

Mark G. Flanner

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PROFESSIONAL APPOINTMENTS

- 2021–*pres* *Professor*, Climate and Space Sciences and Engineering, University of Michigan, Ann Arbor MI
- 2015–2021 *Associate Professor*, Climate and Space Sciences and Engineering, University of Michigan, Ann Arbor MI
- 2016–2017 Visiting scholar at the Institut des Géosciences de l'Environnement (IGE), Université Grenoble Alpes, France
- 2009–2015 *Assistant Professor*, Atmospheric, Oceanic and Space Sciences, University of Michigan, Ann Arbor MI
- 2007–2009 *Postdoctoral Fellow*, Advanced Study Program (ASP), National Center for Atmospheric Research, Boulder CO

EDUCATION

- Ph.D. (2007) Earth System Science, University of California, Irvine.
Thesis advisor: [Charlie Zender](#)
- B.S. (2002) Biomedical Engineering, University of Wisconsin, Madison
(2000: visiting student at the Technical University of Budapest, Hungary)

OUTREACH, SERVICE, and SYNERGISTIC ACTIVITIES

- 2018–*pres* U. of M. representative to the University Corporation of Atmospheric Research (UCAR)
- 2018–*pres* Editor for *The Cryosphere*
- 2017–*pres* Member of the NSF Advisory Committee for the Office of Polar Programs
- 2016–*pres* Co-chair, Arctic Monitoring and Assessment Programme (AMAP) Short-lived Climate Forcers Expert Group
- 2007–*pres* Peer-reviewer for more than 100 unique journal article submissions
- 2004–*pres* Author and maintainer of the Snow, Ice, and Aerosol Radiative (SNICAR) model (online at: <http://snow.engin.umich.edu/>)
- 2020–2021 Member of AGU Macelwane Medal Selection Committee
- Sept. 2020 Panelist for event: “The Future of the Outdoor State: Climate Impacts in the Midwest”, hosted by Protect Our Winters (POW)
- 2015–2019 Member of the *Eos* Editorial Advisory Board
- 2015–2018 Steering committee member for the snow model intercomparison project: ESM-SnowMIP
- January 2017 Guest lecturer for the [European Research Course on Atmospheres](#) (ERCA), Grenoble France
- 2009–2015 U.S. representative to the Arctic Monitoring and Assessment Programme (AMAP) Short-Lived Climate Forcers Expert Group. A lead author of 2011 AMAP report: [The Impact of Black Carbon on Arctic Climate](#), and 2015 report: [Black carbon and ozone as Arctic climate forcers](#)
- July 2014 Guest lecturer at [2014 Connaught Summer Institute in Arctic Science](#) (“Atmosphere, Cryosphere, and Climate”), Alliston, Ontario

- 2010–2013 Contributing author to [Chapter 7 \(Clouds and Aerosols\) of the IPCC Working Group 1 Fifth Assessment Report](#)
- June 2012 Guest lecturer at [Alpine Summer School Course XX \(“Climate, Aerosols and the Cryosphere”\)](#), Valsavarenche, Italy
- 2010–2011 A lead author of 2011 UNEP/WMO report: [Integrated Assessment of Black Carbon and Tropospheric Ozone](#)

HONORS

- 2018 Named a *Highly Cited Researcher* by [Clarivate Analytics](#)
- 2017 Nominated by students for the U-M Golden Apple Award, which recognizes outstanding university teaching
- 2015 AGU 2014 Editors' Citation for Excellence in Refereeing – *Journal of Geophysical Research Atmospheres*
- 2013 Awarded Faculty Early Career Development (CAREER) grant from the National Science Foundation
- 2012 On [invitation from Secretary of State Hillary Clinton](#), attended State Department announcement of new U.S.-led Climate & Clean Air Coalition (CCAC) to reduce short-lived climate pollutants
- 2005–2007 NASA Earth System Science Fellowship
- 2006 Outstanding Student Presentation Award (oral), Fall 2005 Meeting of the American Geophysical Union
- 2005 UCI Medal student award

TEACHING / ADVISING (as of Sep. 2021)

