
- NCAR CGD Special Achievement Award (2015), for research on climate feedbacks
- Citation for Excellence in Refereeing, *Geophysical Research Letters* (2014)

Funded Proposals to CU Boulder (\$3.4 Million, 7 Kay PI grants, 2 Kay co-I grants)

Active

- NASA CloudSat and CALIPSO Science Team, Advanced understanding and modeling of polar cloud and precipitation processes using CloudSat and CALIPSO (Kay PI, \$612k, 2019-2022)
- NASA Earth Ventures Instrument, The Polar Radiant Energy in the Far Infrared Experiment (PREFIRE), (T. L'Ecuyer U. Wisconsin PI, Kay co-I, Total budget \$35 million, CU budget under management of co-I Kay \$600K, 2018-2023, supplement submitted Spring 2020)
- NSF CAREER: Going global - The influence of Southern Ocean albedo on large-scale climate dynamics (Kay PI, \$820K, 2016-2021)

Complete

- NSF Office of Polar Programs (OPP), Collaborative Research: Uncertainty in Antarctic climate change projections and the role of sea ice, clouds and ocean structure (Kay PI, \$244K, 2017-2019)
- CIRES Innovative Research Program, Assessing the potential of biometric sensors to measure engagement and learning in the classroom (Kay PI, \$25k, 2019)
- NSF CAREER: Going global - The influence of Southern Ocean albedo on large-scale climate dynamics (Kay PI, \$820K, 2016-2021)
- NASA CloudSat+CALIPSO Science Team, Advanced understanding and modeling of polar cloud and precipitation processes using CloudSat, CALIPSO, and complementary datasets (Kay PI, \$598K, 2016-2019)
- NSF OPP, Workshop: Enabling US Early Career Researchers to Advance Polar Science using High Performance Computing and Earth System Modeling, (Kay PI, \$49K, 2017-2018)
- NASA CloudSat+CALIPSO Science Team, Advanced understanding and modeling of Arctic cloud processes and feedbacks (Kay PI, \$552K, 2014-2016)

Pending Proposals to CU Boulder (\$1.9 million)

- NSF Arctic Natural Sciences (ANS) Beyond circulation: What controls historical and near-future (1980-2060) Arctic warming and impacts on lower latitudes? (Kay PI, \$568,202)
- NASA CloudSat+CALIPSO Science Team, Advanced understanding and modeling of polar cloud and precipitation processes using CloudSat, CALIPSO, and complementary datasets (Kay PI, \$805,112)
- NASA Salinity Science Team, Advanced understanding and modeling of 21st century surface ocean salinity change using Aquarius, SMAP, and complementary datasets (Kay PI, \$565,330)

Funded Proposals Prior to CU Boulder (\$1.9 Million)

- NASA CloudSat/CALIPSO Science Team: Observing and Modeling Cloud Influence on Recent and Projected Arctic Sea Ice Loss (\$494K, Kay Science PI, awarded to NCAR 2010)
- NASA Modeling, Analysis, and Prediction (MAP) Program: Seamless prediction of clouds and their effects on weather and climate (\$1.4 million, A. Gettelman PI, Kay Co-I, awarded to NCAR 2009)

Peer-reviewed Publications:

H-index 39 (Web of Science), 45 (Google Scholar)

Web of Science Publons/Researcher ID: C-6042-2012, ORCID ID: 0000-0002-3625-5377

As of January 2022:

86 published total papers including:

- 21 first-author papers
- 30 papers led by students or postdocs advised/co-advised by J. E. Kay
- 8 highly cited papers: 3 first-author (#53, #44, #28), 5 co-author (#55, #31, #30, #20, #10). *Note: highly cited papers rank in the top 1% by citations for field and publication year in Web of Science.*

46 published papers since starting at CU Boulder in January 2014 including:

- 7 first-author papers
- 26 papers led by students or postdocs: 9 in the Kay Group, and 13 co-advised by J. E. Kay
- 3 highly cited papers: 2 first-author (#53, #44), 1 co-author (#55)
- 1 invited review paper as first-author (#54)

Publications while at CU Boulder

¹ = student or postdoc in Kay group at CU Boulder

² = student or postdoc co-advised by J. E. Kay

Under Review

Kay, J. E., ²DeRepentigny, P., Holland, M. M., Bailey, D. A., DuVivier, A. K., Blanchard-Wrigglesworth, E., Deser, C., Jahn, A., Singh, H., Smith, M. M., Webster, M. A., Edwards, J., Lee, S.-S., Rodgers, K. B. and N Rosenbloom (revised), Less surface sea ice melt in the CESM2 improves Arctic sea ice simulation with minimal non-polar climate impacts, *Journal of Advances in Modeling Earth Systems (JAMES)*

²DeRepentigny, P., Jahn, A., Holland, M. M., **Kay, J. E.**, Fasullo, J., Lamarque, J-F, Hannay, C., Mills, M. J., Bailey, D. A., Tilmes, S. and A. Barrett, (revised), *Nature Climate Change*

Singh, H., Feldl, N., **Kay, J. E.**, and A. L. Morrison (being revised), Climate Sensitivity is Sensitive to Changes in Ocean Heat Transport, *J. Climate*,

Zhu, J., Otto-Bliesner, B., Brady, E. C., Poulsen, C. J., ¹Shaw, J. K. and **J. E. Kay** (revised), LGM paleoclimate constraints inform cloud parameterizations and equilibrium climate sensitivity in CESM2, *JAMES*

2022

87) ¹Chalmers, J. **Kay, J. E.**, ¹Middlemas, E. A., Maroon, E. A., and P. DiNezio (2022), The linearity of greenhouse warming and cooling in CESM1, *J. Climate*, accepted December 15 2021

2021 (4)

86) ²Chemke, R, Polvani, L. M., **Kay, J. E.**, and C. Orbe, (2021), Ocean heat transport nearly halves Arctic amplification and sea-ice loss over the 21st century, *Nature Atmosphere and Climate*, 4:46, <https://doi.org/10.1038/s41612-021-00204-8>

85) Mulmenstadt, J, Salzmann, M., **Kay, J.E.**, Zelinka, M. D., Ma, P., Hornig, S., and J. Quaas, (2021), An underestimated negative cloud feedback from cloud lifetime changes, *Nature Climate Change*, 11(6), 508–513. <https://doi.org/10.1038/s41558-021-01038-1>

84) ²Huang, Y., Dong, X., **Kay, J. E.**, Xi, B., and ²E. A. McIlhatten (2021), The Climate Response to Increased Cloud Liquid Water over the Arctic in CESM1: A Sensitivity Study of Wegener–Bergeron–Findeisen Process, *Climate Dynamics*, 56, 3373–3394 (2021). <https://doi.org/10.1007/s00382-021-05648-5>

83) L'Ecuyer, T., Drouin, B. D., Anheuser, J., Grames, M., Henderson, D. S., Huang, X., Kahn, B. H., **J. E. Kay**, Lim, B. H., Mateling, M., Merrelli, A., Miller, N. B., Padmanabhan, S., Peterson, C., Schlegel, N.-J., White, M. L., and Y. Xie, (2021), The Polar Radiant Energy in the Far InfraRed Experiment: A New Perspective on Energy Exchanges in the Earth's Polar Regions, *BAMS*, <https://doi.org/10.1175/BAMS-D-20-0155.1>

2020 (10)

- 82) **Kay, J. E.** (2020), Early climate models successfully predicted global warming, *Nature*, 578, 45-46 (2020), doi: 10.1038/d41586-020-00243-w.
- 81) ¹Middlemas, E., **Kay, J. E.**, Medeiros, B. and E. Maroon (2020), Quantifying the influence of cloud radiative feedbacks on Arctic surface warming using cloud locking in an earth system model, *Geophysical Research Letters*, <https://doi.org/10.1029/2020GL089207>
- 80) Schneider, D., **Kay, J. E.**, and J. Lenaerts, (2020), Improved clouds over Southern Ocean amplify Antarctic precipitation response to ozone depletion in an Earth system model, *Climate Dynamics*, <https://doi.org/10.1007/s00382-020-05346-8>
- 79) ²McIlhatten, E., **Kay, J. E.**, and T. L'Ecuyer, (2020), Arctic Clouds and Precipitation in the Community Earth System Model Version 2, *JGR-Atmospheres*, <https://doi.org/10.1029/2020JD032521>
- 78) DuVivier, A., Holland, M., **Kay, J. E.**, S. Tilmes, A. Gettelman, and D. Bailey (2020), Arctic and Antarctic sea ice state in the Community Earth System Model Version 2, *JGR-Oceans*, <http://dx.doi.org/10.1029/2019JC015934>
- 77) Molnar, P., Bitz, C. M., Holland, M. M. **Kay, J. E.**, Penk, S. R., and S. Amstrup (2020), Fasting season length sets temporal limits for global polar bear persistence, *Nature Climate Change*, <https://www.nature.com/articles/s41558-020-0818-9>
- 76) Lenaerts, J. T. M., ²Camron, M. D., ²Wyburn-Powell, C. R., and **Kay, J. E.** (2020), Present-day and future Greenland Ice Sheet precipitation frequency from CloudSat observations and the Community Earth System Model, *The Cryosphere*, 14, 2253–2265, <https://doi.org/10.5194/tc-14-2253-2020>.
- 75) Danabasoglu, G. and co-authors including **Kay, J. E.** (2020), The Community Earth System Model version 2 (CESM2), *JAMES*, <https://doi.org/10.1029/2019MS001916>
- 74) Deser, C., Lehner, F., Rodgers, K. B., et al. including **J. E. Kay** (2020), Strength in Numbers: The Utility of Large Ensembles with Multiple Earth System Models, *Nature Climate Change*, 10, 277–286. <https://doi.org/10.1038/s41558-020-0731-2>
- 73) DuVivier, A., ²DeRepentigny, P., Holland, M., Webster, M., **Kay, J. E.**, and D. Perovich (2020), Going with the floe: tracking CESM Large Ensemble sea ice in the Arctic provides context for ship-based observations, *The Cryosphere*, 14, 1259–1271, <https://doi.org/10.5194/tc-14-1259-2020>.