- CLIMATE 105 *Our Changing Atmosphere* (4 semesters)
- CLIMATE 380 *Introduction to Atmospheric Radiation* (6 semesters)
- CLIMATE 473 *Climate Physics* (8 semesters)
- CLIMATE 532 *Radiative Transfer* (3 semesters)
- Advising Chairing/chaired thesis committees of 1 current / 6 former Ph.D. students
Served on thesis committees of 25 PhD students
Advised research projects for 2 M.S. students
Advised research projects for 18 undergrad and REU students

JOURNAL PUBLICATIONS (advised students underlined, post-docs italicized)

Google Scholar: [Mark Flanner](#) (total citations: >18,000+; h-index: 51)
 ResearcherID / Publons: [C-6139-2011](#) (total citations: 12,500+; h-index: 44)
 ORCID: [0000-0003-4012-174X](#)

83) Ward, J. L., **Flanner, M. G.**, and Dunn-Sigouin, E. (2020), [Impacts of Greenland block location on clouds and surface energy fluxes over the Greenland Ice Sheet](#). *J. Geophys. Res. Atmos.*, 125, e2020JD033172, doi:10.1029/2020JD033172.

82) Fair, Z., **Flanner, M.**, Brunt, K. M., Fricker, H. A., and Gardner, A. S. (2020), [Using ICESat-2 and Operation IceBridge altimetry for supraglacial lake depth retrievals](#), *The Cryosphere*, 14, 4253–4263, doi: 10.5194/tc-14-4253-2020.

- 81) Snide, C. E., L. Gilbert, A. Meyer, P. Samson, **M. Flanner**, and J. Bassis (2020), [Seeing the Greenland Ice Sheet through students' eyes](#), *Eos*, 101, doi:10.1029/2020EO139739.
- 80) Cook, J. M., Tedstone, A. J., Williamson, C., McCutcheon, J., Hodson, A. J., Dayal, A., Skiles, M., Hofer, S., Bryant, R., McAree, O., McGonigle, A., Ryan, J., Anesio, A. M., Irvine-Fynn, T. D. L., Hubbard, A., Hanna, E., **Flanner, M.**, Mayanna, S., Benning, L. G., van As, D., Yallop, M., McQuaid, J. B., Gribbin, T., and Tranter, M. (2020), [Glacier algae accelerate melt rates on the south-western Greenland Ice Sheet](#), *The Cryosphere*, 14, 309–330, doi:10.5194/tc-14-309-2020.
- 79) Wang, H., R. C. Easter, R. Zhang, P.-L. Ma, B. Singh, K. Zhang, D. Ganguly, P. J. Rasch, S. M. Burrows, S. J. Ghan, S. Lou, Y. Qian, Y. Yang, Y. Feng, **M. Flanner**, R. L. Leung, X. Liu, M. Shrivastava, J. Sun, Q. Tang, S. Xie, J.-H. Yoon (2020), [Aerosols in the E3SM Version 1: New developments and their impacts on radiative forcing](#), *J. Adv. Model. Earth Syst.*, 12, e2019MS001851, doi:10.1029/2019MS001851.
- 78) Lawrence, D. M., R. A. Risher, C. D. Koven, K. W. Oleson, S. C. Swenson, G. Bonan, N. Collier, B. Ghimire, L. van Kampenhou, D. Kennedy, E. Kluzek, P. J. Lawrence, F. Li, H. Li, D. Lombardozzi, W. J. Riley, W. J. Sacks, M. Shi, M. Vertenstein, W. R. Wieder, C. Xu, A. A. Ali, A. M. Badger, G. Bisht, M. van den Broeke, M. A. Brunke, S. P. Burns, J. Buzan, M. Clark, A. Craig, K. Dahlin, B. Drewniak, J. B. Fisher, **M. Flanner**, A. M. Fox, P. Gentine, F. Hoffman, G. Keppel-Aleks, R. Knox, S. Kumar, J. Lenaerts, L. R. Leung, W. H. Lipscomb, Y. Lu, A. Pandey, J. D. Pelletier, J. Perket, J. T. Randerson, D. M. Ricciuto, B. M. Sanderson, A. Slater, Z. M. Subin, J. Tang, R. Q. Thomas, M. V. Martin, X. Zeng (2019), [The Community Land Model version 5: Description of new features, benchmarking, and impact of forcing uncertainty](#), *J. Adv. Model. Earth Syst.*, 11, doi:10.1029/2018MS001583.
- 77) Dang, C., Zender, C. S., and **Flanner, M. G.** (2019), [Intercomparison and improvement of two-stream shortwave radiative transfer schemes in Earth system models for a unified treatment of cryospheric surfaces](#), *The Cryosphere*, 13, 2325–2343, doi:10.5194/tc-13-2325-2019, 2019.
- 76) Chen, Y.-H., X.L. Huang, X. H. Chen, and **M. G. Flanner** (2019), [The Effects of Surface Longwave Spectral Emissivity on Atmospheric Circulation and Convection over the Sahara and Sahel](#), *J. Climate*, 32(15), 4873-4890, doi:10.1175/JCLI-D-18-0615.1.
- 75) Schneider, A., **Flanner, M.**, De Roo, R., and Adolph, A. (2019), [Monitoring of snow surface near-infrared bidirectional reflectance factors with added light-absorbing particles](#), *The Cryosphere*, 13, 1753-1766, doi:10.5194/tc-13-1753-2019.
- 74) Rasch, P. J., S. Xie, P.-L. Ma, W. Lin, H. Wang, Q. Tang, S. M. Burrows, P. Caldwell, K. Zhang, R. C. Easter, P. Cameron-Smith, B. Singh, H. Wan, J.-C. Golaz, B. E. Harrop, E. Roesler, J. Bacmeister, V. E. Larson, K. J. Evans, Y. Qian, M. Taylor, L. R. Leung, Y. Zhang, L. Brent, M. Branstetter, C. Hannay, S. Mahajan, A. Mametjanov, R. Neale, J. H. Richter, J.-H. Yoon, C. S. Zender, D. Bader, **M. Flanner**, J. G. Foucar, R. Jacob, N. Keen, S. A. Klein, X. Liu, A.G. Salinger, M. Shrivastava, Y. Yang (2019), [An Overview of the Atmospheric Component of the Energy Exascale Earth System Model](#), *J. Adv. Model. Earth Syst.*, 11, 2377– 2411, doi:10.1029/2019MS001629.
- 73) Golaz, J.-C., P. M. Caldwell, L. P. Van Roekel, M. R. Petersen, Q. Tang, J. D. Wolfe, G. Abeshu, V. Anantharaj, X. S. Asay-Davis, D. C. Bader, S. A. Baldwin, G. Bisht, P. A. Bogenschutz, M. Branstetter, M. A. Brunke, S. R. Brus, S. M. Burrows, P. J. Cameron-Smith, A. S. Donahue, M. Deakin, R. C. Easter, K. J. Evans, Y. Feng, **M. Flanner**, J. G. Foucar, J. G. Fyke, B. M. Griffin, C. Hannay, B. E. Harrop, M. J. Hoffman, E. C. Hunke, R. L. Jacob, D. W. Jacobsen, N. Jeffery, P. W. Jones, N. D. Keen, S. A. Klein, V. E. Larson, L. R. Leung, H.-Y. Li, W. Lin, W. H. Lipscomb, P.-L. Ma, S. Mahajan, M. E. Maltrud, A. Mametjanov, J. L. McClean, R. B. McCoy, R. B. Neale, S. F. Price, Y. Qian, P. J. Rasch, J. E. J. R. Eyre, W. J. Riley, T. D. Ringler, A. F. Roberts, E. L. Roesler, A. G. Salinger, Z. Shaheen, X. Shi, B. Singh, J. Tang, M. A. Taylor, P. E. Thornton, A. K. Turner, M. Veneziani, H. Wan, H. Wang, S. Wang, D. N.

Williams, P. J. Wolfram, P. H. Worley, S. Xie, Y. Yang, J.-H. Yoon, M. D. Zelinka, C. S. Zender, X. Zeng, C. Zhang, K. Zhang, Y. Zhang, X. Zheng, T. Zhou, Q. Zhu (2019), [The DOE E3SM coupled model version 1: Overview and evaluation at standard resolution](#), *J. Adv. Model. Earth Syst.*, 11, 2089–2129, doi:10.1029/2018MS001603.

72) Sun, T., Liu, L., **Flanner, M. G.**, Kirchstetter, T. W., Jiao, C., Preble, C. V., Chang, W. L., and Bond, T. C. (2019), [Constraining a historical black carbon emission inventory of the United States for 1960–2000](#), *J. Geophys. Res. Atmos.*, 124, 4004–4025, doi:10.1029/2018JD030201.