2019 (4)

- 72) ¹Morrison, A., ¹Rozak, S., Gold, A., and **J. E. Kay** (2019), Quantifying student engagement in learning about climate change using galvanic hand sensors in a controlled educational setting, *Climatic Change*, accepted October 2019
- 71) ²Takahashi, H., Lebsock, M., Richardson, M., Marchand, R. and **J. E. Kay** (2019), When will spaceborne cloud radar detect upward shifts in cloud heights?, *JGR-Atmospheres*, DOI: 10.1029/2018JD030242
- 70) ²Huang, Y., Dong, X., Bailey, D., Holland, M., Xi, B., DuVivier, A., **J. E. Kay**, Landrum L. and Y. Deng (2019), Thicker clouds and accelerated Arctic sea ice decline: The atmosphere-sea ice interactions in spring, *Geophysical Research Letters*, DOI: 10.1029/2019GL082791
- 69) ¹Morrison, A. L. **Kay, J. E.**, Chepfer, H., Guzman, R., and W. Frey (2019), Cloud response to Arctic sea ice loss and implications for future feedbacks in the CESM1 climate model, *JGR-Atmospheres*, 124 (2), 1003-1020, <https://doi.org/10.1029/2018JD029142>

2018 (8)

- 68) **Kay, J. E.**, L'Ecuyer, T., Pendergrass, A., Chepfer, H., Guzman, R., and V. Yettella (2018), Scale-aware and definition-aware evaluation of modeled near-surface precipitation frequency using CloudSat observations, *Journal of Geophysical Research (JGR) Atmospheres*, 123,4294–4309, <https://doi.org/10.1002/2017JD028213>
- 67) Goosse, H., **Kay, J. E.**, Armour, K. C., Bodas-Salcedo, A., Chepfer, H., Docquier, D., Jonko, A., Kushner, P. J., Lecomte, O., Massonnet, F., Park, H., Pithan, F., Svensson, G., and M. Vancoppenolle (2018), Quantifying climate feedbacks in polar regions, *Nature Communications*, 9, 1919, doi:10.1038/s41467-018-04173-0.
- 66) ¹Morrison, A. L., **Kay, J. E.**, Chepfer, H., Guzman, R. & Yettella, V. (2018). Isolating the liquid cloud response to recent Arctic sea ice variability using spaceborne lidar observations. *JGR Atmospheres*, 123, 473–490, <https://doi.org/10.1002/2017JD027248>
- 65) ¹Maroon, E. A., **Kay, J. E.**, and K. Karlsruhkas (2018), Influence of the Atlantic meridional overturning circulation on the Northern Hemisphere surface temperature response to radiative forcing, *J. Climate*, in press, <https://doi.org/10.1175/JCLI-D-17-0900.1>
- 64) ¹Frey, W. R., ¹Morrison, A. L., **Kay, J. E.**, Guzman, R., and H. Chepfer (2018), The combined influence of observed Southern Ocean clouds and sea ice on top-of-atmosphere albedo, *JGR Atmospheres*, 123,4461–4475, <https://doi.org/10.1029/2018JD028505>
- 63) ¹Yettella, V., Weiss, J., **Kay, J. E.**, and A. G. Pendergrass (2018), An ensemble framework for quantifying forced climate variability and its time of emergence, *J. Climate*, 31:10, 4117–4133, <https://doi.org/10.1175/JCLI-D-17-0719.1>
- 62) ²Lacour, A., Chepfer, H., Miller, N., Shupe, M. Noel, V., Fettweis, X., Gallee, H., **Kay, J. E.**, Guzman, R., and J. Cole (2018), How well are clouds simulated over Greenland in CMIP5 models? Consequences for the surface cloud radiative effect over the ice sheet. *J. Climate*, 30 (15), 6065–6083, <https://doi.org/10.1175/JCLI-D-18-0023.1>
- 61) ²Miller, N. B., Shupe, M. D., Lenearts, J. T. M., **Kay, J. E.**, deBoer, G. and R. Bennartz (2018), Process-based model evaluation using surface energy budget observations in central Greenland, *JGR Atmospheres*, 123, <https://doi.org/10.1029/2017JD027377>

2017 (6)

- 60) ¹Frey, W. R., ¹Maroon, E. A., Pendergrass, A. G., and **J. E. Kay** (2017), Do Southern Ocean cloud feedbacks matter for 21st century warming?, *Geophysical Research Letters*, 44, 12,447–12,456. DOI: 10.1002/2017GL076339
- 59) ¹Frey, W., and **J. E. Kay** (2017), The influence of extratropical cloud phase and amount feedbacks on climate sensitivity, *Climate Dynamics*, 50: 3097, DOI: 10.1007/s00382-017-3796-5
- 58) ¹Yettella, V. and **J. E. Kay** (2017) How will precipitation change in extratropical cyclones as the planet warms? Insights from a large initial condition climate model ensemble, *Climate Dynamics*, 49: 1765, <https://doi.org/10.1007/s00382-016-3410-2>
- 57) ²Guzman, R., Chepfer, H., Noel, V., Vaillant de Guelis, T., **Kay, J. E.**, Raberanto, P., Cesana, G., Vaughan, M. A., and D. M. Winker (2017), Atmospheric opacity observed by CALIPSO, *JGR Atmospheres*, 122 (2), 1066–1085, doi:10.1002/2016JD025946
- 56) ²Lacour, A., Chepfer, H., Stone, M.², Shupe, M., Miller, N.², Noel, V. **Kay, J. E.**, and D. D. Turner (2017), Greenland clouds observed by CALIPSO: comparison with ground-based Summit observations, *J. Climate*, 30, 6065–6083, <https://doi.org/10.1175/JCLI-D-16-0552.1>
- 55) Webb, M., T. Andrews, A. Bodas-Salcedo, S. Bony, Christopher S. Bretherton, R. Chadwick, H. Chepfer, H. Douville, P. Good, **J. E. Kay**, S. A. Klein, R. Marchand, B. Medeiros, A. P. Siebesma, C. B. Skinner, B. Stevens, G. Tselioudis, Y. Tsushima, and M. Watanabe (2017), The Cloud Feedback Model Intercomparison Project (CFMIP) contribution to CMIP6, *Geosci. Model Dev*, 10, 359–384, doi:10.5194/gmd-10-359-2017 [highly cited paper](#)

2016 (10)

- 54) **Kay, J. E.**, L'Ecuyer, T., Chepfer, H., Loeb, N., ¹Morrison, A., and G. Cesana (2016), Recent advances in Arctic cloud and climate research, *Current Climate Change Reports*, DOI: 10.1007/s40641-016-0051-9. [invited review paper](#)
- 53) **Kay, J. E.**, ²Wall, C. J., ¹Yettella, V., Medeiros, B. Hannay, C., Caldwell, P. and C. Bitz (2016), Global climate impacts of fixing the Southern Ocean shortwave radiation bias in the Community Earth System Model, *J. Climate*, 29:12, 4617–4636, doi:10.1175/JCLI-D-15-0358.1 [highly cited paper](#)
- 52) **Kay, J. E.**, ²Bourdages, L., Chepfer, H., ²Miller, N., ¹Morrison, A., ¹Yettella, V., and B. Eaton (2016), Evaluation of cloud phase in the Community Atmosphere Model version 5 using spaceborne lidar observations, *JGR Atmospheres*, 121:8, 4162–4176, DOI: 10.1002/2015JD024699
- 51) ²Barnhart, K. R., Miller, C. R., Overeem, I. and **J. E. Kay** (2016), Mapping the future expansion of Arctic open water, *Nature Climate Change*, doi:10.1038/nclimate2848
- 50) ²Palerme, C., Genthon, C., Claud, C., **Kay, J. E.**, Wood, N. B. and T. L'Ecuyer (2016), Evaluation of current and projected Antarctic precipitation in CMIP5 models, *Climate Dynamics*, DOI 10.1007/s00382-016-3071-1
- 49) Jahn, A., Holland, M. and **J. E., Kay** (2016), How predictable is the timing of a summer ice-free Arctic?, *Geophysical Research Letters*, doi: 10.1002/2016GL070067
- 48) Stephens, G. L., Haukuba, M. Z., Hawcroft, M., Haywood, J., Behrangi, A, **Kay, J. E.**, and P. J. Webster (2016), The curious nature of the hemispheric symmetry of the Earth's water and energy balances, *Current Climate Change Reports*, doi:10.1007/s40641-016-0043-9
- 47) Favier, V., and co-authors including **Kay, J. E.** (2016). Atmospheric drying as the main driver of dramatic glacier wastage in the southern Indian Ocean, *Nature Scientific Reports*, 6, 32396 doi:10.1038/srep32396
- 46) Day, J., Svensson, G., Brooks, I., Bitz, C. Broman, L., Carver, G., Cevallier, M., Goessling, H., Hartung, K., Jung, T., **Kay, J. E.**, Kolstad, E. W., Perovich, D., Screen, J., Seimen, S., Vana, F. (2016), The Abisko Polar Prediction School, *Bulletin of the American Meteorological Society*, 98:3, 445-447, DOI: <http://dx.doi.org/10.1175/BAMS-D-16-0119.1>
- 45) Baker, A. H., and co-authors including **Kay, J. E.**, (2016), Evaluating Lossy Data Compression on Climate Simulation Data within a Large Ensemble, *Geosci. Model Dev*, 9, 4381-4403, doi:10.5194/gmd-9-4381-2016

2015 (3)

- 44) **Kay, J. E.**, Deser, C., Phillips, A., Mai, A., Hannay, C., Strand, G., Arblaster, J., Bates, S., Danabasoglu, G., Edwards, J., Holland, M. Kushner, P., Lamarque, J.-F., Lawrence, D., Lindsay, K., Middleton, A., Munoz, E., Neale, R., Oleson, K., Polvani, L., and M. Vertenstein (2015), The Community Earth System Model (CESM) Large Ensemble Project: A Community Resource for Studying Climate Change in the Presence of Internal Climate Variability, *Bulletin of the American Meteorological Society*, 96, 1333–1349, doi:10.1175/BAMS-D-13-00255.1, [highly cited paper](#)
- 43) ²Matus, A. V., L'Ecuyer, T. S., **Kay, J. E.**, Hannay, C. and J.-F. Lamarque (2015), The Role of Clouds in Modulating Global Aerosol Direct Radiative Effects in Spaceborne Active Observations and the Community Earth System Model. *J. Climate*, 28, 2986–3003. doi: <http://dx.doi.org/10.1175/JCLI-D-14-00426.1>
- 42) ²Swart, N. C., Fyfe, J. C., Hawkins, E., **Kay, J. E.**, and A. Jahn (2015), Influence of internal variability on Arctic sea-ice trends, *Nature Climate Change*, 5, 86-89, doi:10.1038/nclimate2483.

2014 (5)

- 41) **Kay, J. E.** B. Medeiros, ²Y.-T. Hwang, A. Gettelman, ²J. Perket, and M. G. Flanner (2014), Processes controlling Southern Ocean shortwave climate feedbacks in CESM, *Geophys. Res. Lett.*, 41, doi:10.1002/2013GL058315.
- 40) ²English, J. M., **Kay, J. E.**, Gettelman, A., Liu, X., Wang, Y., Zhang, Y. and H. Chepfer, (2014), Contributions of clouds, surface albedos, and mixed-phase ice nucleation schemes to Arctic radiation biases in CAM5, *J. Climate*, doi: <http://dx.doi.org/10.1175/JCLI-D-13-00608.1>

- 39) ²Palerme, C., **Kay, J. E.**, Genthon, C., L'Ecuyer, T., Wood, N. B., and C. Claud (2014), How much snow falls on the Antarctic ice sheet?, *The Cryosphere*, 8, 1577-1587, doi:10.5194/tc-8-1577-2014.
- 38) ²Perket, J., Flanner, M. G. and **J. E. Kay** (2014), Diagnosing Shortwave Cryosphere Radiative Effect and 21st Century Evolution in CESM, *J. Geophys. Res.*, doi: 10.1002/2013JD021139
- 37) Tilmes, S., Jahn, A., **Kay, J. E.**, M. Holland and J.-F. Lamarque (2014), Can regional climate engineering save the summer Arctic sea ice?, *Geophys. Res. Lett.*, doi: 10.1002/2013GL058731

Publications before CU Boulder

² = graduate student or postdoc co-advised by J. E. Kay

- 36) **Kay, J. E.** and T. L'Ecuyer (2013): Observational constraints on Arctic Ocean clouds and radiative fluxes during the early 21st century, *J. Geophys. Res.*, 118, doi:10.1002/jgrd.50489.
- 35) Gettelman, A., **J. E. Kay**, and J. T. Fasullo, 2013: Spatial Decomposition of Climate Feedbacks in the Community Earth System Model. *J. Climate*, 26, 3544–3561, doi: <http://dx.doi.org/10.1175/JCLI-D-12-00497.1>
- 34) Holland, M. M., ²Blanchard-Wrigglesworth, E., **Kay, J. E.**, and S. Vavrus (2013), Initial-value predictability of Antarctic sea ice in the Community Climate System Model 3, *Geophys Res Lett.*, 40, 2121–2124, doi:10.1002/grl.50410.
- 33) Brady, E., Otto-Bliesner, B **Kay, J. E.**, and N. Rosenbloom (2013), Sensitivity to Glacial Forcing in the CCSM4, *J. Climate*, 26, 1901–1925, doi: <http://dx.doi.org/10.1175/JCLI-D-11-00416.1>.
- 32) ²Sand, M., Berntsen, T. K., **Kay, J. E.**, Lamarque, J. F., Seland, Ø., and Kirkevåg, A., (2013), The Arctic response to remote and local forcing of black carbon, *Atmos. Chem. Phys.*, 13, 211-224, doi:10.5194/acp-13-211-2013.
- 31) Hurrell, J., Holland, M. M., Gent, P. R., Ghan, S., **Kay, J. E.**, Kushner, P., Lamarque, J-F., Large, W., G., Lawrence, D., Lindsay, K., Lipscomb, W. H., Long, M., Mahowald, N., Marsh, D., Neale, R., Rasch, P., Vavrus, S., Vertenstein, M., Bader, D., Collins, W. D., Hack, J. J., Kiehl, J. and S. Marshall, (2013), The Community Earth System Model: A Framework for Collaborative Research, *Bull. Amer. Meteor. Soc.*, doi: <http://dx.doi.org/10.1175/BAMS-D-12-00121.1> highly cited paper
- 30) Meehl, G., Washington, W. M., Arblaster, J. M., Hu, A., Teng, H., **Kay, J. E.**, Gettelman, A., Lawrence, D. M., Sanderson, B. M., and W. G. Strand, (2013), Climate change projections in CESM1(CAM5) compared to CCSM4, *J. Climate*, doi: <http://dx.doi.org/10.1175/JCLI-D-12-00572.1> highly cited paper
- 29) **Kay, J. E.**, Holland, M. M., Bitz, C., Gettelman, A., ²Blanchard-Wrigglesworth, E., Conley, A., and D. Bailey, (2012), The influence of local feedbacks and northward heat transport on the equilibrium Arctic climate response to increased greenhouse gas forcing in coupled climate models, *J. Climate*, 25, 5433-5450, doi: <http://dx.doi.org/10.1175/JCLI-D-11-00622.1>
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Teaching Activities

Courses developed and taught as primary instructor at CU Boulder:

- **ATOC5860 Objective Data Analysis Lab** (Spring 2018, Spring 2019, Fall 2020, Spring 2022 planned), 3-credit course for graduate students. Developed by Prof. Kay at request of ATOC graduate students and faculty. Course provides “learning by doing” in advanced data analysis methods and programming in Python, Course designed to enable students to apply methods to their own research, Course taught with 50% lectures and 50% “application labs” to demonstrate and apply methods using datasets in atmospheric and oceanic sciences and beyond. Fall 2020 adapted to be offered online.
- **ATOC 4870/5870 Climate Modeling Lab** (Fall 2016), 3-credit course taught primarily to undergraduates with little prior computing and modeling experience, also cross-listed for ATOC graduate students. Course covers 0-dimensional energy balance models, 1-dimensional energy balance models including latitudinal dependence and seasonal cycle, and ended with students designing and running their own fully coupled climate modeling experiments using state-of-the-art supercomputing facilities.
- **ATOC6020 Climate Classics** (planned Spring 2022), 1-credit course offered as a teaching overload. Goal is to expose students to classics in climate science literature through discussion. Offered jointly with Prof. Jeff Weiss and Prof. Pedro DiNezio.
- **ATOC6020 Polar Discussion** (Fall 2015, Fall 2017, Fall 2018), 1-credit course offered as a teaching overload. Typical enrollment ~10 graduate students in ATOC, Geology, Geography and Engineering, course goal is to expose students to current literature through paper discussion and student presentations and to enable students to network through panel presentations from polar scientists at CU and national laboratories located in Boulder including NSIDC, NOAA, and NCAR.
- **ATOC6020 Sea Ice** (Fall 2016), 1-credit course offered as a teaching overload. Course had 11 students from ATOC, Geology, Geography, and Engineering. While J. Kay was listed as the primary instructor, Alice Bradley, then a CU Aerospace Engineering Ph.D. candidate, taught the course. J. Kay mentored A. Bradley and provided constructive feedback on lecturing style and planned activities including modeling and data analysis. *Dr. Bradley is now a faculty member Williams College.*