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70) Li, Y. and **Flanner, M. G.** (2018), [Investigating the impact of aerosol deposition on snowmelt over the Greenland Ice Sheet using a large-ensemble kernel](#), *Atmos. Chem. Phys.*, 18, 16005–16018, doi:10.5194/acp-18-16005-2018.

69) Skiles, S. M., **Flanner, M.**, Cook, J. M., Dumont, M., and Painter, T. H. (2018), [Radiative forcing by light-absorbing particles in snow](#), *Nature Climate Change*, 8, 964–97, doi:10.1038/s41558-018-0296-5.

68) Krinner, G. and **Flanner, M. G.** (2018), [Striking stationarity of large-scale climate model bias patterns under strong climate change](#), *Proc. Nat. Acad. Sci.*, 115, 38, 9462–9466, doi: 10.1073/pnas.1807912115.

67) He, C., **Flanner, M. G.**, Chen, F., Barlage, M., Liou, K. N., Kang, S., Ming, J., and Qian, Y. (2018), [Black carbon-induced snow albedo reduction over the Tibetan Plateau: uncertainties from snow grain shape and aerosol–snow mixing state based on an updated SNICAR model](#), *Atmos. Chem. Phys.*, 18, 11507–11527, doi:10.5194/acp-18-11507-2018.

66) Smith, B. E., A. Gardner, **A. Schneider**, and **M. Flanner** (2018), [Modeling biases in laser-altimetry measurements caused by scattering of green light in snow](#), *Remote Sens. Environ.*, 215, 398–410, doi:10.1016/j.rse.2018.06.012.

65) **Ward, J. L.**, **Flanner, M. G.**, Bergin, M., Dibb, J. E., Polashenski, C. M., Soja, A. J., and Thomas, J. L. (2018), [Modeled response of Greenland snowmelt to the presence of biomass burning-based absorbing aerosols in the atmosphere and snow](#), *J. Geophys. Res. Atmos.*, 123, 6122–6141, doi:10.1029/2017JD027878.

64) Matsui, H., Mahowald, N. M., Moteki, N., Hamilton, D. S., Ohata, S., Yoshida, A., Koike, M., Scanza, R. A., and **Flanner, M. G.** (2018), [Anthropogenic combustion iron as a complex climate forcer](#), *Nature Communications*, 9, 1593, doi:10.1038/s41467-018-03997-0.

63) **Singh, D.**, **Flanner, M. G.**, and Millour, E. (2018), [Improvement of Mars surface snow albedo modeling in LMD Mars GCM with SNICAR](#), *J. Geophys. Res. Planets*, 123, 780–791, doi:10.1002/2017JE005368.

62) Huang, X., X. Chen, **M. Flanner**, P. Yang, D. Feldman, and C. Kuo (2018), [Improved representation of surface spectral emissivity in a global climate model and its impact on simulated climate](#), *J. Climate*, 31, 3711–3727, doi:10.1175/JCLI-D-17-0125.1.

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- 60) **Schneider, A., Flanner, M.**, and Perket, J. (2018), [Multidecadal variability in surface albedo feedback across CMIP5 models](#), *Geophys. Res. Lett.*, 45, 1972–1980, doi:10.1002/2017GL076293.
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- 56) Thomas, J. L., Polashenski, C. M., Soja, A. J., Marelle, L., Casey, K. A., Choi, H. D., Raut, J.-C., Wiedinmyer, C. and Emmons, L. K., Fast, J. D., Pelon, J., Law, K. S., **Flanner, M. G.**, and Dibb, J. E. (2017), [Quantifying black carbon deposition over the Greenland ice sheet from forest fires in Canada](#), *Geophys. Res. Lett.*, 44, 7965–7974, doi:10.1002/2017GL073701.
- 55) Myhre, G., Aas, W., Cherian, R., Collins, W., Faluvegi, G., **Flanner, M.**, Forster, P., Hodnebrog, Ø., Klimont, Z., Lund, M. T., Mülmenstädt, J., Lund Myhre, C., Olivié, D., Prather, M., Quaas, J., Samset, B. H., Schnell, J. L., Schulz, M., Shindell, D., Skeie, R. B., Takemura, T., and Tsyro, S. (2017), [Multi-model simulations of aerosol and ozone radiative forcing due to anthropogenic emission changes during the period 1990–2015](#), *Atmos. Chem. Phys.*, 17, 2709–2720, doi:10.5194/acp-17-2709-2017.
- 54) Schmale, J., **Flanner, M.**, Kang, S., Sprenger, M., Zhang, Q., Guo, J., Li, Y., Schwikowski, M., Farinotti, D. (2017), [Modulation of snow reflectance and snowmelt from Central Asian glaciers by anthropogenic black carbon](#), *Scientific Reports*, 7, doi:10.1038/srep40501.
- 53) Chen, X. H., X. L. Huang, C. Y. Jiao, **M. G. Flanner**, T, Raeker and B. Palen (2017), [Running climate model on a commercial cloud computing environment: A case study using Community Earth System Model \(CESM\) on Amazon AWS](#), *Computers & Geosciences*, 98, 21–25, doi:10.1016/j.cageo.2016.09.014.
- 52) **Singh, D.** and **M. G. Flanner** (2016), [An improved carbon dioxide snow spectral albedo model: Application to Martian conditions](#), *J. Geophys. Res. Planets*, 121, 2037–2054, doi:10.1002/2016JE005040.
- 51) van den Hurk, B., Kim, H., Krinner, G., Seneviratne, S. I., Derksen, C., Oki, T., Douville, H., Colin, J., Ducharne, A., Cheruy, F., Viovy, N., Puma, M. J., Wada, Y., Li, W., Jia, B., Alessandri, A., Lawrence, D. M., Weedon, G. P., Ellis, R., Hagemann, S., Mao, J., **Flanner, M. G.**, Zampieri, M., Matera, S., Law, R. M., and Sheffield, J. (2016), [LS3MIP \(v1.0\) contribution to CMIP6: the Land Surface, Snow and Soil moisture Model Intercomparison Project – aims, setup and expected outcome](#), *Geosci. Model Dev.*, 9, 2809–2832, doi:10.5194/gmd-9-2809-2016.
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- 49) Wobus, C., **Flanner, M.**, Sarofim, M. C., Moura, M. C. P. and Smith, S. J. (2016), [Future Arctic temperature change resulting from a range of aerosol emissions scenarios](#), *Earth's Future*, 4, 270–281, doi:10.1002/2016EF000361.
- 48) Arnold S. R., K. S. Law, C. A. Brock, J. L. Thomas, S. M. Starkweather, K. von Salzen, A. Stohl, S. Sharma, M. T. Lund, **M. G. Flanner**, T. Petäjä, H. Tanimoto, J. Gamble, J. E. Dibb, M. Melamed, N. Johnson, M. Fidel, V.-P. Tynkkynen, A. Baklanov, S. Eckhardt, S. A. Monks, J. Browse, H. Bozem (2016), [Arctic air pollution: Challenges and opportunities for the next decade](#), *Elem. Sci. Anth.*, 4, 000104, doi: 10.12952/journal.elementa.000104.
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- 46) Sand, M., T. K. Berntsen, K. von Salzen, **M. G. Flanner**, J. Langner, and D. G. Victor (2016), [Response of Arctic temperature to changes in emissions of short-lived climate forcers](#), *Nature Clim. Change*, 6, 286-290, doi: 10.1038/nclimate2880.
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- 44) Singh, D., **Flanner, M. G.**, and Perket, J. (2015), [The global land shortwave cryosphere radiative effect during the MODIS era](#), *The Cryosphere*, 9, 2057-2070, doi:10.5194/tc-9-2057-2015.
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- 42) Oaida, C. M, Y. Xue, **M. G. Flanner**, S. M. Skiles, F. De Sales, and T. H. Painter (2015), [Improving snow albedo processes in WRF/SSiB regional climate model to assess impact of dust and black carbon in snow on surface energy balance and hydrology over western U.S.](#), *J. Geophys. Res. Atmos.*, 120, 3228–3248. doi: 10.1002/2014JD022444.
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[deposits from the 2009 eruption of Redoubt volcano](#), *J. Geophys. Res. Atmos.*, 119, 11387–11397, doi:10.1002/2014JD021949.

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