Courses taught as primary instructor at CU Boulder:

- **ATOC1060 Our Changing Environment** (Fall 2014, Fall 2015, Spring 2017, Fall 2017, Fall 2018, Fall 2019, Fall 2021), 3-credit large (~200 students) undergraduate non-science major course on climate. Course in three equal parts: 1) how the climate system works, 2) climate change on geologic timescales (thousands-billions of years), and 3) climate change on human timescales (decades-centuries). Used Learning Assistant Program and Clickers every semester. Fall 2021 adapted to be offered online.
- **ATOC5600 Physics and Chemistry of Clouds and Aerosols**, 3-credit required ATOC core course for graduate students (Spring 2014, Spring 2016, Spring 2020)

Professional Development at CU Boulder:

- FTEP "Teaching in a nutshell" (Spring 2014), "Effective Use of Clickers" (Fall 2014), "Designing and Grading Assessments and Exams" (Fall 2014), "Aligning Course Goals with Assignments" (Spring 2018), "Inclusive Pedagogy" (Fall 2019)
- LEAP Introductory Leadership Workshop (May 2015)
- iclicker Upgrade and Training (Every Fall)

Graduate Students in Kay group at CU Boulder

- G. Clow, ATOC Ph.D. Student, Fall 2021-present (co-advised with Prof. Nikki Lovenduski)
- W. Bertrand, ATOC Ph.D. Student, Fall 2021-present
- S. Leister, ATOC Ph.D. Student, Fall 2021-present
- J. Shaw, ATOC Ph.D. Student, Fall 2020-present
- A. Pinkney, ATOC Master of Science, graduated Fall 2020
- M. Gentry, ATOC Master of Science, graduated Spring 2020
- A. Morrison, ATOC Ph.D. graduated 2019, awarded 2016-2017 STEM Chateaubriand Fellowship by the Embassy of France to spend 5 months doing research in France, *Morrison et al. (2018a)*, *Morrison et al. (2019a)*, *Morrison et al. (2019b)*, Invited talk AGU (2016, 2018, 2019), AGU Outstanding Student Presentation Award (2018), *Current position: Postdoc, U. Victoria*
- V. Yettella, ATOC Ph.D., graduated 2018, CIRES Graduate Student Research Award (2017), *Yettella and Kay (2016)*, *Yettella et al. (2018)*, *Yettella and England (2019)*, INSIGHT Data Science Fellowship, *Current position: Engineer, Apple*
- W. Frey, ATOC Ph.D., graduated 2018, *Frey and Kay (2017)*, *Frey et al. (2017)*, *Frey et al. (2018)*. *Current position: Major, U.S. Air Force*
- R. Bateman, ATOC Master of Science with Research Thesis, graduated Spring 2018.
- B. MacFerrin, Master of Science in Information & Communication Technology for Development (ICTD), graduated Spring 2017.

Postdoctoral fellows in Kay group at CU Boulder

- M. Diamond, CIRES Visiting Fellow/NOAA, November 2020-present (co-advised with Dr. Graeme Feingold NOAA)
- N. Maher, CIRES Visiting Fellow/ATOC, November 2020-present (co-advised with Dr. Antonietta Capotondi NOAA)
- E. Middlemas, CIRES Visiting Fellow/ATOC, January 2019-September 2020 *Current position: Data Scientist, Jupiter*
- A. Morrison, CIRES/ATOC, June 2019-December 2019, *Current position: Postdoc, U. Victoria*
- E. Maroon, CIRES Visiting Fellow/ATOC, 2016-2018, *Current position: Assistant Professor, University of Wisconsin Madison, Dept. of Atmospheric and Oceanic Sciences*
- A. Pendergrass, CIRES/ATOC, 2016. *Current position: Assistant Professor, Cornell University, Department of Earth and Atmospheric Sciences*

Undergraduates in Kay group at CU Boulder

- R. Barrera, Computer Science Undergraduate, U. Texas Rio. Grande Valley (Summer 2021 ATOC Data Science REU)
- J. Chalmers, CU Chemical Engineering Class of 2020, independent research (2018-2020) Funded Kay NSF CAREER award by the CU Boulder Undergraduate Research Opportunities Program (UROP) Program (2019), Project: "Linearity of cloud feedbacks in idealized climate models", work published in *Journal of Climate*, Chalmers, Kay et al. (in press)
- S. Rozak, Pike Peak Community College, Summer 2018, funded by the CIRES Research Experience for Community College Students (RECCS) Program, Summer 2018
- K. Manley, ENVS/ATOC Minor, Honors Thesis, graduated Spring 2018 Magna Cum Laude

- L. Rieves, Summer 2017, sponsored by the CU Boulder Undergraduate Research Opportunities Program (UROP) Program, Project Title: “Future of Farming in the Heartland”

Graduate Student Committees (Non-Chair)

- CU Boulder Ph.D. in progress (4): H. Chen, P. Case, L. Wang, M. Thompson-Munson
- External to CU Boulder Ph.D. in progress (1): X. Li (U. Utah, Atmospheric Science)
- CU Boulder Ph.D. graduated (13): N. Miller ATOC (2017), A. Crawford Geography (2017), K. Tomoko ATOC (2018), M. Tooth Aerospace Engineering (2018), V. Hartwick (2019), M. Stone (2019), C. Maloney (2019), S. Cochrane (2020), R. Harp (2020), A. Smith (2020), L. Montgomery (2020), P. DeRepentigny (2021), A. Thayer Geology (2021)
- External to CU Boulder Ph.D. graduated (2): B. Hillman U. Washington-Seattle (2016), N. Szapiro U. Oklahoma (2019)

Visitors to Kay group at CU Boulder

- B. Molina, now an ATOC Ph.D. student (Summer 2021)
- T. Vogl, Ph.D. Candidate, U. Leipzig Germany (Spring 2020)
- F. Marcello de Oliveira, Ph.D. Candidate, U. Sao Paulo Brazil (Spring 2020)
- A. Robock, Professor Rutgers University, CIRES Visiting Fellow Sabbatical Visit (Summer 2019)
- H. Hung, undergraduate, National Taiwan University Taiwan (Summer 2019)
- J. Sala, undergraduate, University of Milano Bicocca Italy (Spring 2019)
- L. Bourdages, Ph.D. candidate, McGill University Canada (Spring 2015)
- A. Lacour, Ph.D. candidate, LMD France, *Lacour et al. (2017)* (Summer-Fall 2015)
- C. Palerme, Postdoc, LGGE France, *Palerme et al. (2016)* (Fall 2015), Current Position: Scientist, Norwegian Met Office

Education Research at CU Boulder

- NSF-funded educational research project (2016-2022) investigates the influence of an emotional hook on student interest in and capacity to learn about the globally connected climate system. The primary research question is: *Which teaching strategies increase student engagement in climate science?* With IRB approval, both controlled and in classroom experiments designed to measure student engagement using biometric and qualitative measures. Publications include: Morrison et al. (2019) on controlled setting findings, Gold et al. (in prep) on in-classroom findings. Presentations at American Geophysical Union (2018, 2019), Geological Society of America (2020) <http://ciresgroups.colorado.edu/polarbears/welcome>

Educational film making

- With funding from NSF, a CU team led by J. Kay including Anne Gold (CIRES Education and Outreach), A. Morrison (Ph.D. student), and B. MacFerrin (MS student) developed three short (~5 minutes) videos on basic concepts in climate. Movie production included filming on location for 2 weeks in Churchill, Manitoba (Canada) with Polar Bears International. Content was peer-reviewed by faculty at CU and the University of Washington - Seattle.
 - 1) ***Our Shared Climate Future (2017, viewed ~1200 times)***
<https://www.youtube.com/watch?v=sGrQdLH1K74>
 - 2) ***Arctic Feedbacks (2017, viewed ~2200 times)***
<https://www.youtube.com/watch?v=3qyT43pbUus&t=1s>
 - 3) ***Unique Polar Processes (2017, viewed ~1000 times)***
<https://www.youtube.com/watch?v=u0G8UVDi8jI&t=5s>

Use:

- Curriculum for introductory undergraduate climate science courses at CU-Boulder, the University of Michigan – Ann Arbor, and the University of Washington – Seattle. (2016-present)
- Climate Literacy and Energy Awareness Network (CLEAN), an award-winning collection of ~700 free, ready-to-use resources rigorously reviewed by educators and scientists. (2017-present)
- Online course about the Arctic: Frozen in the Ice: Exploring the Arctic, ~2500 people have enrolled, <https://www.coursera.org/learn/frozen-in-the-ice> (2020)
- Print and online magazine for middle school teachers and students published by *Scholastic Inc.* (2021)

Educational Workshops:

- Speaker and Curriculum Reviewer for Virtual Teacher Workshops organized by CIRES Education and Outreach on Arctic Climate Change, funded by Kay NSF CAREER award (2020, 2021, 2022)
- Created CESM Polar Modeling Workshop. One-week workshop to bring together ~20 early career scientists for advanced tutorial on polar climate modeling and high-performance computing. Organized with M. Holland, D. Bailey, and A. DuVivier (NCAR). Funded for 2018 by NSF Grant (2018, Kay PI) and with continued funding from NSF in 2019.
- Lecturer and Organizer for World Weather Research Program (WWRP)/World Climate Research Program (WCRP)/Bolin Center Year of Polar Prediction (YOPP) Spring School, Abisko, Sweden (April 2016) *Day et al. 2016 (#46)*
- Lecturer for NSF-funded sea ice camp, Barrow, Alaska (May 2016)

Service Activities

ATOC Departmental Committees

- Admissions Committee for Graduate Program (2014, 2015, 2016, 2019-present chair)
- Space Committee (2018-2020, 2021-present chair)
- Comprehensive Exam (COMPS) I Committee (2015-2018, 2016-2018 chair)
- Program Fees Committee (2017, 2018)
- Academic Review and Planning Advisory Committee (ARPAC) (2016, 2017)
- Climate Dynamics Faculty Search Committee (2015, 2016)

CIRES Research Institute Committees

- Executive Committee, Associate Director (2021-present)
- Innovative Research Program (IRP) Committee (2018, 2020)
- Visiting Fellows Committee (2017)
- ARPAC (2016, 2017)
- Graduate Student Awards Committee (2015, 2016, 2019)
- Distinguished Lecture Committee (2014, 2015)

University of Colorado Service

- Reviewer for Beverly Sears/Cynthia Schultz graduate research grant (2020, 2021)
- Reviewer for Undergraduate Research Opportunities Program (UROP) (2018)
- Featured in a short video on polar climate through CU Boulder campus-wide initiative Learn More About Climate (LMAC) <https://vimeo.com/142447766> (2015)

Colorado Outreach

- Science on Tap, “The Vanishing World of the Polar Bear” (2019)
- Guest Presentation on Polar Bears, Columbine Elementary School, Boulder, Colorado (2019)
- TEDx Salon Panelist, The Melting Arctic (2018)
- Panel at A-basin ski area on Climate Change, Snow, Water Resources, and Skiing (2018)
- Guest on NBC 9 News Denver evening news to discuss polar bear video that had gone viral (2017)
- Talk for Front Range Promoting Geoscience Research, Education & Success (PROGRESS) Mentoring Event for Women in Science, <https://geosciencewomen.org/> (2017)
- Lunchtime talk to Retired CU Faculty Association on Polar Research (2016)
- Invited lecture on climate change and Colorado, Colorado Bar Association (2015)

National News Media and Congressional Briefing

- Guest on Caroline Gleich Show (2021)
- Guest on national radio program E-Town to discuss Arctic climate change. Program aired on 300 radio stations across the country, <https://www.ETown.org/broadcasts/leftover-salmon-paul-thorn-jen-kay/> (2018)
- Research featured in AGU press conference (2014), CU press releases (2015, 2016), *The New York Times* (2014, 2020), and *Nature* (2015)
- Panelist for Congressional Briefing “State of the Arctic: Forecasting environmental change, risk, and opportunity”, Rayburn House Building, Washington DC, <https://president.ucar.edu/government-relations/washington-update/851/state-arctic-ucar-congressional-briefing> (2015)

National and International Outreach

- Science Alliance, Protect Our Winters (POW), (2019-present), Panelist Outdoor Retailer in Denver (2019), Advisor on report on climate change impacts on trail running, climbing, and hiking (2021)
- Panelist, Polar Bears International Tundra Connections Program: Webcasts on polar bears, sea ice, and climate change live from the Polar Bear Capital of the World: Churchill, Manitoba, Canada. Viewed ~80,000 times during Fall 2014. (2014, 2015)
- Featured in a short videos on climate change and scientists who do climate change research produced for the More than Scientists website, Viewed 7,500 times, <https://www.facebook.com/MoreThanScientists/videos/1116678608387708/> (2016)
- Lunchtime talk to Zookeepers at Assiniboine Park Zoo, Winnipeg, Manitoba, Canada (2016)
- Scientific review of kids book on climate: Basher Science: Climate Change <https://www.amazon.com/Basher-Science-Climate-Change-Simon/dp/0753471752> (2014)

Editing and Reviewing

- Editor, *J. Climate* (2022-present)
- Associate Editor, *J. Climate* (2021)
- Special Issue Editor, *Atmospheric Chemistry and Physics* (2018-present)
- Associate Editor, *Monthly Weather Review* (2013-2019)
- Proposal Review Panel for NOAA (2015), NASA (2016), NSF (2020), DOE (2020), NASA (2021)
- Proposal Reviewer for NSF, NASA, DOE, New Zealand Rutherford Discovery Fellowship
- Review of NASA's CloudSat Mission Operations and Data Products (2021)
- Peer-review of scientific publications including: *Geophysical Research Letters*, *Journal of Geophysical Research*, *Climate Dynamics*, *Nature*, *Nature Climate Change*, *Nature Climate and Atmospheric Sciences*, *Current Climate Change Reports*, *Journal of the Atmospheric Sciences*, *Journal of Advances in Modeling Earth Systems*, *Cambridge University Press*, *Atmospheric Chemistry and Physics*, *Earth's Future*, *Monthly Weather Review*, *Journal of Climate*, *Bulletin of the American Meteorological Society*

Leadership in national-level climate model development and analysis

- Coordinator, CESM participation in CFMIP (2010-2019): Developed, wrote, and tested code to implement climate model diagnostics that can be directly compared with satellite observations of clouds (Kay et al. 2012b, Kay et al. 2016, Kay et al. 2018), Coordinated research using outputs in the national lab/university/international community.
- Co-chair, CESM Polar Climate Working Group (2011-2020): Coordinating and promoting polar climate model development and research for a globally used global climate model
- Co-leader, CESM Large Ensemble Project (2013-2018): Designed and implemented large initial-condition climate model ensemble with NCAR/University collaborators, Dataset is publicly available and has been used by 49+ universities in 11+ countries, Kay et al. (2015) official reference and is a Web of Science highly cited paper

National and international committees

- Member, Cloud Feedbacks Model Intercomparison Project (CFMIP) Scientific Steering Committee <https://www.cfmip.org/> (2013-present)
- Member, AMS Atmospheric Research Awards Committee (2018-present)
- Member, Climate and Ocean Variability, Predictability, and Change (CLIVAR) Climate Dynamics Panel <https://www.clivar.org/clivar-panels/climate-dynamics/> (2021)

- Member, American Meteorological Society (AMS) Committee on Polar Meteorology and Oceanography, (2013-2020)
- Member, US Climate Variability and Predictability Program (CLIVAR) Working Group on Large Ensembles (2018-2020)
- Co-leader, World Climate Research Programme (WCRP) Polar Climate Predictability Initiative, Initiative #4: Assess performance of climate models in polar regions <http://www.climate-cryosphere.org/wcrp/pcpi> (2014-2018)
- Member, US CLIVAR Process Study Model Improvement Panel (2014-2015)

Leadership in convening and hosting national and international meetings

- Convener of AGU sessions on Integrating Models and Observations for Polar Research and Cloud/Precipitation Physics (2014-present)
- Lead of Organizing Committee for CFMIP Meeting on Clouds, Circulation, and Climate Meeting, hosted virtually, ~330 scientists from around the world <http://www.cgd.ucar.edu/events/2020/CFMIP/> (September 2020)
- Organizing Committee for 2019 US CLIVAR Workshop on Large Ensembles, ~120 scientists from around the world, <https://usclivar.org/meetings/large-ensembles-workshop> (July 2019)
- Lead of Organizing Committee for CFMIP Meeting on Clouds, Circulation, and Climate hosted at the NCAR, ~120 scientists from around the world, <http://www.cgd.ucar.edu/events/CFMIP2018/> (October 2018)
- Organizing Committee for NSF Arctic System Change Workshop for ~80 scientists hosted at NCAR <http://www.cgd.ucar.edu/events/20180409/> (April 2018)
- Co-convened (w/Professor Hugues Goosse) WCRP-funded workshop on Arctic feedbacks for 20 international scientists at Université catholique de Louvain Louvaine-la-nueve, Belgium *Goose, Kay, et al. (2018)* (May 2016)
- Organizing Committee for NSF Postdoc development workshop (March 2016)

Conference Presentations and Seminars since starting at CU Boulder

Since starting at CU Boulder (updated through 2021):

141 total including 56 invited talks and 48 presentations given by students/postdocs in the Kay group
*=invited, #=poster, ¹= graduate student or postdoc in Kay group

2021 (15 total, 4 invited, 4 student/postdoc)

Note: Due to COVID19, scientific meetings were offered virtually or were cancelled.

*Kay, J. E., How do clouds affect global warming?, University of Toronto Physics Colloquium, Jan. 21

Kay, J. E., Why do the climate responses to idealized greenhouse warming and greenhouse cooling differ?,
NCAR Climate Analysis Section, March 10

Kay, J. E. and J. Chalmers Why does the climate response to greenhouse warming and greenhouse cooling
differ? EGU, April 27

*Kay, J. E., How do polar clouds and precipitation affect global warming?, EGU, April 28

*Kay, J. E., How do clouds affect global warming?, University of California Irvine Colloquium, May 4

*Kay, J. E., Why do the climate and cloud responses to idealized greenhouse warming and cooling differ?,
Online ECS and Cloud Feedbacks Symposium, June 8

¹Shaw, J., Kay, J. E., and B. Medeiros, Evaluation of clouds in three generations of CAM, *CESM Annual
workshop*, June 15

Kay, J. E., Why do the climate and cloud responses to idealized greenhouse warming and cooling differ?,
CESM Annual Workshop, June 16

¹Shaw, J. and J. E. Kay, Infrared Observations and Arctic Climate Change: Informing process-level
understanding and global climate models, *3rd PREFIRE Science Team Meeting*, November 17

¹Diamond, M., Grisley, J., Feingold, G., and J. E. Kay, Aerosols & the Antarctic: Underappreciated Drivers of
Earth's Hemispheric Albedo Symmetry, *Fall AGU*, December 14

Sledd, A., L'Ecuyer, T., and J. E. Kay, The Influence of Arctic Clouds on Fall SST in the Community Earth
System Model, *Fall AGU*, December 15

McIlhattan, E., Kay, J. E., and T. L'Ecuyer, Cloudier, Warmer, and Rainier: Exploring Changes to the Arctic
Mean State in the Community Earth System Model Version 2, *Fall AGU*, December 15

Singh, H., Feldl, N., Kay, J. E., and A. Morrison, Climate Sensitivity is Sensitive to Changes in Ocean Heat
Transport, *Fall AGU*, December 16

Kay, J. E., et al., Less surface sea ice melt in the CESM2 improves Arctic sea ice simulation with minimal
nonpolar climate impacts, *Fall AGU*, December 17

¹Maher, N., Kay, J. E., and A. Capotondi, Modulation of ENSO Teleconnections over North America by Pacific
Decadal Variability, *Fall AGU*, December 17

2020 (9 total, 4 invited, 2 student/postdoc)

Note: Due to COVID19, scientific meetings were offered virtually or were cancelled.

Kay, J. E., and J. Mülmenstädt, An underestimated negative cloud feedback from cloud lifetime changes?,
Virtual AGU, December 15

¹Chemke, R. et al. including J. E. Kay, Ocean heat transport nearly halves Arctic amplification and sea-ice
loss over the 21st century, *Virtual AGU*, December 14

Griffith, J. et al. including J. E. Kay, On board with MOSAiC: how an Arctic research expedition can engage
students in Earth system thinking, *Virtual AGU*, December 11

*Kay, J. E., Using "all but one" coupled climate model experiments to assess the influence of XX on Arctic
change, *Virtual seminar Ulsan National Institute of Science and Technology - South Korea*,
November 30

*Kay, J. E., The influence of sea ice mean state on transient climate change in CESM2, *Virtual CESM2 Large
Ensemble Workshop*, November 11

Gold, A., Morrison, A. and J. Kay, Exploring student engagement in learning climate science in different

- instructional settings, *Virtual Geological Society of America Meeting*, October 29
- Kay, J. E., Quantifying the influence of cloud radiative feedbacks on Arctic surface warming using cloud locking in an earth system model, *Virtual ATOC Colloquium*, October 16
- *Kay, J. E. The influence of sea ice mean state on transient climate change: a case for tuning? *Virtual US CLIVAR WG on Large Ensembles*, October 7
- ¹Shaw, J. and J. E. Kay, CESM2, Idealized Calculations, and PREFIRE Modeling Plans, *Virtual Workshop on Far-Infrared Satellite Missions*, October 6
- *Kay, J. E. Do extratropical cloud feedbacks matter for climate?, *Virtual CFMIP Meeting*, September 17
- Kay, J. E., The influence of sea ice mean state on transient climate change: a case for tuning?, *Virtual CESM Workshop*, June 16
- Kay, J. E. An underestimated negative cloud feedback from cloud lifetime changes, *CloudSat+CALIPSO Science Team Meeting*, Boulder, CO, March 3
- Kay, J. E., Arctic clouds and precipitation in the Community Earth System Model Version 2, *Polar Climate Working Group Meeting*, Boulder, CO, February 6

2019 (20 total, 3 invited, 9 student/postdoc)

- #¹Morrison, A., Gold, A. and J. E. Kay, High-stakes activities increase student engagement in an introductory climate science class: evidence from biometric sensors, *Fall American Geophysical Meeting*, San Francisco, CA, Dec. 12
- *¹Morrison, A., Kay, J. E., Cloud Response to Arctic Sea Ice Loss and Implications for Future Feedbacks in the CESM1 Climate Model, *Fall American Geophysical Meeting*, San Francisco, CA, Dec. 9
- Kay, J. E., Are cloud feedbacks linear with carbon dioxide forcing?, *Fall American Geophysical Meeting*, San Francisco, California, December 12
- ¹Middlemas, E., Kay, J. E., Maroon, E., and B. Medeiros, Isolating the influence of cloud radiative feedbacks on Arctic amplification through cloud-locking, *Fall American Geophysical Meeting*, San Francisco, California, December 10
- Kay, J. E., Using observations and models to understand the warming Arctic: First thoughts for PREFIRE, *PREFIRE Science Team Meeting*, Madison, Wisconsin, October 9
- ¹Middlemas, E., Kay, J. E., Maroon, E., and B. Medeiros, Isolating the influence of cloud radiative feedbacks on Arctic amplification through cloud-locking, *CFMIP Meeting on Clouds Circulation and Climate Sensitivity*, Mykonos, Greece, October 3
- Kay, J. E., Are cloud feedbacks linear with carbon dioxide forcing?, *CFMIP Meeting on Clouds Circulation and Climate Sensitivity*, Mykonos, Greece, October 1
- *Kay, J. E., Polar Amplification Model Intercomparison Project, The influence of clouds on Arctic Warming and Amplification, Exeter, United Kingdom, June 26
- Kay, J. E., Arctic sea ice loss and warming in large initial condition ensembles (and implications for the CESM2 (CAM) Arctic “thin ice” bias), *Annual CESM Workshop*, Boulder, CO, June 18
- ¹Middlemas, E. Isolating the influence of cloud radiative feedback on Arctic amplification through cloud-locking, *Annual CESM Workshop*, Boulder, CO, June 18
- ¹Gentry, M. Modeling the effect of clouds on the Southern ocean carbon sink, *Annual CESM Workshop*, Boulder, CO, June 19
- Kay, J. E., The combined influence of observed Southern Ocean clouds and sea ice on top-of-atmosphere albedo, *AMS Polar Meteorology and Oceanography Meeting*, Boulder, CO
- ¹Middlemas, E., Isolating the influence of cloud radiative feedback on Arctic amplification through cloud-locking, *AMS Polar Meteorology and Oceanography Meeting*, Boulder, CO
- #Kay, J. E., Arctic sea ice loss and warming in large initial condition ensembles *CIRES Rendezvous*, Boulder, CO, May 18
- #¹Gentry, M. Modeling the effect of clouds on the Southern ocean carbon sink, *CIRES Rendezvous*, Boulder, CO, May 18
- #¹Middlemas, E. *CIRES Rendezvous*, Isolating the influence of cloud radiative feedback on Arctic amplification through cloud-locking, Boulder, CO, May 18
- *Kay, J. E., Using models and observations to understand the warming Arctic, *NASA JPL*, May 13

- *Kay, J. E., Using models and observations to understand the warming Arctic, U. Oklahoma School of Meteorology Colloquium, Norman, OK, March 12
- Kay, J. E., The combined influence of observed Southern Ocean clouds and sea ice on top-of-atmosphere albedo, CESM PCWG/LIWG, Boulder, CO, Feb 21
- Kay, J. E., Scale-aware and definition-aware evaluation of modeled near-surface precipitation frequency using CloudSat observations, CESM AMWG, Boulder, CO, Feb. 4

2018 (22 total 10 invited, 9 student/postdoc)

- *¹Morrison, A., Gold, A., Rozak, S., Kay, J. E. Evaluating the Impact of Educational Activities on Student Engagement in Climate Science Using Galvanic Hand Sensors, American Geophysical Union (AGU) Fall Meeting, Washington DC, December 14
- *Kay, J. E., Advancing polar science as the world warms, Future Horizons in Climate Science Turco Lecture, AGU Meeting, Washington DC, December 13
- *¹Morrison, A., Kay, Cloud Response to Arctic Sea Ice Loss and Implications for Future Feedbacks in the CESM1 Climate Model, AGU Meeting, Washington DC, December 12
- #Kay, J. E., Scale-aware and definition-aware evaluation of modeled near-surface precipitation frequency using CloudSat observations, AGU Meeting, Washington DC, December 10
- #¹Gentry, M., Kay, J.E., Schneider, D. and N. Lovenduski, Cloud changes affect Southern Ocean biology in the Community Earth System Model (CESM1), AGU Meeting, Washington DC, December 10
- *Kay, J. E., Detection and Attribution of Arctic Climate Change, *Future of Earth System Modeling: Polar Climates*, Caltech, Pasadena, California, November 28
- #¹Chalmers, J., J. E. Kay, Linearity of Cloud Feedbacks in Idealized Climate Modeling Experiments, *CFMIP Meeting on Clouds Circulation and Climate Sensitivity*, National Center for Atmospheric Research, Boulder, October 18
- #¹Gentry, M., J. E. Kay, Impact of cloud-induced solar radiation biases on Antarctic sea ice variability in the Community Earth System Model (CESM), *CFMIP Meeting on Clouds Circulation and Climate Sensitivity*, National Center for Atmospheric Research, Boulder, October 17
- *Kay, J. E., Detection and Attribution of Arctic Climate Change, *Goddard Seminar*, NASA Goddard, Greenbelt, Maryland, September 19
- *Kay, J. E., Detection and Attribution of Arctic Climate Change, *CERES Science Team Meeting*, National Center for Atmospheric Research, Boulder, September 12
- *Kay, J. E., The Community Earth System Model (CESM) Large Ensemble Project: A Community Resource for Studying Climate Change in the Presence of Internal Climate Variability, *Geography Department Seminar*, University of Colorado Boulder, September 7
- *Kay, J. E., Thoughts on Large Initial Condition Ensembles, *Webinar for US CLIVAR Working Group on Large Ensembles*, June 29
- *Kay, J. E., The Community Earth System Model (CESM) Large Ensemble Project: A Community Resource for Studying Climate Change in the Presence of Internal Climate Variability, *LMD*, Palaiseau, France, June 21
- #¹Maroon, E., A., Kay, J. E., and K. B. Karnauskas, The influence of North Atlantic Ocean circulation on Northern Hemisphere surface warming trends, *CIRES Rendezvous*, Boulder, CO, May 18
- ¹Frey, W. Cloud-sea ice relationships using NASA satellite observations including especially CALIPSO in the Antarctic, *CloudSat+CALIPSO Science Team Meeting*, Boulder, CO, April 25
- ¹Morrison, A. Cloud-sea ice relationships using NASA satellite observations including especially CALIPSO in the Arctic, *CloudSat+CALIPSO Science Team Meeting*, Boulder, CO, April 25
- Kay, J. E., CloudSat near-surface precipitation frequency diagnostics for COSP, *CloudSat+CALIPSO Science Team Meeting*, Boulder, CO, April 24
- *Kay, J. E., The boundary layer response to Arctic sea ice loss, *Arctic System Change Workshop*, National Center for Atmospheric Research, Boulder, CO, April 11
- #¹Maroon, E., A., Kay, J. E., and K. B. Karnauskas, The influence of variability in AMOC strength on Northern Hemisphere surface temperature, Portland, OR, February 13

- *Kay, J. E., Clouds in a Changing Arctic, *University of Wisconsin Department of Atmospheric and Oceanic Sciences Colloquium*, February 12
- *Kay, J. E., Do Southern Ocean radiation biases and cloud feedbacks matter for 21st century warming?, *University of Washington Program on Climate Change Mini-Symposium: Using past observations to constrain future climate*, Seattle, WA February 8
- Kay, J. E., New radar simulator-based precipitation diagnostics for CESM, *Polar Climate Working Group Meeting*, Boulder, CO, January 12

2017 (24 total, 9 invited, 10 student/postdoc)

- #¹Frey, W. R. Ocean Heat Uptake Slows 21st Century Surface Warming Driven by Extratropical Cloud Feedbacks, *Fall AGU Meeting*, New Orleans, LA, December 15
- #¹Morrison, A. Cloud Response to Arctic Sea Ice Loss and Implications for Feedbacks in the CESM1 Climate Model, *Fall AGU Meeting*, New Orleans, LA, December 15
- #¹Morrison, A. Measuring Engagement and Learning Outcomes During a Teacher Professional Development Workshop about Creative Climate Communication, *Fall AGU Meeting*, New Orleans, LA, December 15
- *Kay, J. E., The Signal and the Noise: What can we learn from climate modeling?, *Northwestern University Climate Change Symposium*, Evanston, IL, November 10
- *Kay, J. E., Do Southern Ocean radiation biases and cloud feedbacks matter for 21st century warming?, *Yale University Geology and Geophysics Colloquium*, New Haven, CT, October 25
- *Kay, J. E., Big Climate Data, *Earth Analytics in the Cloud hosted by Amazon*, Boulder, CO, October 19
- *¹Frey, W. R. High-latitude ocean heat uptake and cloud feedbacks in CESM, Global Energy and Water Exchanges (GEWEX) Data and Assessment Panel (GDAP) Meeting, Boulder, CO, October 9
- *Kay, J. E., Clouds in a changing Arctic, *Taiwan National University Dept. of Atmospheric Science Colloquium*, Taipei, Taiwan, September 29
- Kay, J. E., Using new process-oriented spaceborne radar and lidar diagnostics to evaluate CESM2, *Cloud Feedbacks Model Intercomparison Project Meeting*, Tokyo, Japan, September 27
- *Kay, J. E., Clouds in a changing Arctic, *Gordon Research Conference on Clouds and Radiation*, Lewiston, Maine, July 17
- ¹Morrison, A., Kay, J.E., Chepfer, H. and R. Guzman, Arctic cloud feedbacks and response to sea ice loss in the CESM1, *22nd CESM workshop*, Boulder, Colorado, June 21
- Kay, J. E., Southern Ocean Heat Budgets in the Community Earth System Model, *22nd CESM workshop*, Boulder, Colorado, June 20
- ¹Frey, W. R. and Kay, J. E., The impact of Southern Ocean heat uptake on the pace and pattern of greenhouse warming, *22nd CESM workshop*, Boulder, Colorado, June 21
- *Kay, J. E., Using spaceborne lidar observations to constrain extratropical cloud feedbacks and climate sensitivity, *IceSat II Atmospheric Tutorial*, Boulder, Colorado, June 1
- *Kay, J. E., The Community Earth System Model (CESM) Large Ensemble Project: A Community Resource for Studying Climate Change in the Presence of Internal Climate Variability, *USGS Rocky Mountain Science Seminar*, Lakewood, Colorado, May 30
- Gold, A. U., Kay, J. E., ¹Morrison, A., and ¹B. MacFerrin, Increasing Student Learning about Climate Science: Are Polar Bears an Effective Emotional Hook?, *CIRES Rendezvous*, Boulder, Colorado, May 18
- ¹Frey, W. R. and Kay, J. E., The impact of Southern Ocean heat uptake on the pace and pattern of greenhouse warming, *CIRES Rendezvous*, Boulder, Boulder, Colorado, May 18
- ¹Yettella, V., Weiss, J. B., Kay, J. E. and A. G. Pendergrass, A flexible decomposition of climate variability into regional components and teleconnections: Insights from a large initial condition ensemble, *CIRES Rendezvous*, Boulder, Boulder, Colorado, May 18
- ¹Maroon, E., Kay, J. E., and K. Karnauskus, Variability in AMOC strength modifies the Northern Hemisphere surface temperature response in the CESM Large Ensemble, *CIRES Rendezvous*, Boulder, Colorado, May 18
- *Kay, J. E., New progress in leveraging spaceborne radar and lidar to advance Arctic cloud-climate research, *University of Leipzig Institute for Meteorology*, Leipzig, Germany, May 15

- ¹Morrison, A., Kay, J.E., Chepfer, H. and R. Guzman, Observing the Cloud Response to Arctic Sea Ice Loss, *European Geophysical Union Meeting*, Vienna, Austria, April
- Guzman, R. et al. including J. E. Kay, Direct atmosphere opacity observations from CALIPSO provide new constraints on cloud-radiation interactions, *A-train Symposium*, Pasadena, California, April
- Kay, J.E., New progress in leveraging spaceborne radar and lidar to advance Arctic cloud-climate research, *NSIDC CPP Seminar*, Boulder, Colorado, February 1
- Kay, J.E., New progress in leveraging spaceborne radar and lidar to advance Arctic cloud-climate research, *97th Annual American Meteorological Meeting*, Seattle, Washington, January 25
- 2016 (22 total, 9 invited, 9 student/postdoc)
- *¹Morrison, A., Kay, J.E., Chepfer, H. and R. Guzman, Observing the Cloud Response to Arctic Sea Ice Loss, *Fall American Geophysical Union Meeting*, San Francisco, CA, December 15
- ¹Frey, W. and Kay, J.E., The Influence of Extratropical Cloud Phase and Amount Feedbacks on Climate Sensitivity Modified by Ocean Heat Uptake, *Fall American Geophysical Union Meeting*, San Francisco, CA, December 15
- *Kay, J. E. and C. Deser, The CESM Large Ensemble Project: Inspiring New Ideas and Understanding, *Fall American Geophysical Union Meeting*, San Francisco, CA, December 14
- #¹Yettella, V., Weiss, J., Kay, J.E. and A. Pendergrass, A Flexible Decomposition of Global Climate Predictability and Variability into Regional Components and Teleconnections, *Fall American Geophysical Union Meeting*, San Francisco, CA, December 13
- Overeem, I., Barnhart, K., and J.E. Kay. Modeling Sea Ice Decline and Impacts on Coastal Processes. 5th forum for Arctic Modeling and Observing Synthesis (FAMOS) Meeting 2016. Woods Hole Oceanographic Institute, November 2-4
- *Kay, J. E., Global climate impacts of fixing large long-standing shortwave radiation biases in the Community Earth System Model, *CASPO Seminar*, Scripps Institute of Oceanography, October 6
- *Kay, J. E., Global climate impacts of fixing large long-standing shortwave radiation biases in the Community Earth System Model, *Caltech Environmental Science and Engineering Seminar Series*, October 5
- ¹Frey, W., and J. E. Kay, How does “fixing” the Southern Ocean absorbed shortwave radiation bias impact climate sensitivity?, *CFMIP/WCRP/ICTP Conference on Cloud Processes, Circulation and Climate Sensitivity*, Trieste, Italy, July 5
- ¹Frey, W., and J. E. Kay, How does “fixing” the Southern Ocean absorbed shortwave radiation bias impact climate sensitivity?, *21st Annual CESM Workshop*, Breckenridge, Colorado, June 22
- ¹Yettella, V., Weiss, J., and J. E. Kay, A new measure of predictability and preliminary results from CESM large ensemble data, *21st Annual CESM Workshop*, Breckenridge, Colorado, June 21
- *Kay, J. E., and C. Deser, The CESM Large Ensemble Project, *21st Annual CESM Workshop*, Breckenridge, Colorado, June 20
- *Kay, J. E., Insights from a workshop on polar feedbacks in Belgium, a week on and near the sea ice in Barrow, and being a co-chair of the CESM Polar Climate Working Group, *US CLIVAR PSMIP Annual Meeting*, Woods Hole Oceanographic Institute, Woods Hole, MA, June 14
- Kay, J. E., Water vapor and cloud feedbacks over the ice-covered oceans, *PCPI Workshop on Polar Climate Feedbacks*, Université catholique de Louvain, Belgium, May 17
- ¹#Frey, W., and J. E. Kay, How does “fixing” the Southern Ocean absorbed shortwave radiation bias impact climate sensitivity?, *CIRES Rendezvous*, Boulder, Colorado, May 13
- ¹#Yettella, V., and J. E. Kay, Understanding extratropical cyclone precipitation change in a warmer climate, *CIRES Rendezvous*, Boulder, Colorado, May 13
- *Kay, J. E., Understanding Arctic climate change and variability, Airborne Radiation Workshop, National Center for Atmospheric Research, Boulder, CO, March 8
- ¹#Morrison, A. and J. E. Kay, Seasonal variability in the vertical structure of Arctic Ocean liquid clouds, CloudSat/CALIPSO Science Team Meeting, Newport News, Virginia, March 2
- Kay, J. E., Global climate impacts of fixing the Southern Ocean shortwave radiation bias in the Community Earth System Model, CloudSat/CALIPSO Science Team Meeting, Newport News, Virginia, March 1

- *Kay, J. E., Global climate impacts of fixing the Southern Ocean shortwave radiation bias in the Community Earth System Model, NASA Langley Research Center, Langley, Virginia, February 29
- Kay, J. E., Clouds in CESM1.5: An initial evaluation of the mean state using simulators, joint session CESM Winter Working Group Meeting, Boulder, CO, February 11
- *Kay, J. E., Understanding Arctic climate change and variability, Iowa State University, Dept. of Geological and Atmospheric Sciences, Ames, Iowa, January 21
- Kay, J. E., Southern Ocean clouds, radiation, and sea ice, National Academies Workshop on Antarctic sea ice, University of Colorado, Boulder, CO, January 8

2015 (16 total, 9 invited, 4 student/postdoc)

- *Kay, J.E., Global climate impacts of fixing the Southern Ocean shortwave radiation bias in the Community Earth System Model (CESM), *Fall AGU*, San Francisco, CA, Dec. 17
- *Kay, J.E., Towards improved understanding of cloud influence on polar surface energy budgets using CloudSat and CALIPSO observations, *Fall AGU*, San Francisco, CA, Dec. 15
- ¹Yettella, V. and J. E. Kay, How will precipitation in extratropical cyclones change as the climate warms?, *Fall AGU*, San Francisco, California, December 14
- ¹Morrison, A., and J. E. Kay, How does sea ice loss affect clouds? A story about stability in a warming Arctic, *ATOC ESSS Poster Conference*, Boulder, Colorado, November 13.
- Kay, J.E., Global climate impacts of fixing the Southern Ocean shortwave radiation bias in the Community Earth System Model (CESM), *University of Colorado Fluids Seminar*, November 10.
- *Kay, J.E., Global climate impacts of “fixing” the Southern Ocean shortwave radiation climate model bias, *UK Met Office Seminar*, Exeter, UK September 8.
- *Kay, J.E., Global climate impacts of “fixing” the Southern Ocean shortwave radiation climate model bias, *20th Annual CESM Workshop*, Breckenridge, Colorado, June 16.
- Kay, J.E., Global climate impacts of “fixing” the Southern Ocean shortwave radiation climate model bias, *CFMIP Meeting on Cloud Processes and Cloud Feedbacks*, Pacific Grove, California, June 9.
- *Kay, J.E., Global climate impacts of “fixing” the Southern Ocean shortwave radiation climate model bias, *University of Washington Atmospheric Dynamics Seminar*, Seattle, Washington, May 7.
- ¹Morrison, A., and J. E. Kay, How does sea ice loss affect clouds? A story about stability in a warming Arctic, *CIRES Rendezvous*, Boulder, Colorado, May 1.
- ¹Yettella, V. How will precipitation change in extratropical cyclones as the planet warms?, *CIRES Rendezvous*, Boulder, Colorado, May 1.
- *Kay, J.E., Improving climate and cryospheric modeling, *Joint NCAR CGD/CliC SSG Seminar*, Boulder, Colorado, February 10.
- Kay, J.E., Southern Ocean climate: The forecast is mostly cloudy, *NCAR CGD Seminar*, Boulder, Colorado, January 27.
- *Kay, J.E., Definite, possible, and unlikely mechanisms for Arctic climate change, York University, Toronto, Canada, January 7
- *Kay, J.E., CESM Large Ensemble Project: Arctic warming and sea ice loss results, *Canadian Sea Ice and Snow Evolution (CanSISE) Meeting*, Toronto, Canada, January 6
- *Kay, J.E., Definite, possible, and unlikely mechanisms for Arctic climate change, *Noble Lecture Series*, University of Toronto, Toronto, Canada, January 5

2014 (13 total, 9 invited, 1 student/postdoc)

- Kay, J. E., Arctic heating: 15 years of sea ice loss and absorbed solar radiation gains, *Fall AGU Press Conference*, December 16.
- *Kay, J. E., The global influence of Southern Ocean shortwave radiation biases, *Fall AGU*, San Francisco, California, December 14.
- ¹Morrison, A. and J. E. Kay, Is losing our sea ice affecting our clouds? A story about stability in the warming Arctic, *CloudSat and CALIPSO Team Meeting*, Washington DC, November 3.
- Kay, J. E., Arctic Climate Impacts of Polar Clouds – Progress and Gaps, *CloudSat and CALIPSO Team Meeting*, Washington, DC, November 3.

- *Kay, J., E., Climate science 101: now offered, what should it include?, *Aspen Global Change Institute – Frontiers of Global Change Science - 25th Anniversary Celebration*, Aspen, Colorado, August 19.
- Kay, J. E., Do jet shifts matter for 21st century Southern Ocean cloud-climate feedbacks?, *7th International Scientific Conference on the Global Water and Energy Cycle*, The Hague, The Netherlands, July 16
- Kay, J. E., Do jet shifts matter for 21st century Southern Ocean cloud-climate feedbacks?, *CFMIP/EUCLIPSE Meeting on Cloud Processes and Climate Feedbacks*, Egmond aan Zee, The Netherlands, July 9
- Kay, J. E., Near-future changes in Greenland climate in the CESM Large Ensemble, *CESM Workshop*, Breckenridge, Colorado, June 18.
- *Kay, J.E., Arctic Sea Ice Observations and Projections, *International Union for Conservation of Nature Polar Bear Specialist Group*, Fort Collins, Colorado, June 10.
- #Kay, J.E., Climate Change, Internal Climate Variability - Implications for Greenland?, *CIRES Rendezvous*, May 2.
- Kay, J.E., Processes controlling Southern Ocean shortwave climate feedbacks, *NSF Workshop on Clouds, Aerosols, Radiation and Air- Sea Interface of the Southern Ocean: Establishing Directions for Future Research*, Seattle, WA, March 18.
- Kay, J.E., The CESM-CAM5 Large Ensemble Project, *CESM Atmospheric Model Working Group*, Boulder Colorado, February 12.
- Kay, J.E., The CESM-CAM5 Large Ensemble Project, *CESM Polar Model Working Group*, Boulder, Colorado, January 30.