References

- Abalos, Marta et al. (Oct. 1, 2017). "Using the Artificial Tracer e90 to Examine Present and Future UTLS Tracer Transport in WACCM". In: *Journal of the Atmospheric Sciences* 74.10, pp. 3383–3403. DOI: 10.1175/JAS-D-17-0135.1.
- Bader, David et al. (July 11, 2014). Accelerated Climate Modeling for Energy (ACME) Project Strategy and Initial Implementation Plan Earth & Environmental Systems Modeling.
- Baldwin, Mark P., Blanca Ayarzagüena, et al. (2021). "Sudden Stratospheric Warmings". In: *Reviews of Geophysics* 59.1, e2020RG000708. DOI: 10 . 1029 / 2020RG000708.
- Baldwin, Mark P., L. J. Gray, et al. (2001). "The quasi-biennial oscillation". In: *Reviews of Geophysics* 39.2, pp. 179–229. DOI: 10.1029/1999RG000073.
- Barnes, John E. and David J. Hofmann (1997). "Lidar measurements of stratospheric aerosol over Mauna Loa Observatory". In: *Geophysical Research Letters* 24.15, pp. 1923–1926. DOI: 10.1029/97GL01943.
- Bekki, S. (1995). "Oxidation of volcanic SO2: A sink for stratospheric OH and H2O". In: *Geophysical Research Letters* 22.8, pp. 913–916. DOI: 10.1029/95GL00534.
- Bekki, S. and J. A. Pyle (1994). "A two-dimensional modeling study of the volcanic eruption of Mount Pinatubo". In: *Journal of Geophysical Research: Atmospheres* 99 (D9), pp. 18861–18869. DOI: 10.1029/94JD00667.
- Bluth, Gregg J. S. et al. (Nov. 1997). "Stratospheric Loading of Sulfur from Explosive Volcanic Eruptions". In: *The Journal of Geology* 105.6, pp. 671–684. DOI: 10. 1086/515972.
- Bradley, Andrew M., Peter A. Bosler, and Oksana Guba (Sept. 27, 2021). "Islet: Interpolation semi-Lagrangian element-based transport". In: *Geoscientific Model Development Discussions*, pp. 1–48. DOI: 10.5194/gmd-2021-296.
- Crutzen, Paul J. (July 25, 2006). "Albedo Enhancement by Stratospheric Sulfur Injections: A Contribution to Resolve a Policy Dilemma?" In: *Climatic Change* 77.3, p. 211. DOI: 10.1007/s10584-006-9101-y.
- Danabasoglu, G. et al. (2020). "The Community Earth System Model Version 2 (CESM2)". In: *Journal of Advances in Modeling Earth Systems* 12.2, e2019MS001916. DOI: https://doi.org/10.1029/2019MS001916.
- Dennis, John M. et al. (Feb. 1, 2012). "CAM-SE: A scalable spectral element dynamical core for the Community Atmosphere Model". In: *The International Jour-*

- *nal of High Performance Computing Applications* 26.1, pp. 74–89. DOI: 10.1177/1094342011428142.
- Eyring, Veronika, Sandrine Bony, et al. (May 26, 2016). "Overview of the Coupled Model Intercomparison Project Phase 6 (CMIP6) experimental design and organization". In: *Geoscientific Model Development* 9.5, pp. 1937–1958. DOI: 10.5194/gmd-9-1937-2016.
- Eyring, Veronika, Jean-François Lamarque, et al. (2013). "Overview of IGAC/SPARC Chemistry-Climate Model Initiative (CCMI) Community Simulations in Support of Upcoming Ozone and Climate Assessments". In: p. 19.
- Golaz, Jean-Christophe et al. (Apr. 22, 2022). *The DOE E3SM Model Version 2: Overview of the physical model*. Earth and Space Science Open Archive. DOI: 10.1002/essoar.10511174.1.
- Guo, Song, Gregg J. S. Bluth, et al. (2004). "Reevaluation of SO2 release of the 15 June 1991 Pinatubo eruption using ultraviolet and infrared satellite sensors". In: *Geochemistry, Geophysics, Geosystems* 5.4. DOI: 10.1029/2003GC000654.
- Guo, Song, William I. Rose, et al. (2004). "Particles in the great Pinatubo volcanic cloud of June 1991: The role of ice". In: *Geochemistry, Geophysics, Geosystems* 5.5. DOI: 10.1029/2003GC000655.
- Gupta, Aman, Edwin P. Gerber, and Peter H. Lauritzen (2020). "Numerical impacts on tracer transport: A proposed intercomparison test of Atmospheric General Circulation Models". In: *Quarterly Journal of the Royal Meteorological Society* 146.733, pp. 3937–3964. DOI: 10.1002/qj.3881.
- Hannah, Walter M. et al. (2021). "Separating Physics and Dynamics Grids for Improved Computational Efficiency in Spectral Element Earth System Models". In: *Journal of Advances in Modeling Earth Systems* 13.7, e2020MS002419. DOI: 10.1029/2020MS002419.
- Held, Isaac M. and Max J. Suarez (Oct. 1, 1994). "A Proposal for the Intercomparison of the Dynamical Cores of Atmospheric General Circulation Models". In: *Bulletin of the American Meteorological Society* 75.10, pp. 1825–1830. DOI: 10.1175/1520-0477(1994)075<1825:APFTIO>2.0.CO;2.
- Holasek, R. E., S. Self, and A. W. Woods (1996). "Satellite observations and interpretation of the 1991 Mount Pinatubo eruption plumes". In: *Journal of Geophysical Research: Solid Earth* 101 (B12), pp. 27635–27655. DOI: 10.1029/96JB01179.
- Holton, James R. and Gregory J. Hakim (Jan. 1, 2013a).
 "Chapter 10 The General Circulation". In: An Introduction to Dynamic Meteorology (Fifth Edition). Ed. by James R. Holton and Gregory J. Hakim. Boston: Aca-

- demic Press, pp. 325–375. DOI: 10.1016/B978-0-12-384866-6.00010-6.
- Holton, James R. and Gregory J. Hakim (Jan. 1, 2013b). "Chapter 12 Middle Atmosphere Dynamics". In: *An Introduction to Dynamic Meteorology (Fifth Edition)*. Ed. by James R. Holton and Gregory J. Hakim. Boston: Academic Press, pp. 413–452. DOI: 10.1016/B978-0-12-384866-6.00012-X.
- Jablonowski, Christiane and David Williamson (2006). "A baroclinic instability test case for atmospheric model dynamical cores". In: *Quarterly Journal of the Royal Meteorological Society* 132.621, pp. 2943–2975. DOI: 10.1256/qj.06.12.
- Jablonowski, Christiane and David Williamson (Feb. 8, 2011). "The Pros and Cons of Diffusion, Filters and Fixers in Atmospheric General Circulation Models". In: *Lecture Notes in Computational Science and Engineering*. Vol. 80, pp. 381–493. DOI: 10.1007/978-3-642-11640-7_13.
- Lauritzen, P. H. et al. (May 4, 2015). "The terminator "toy" chemistry test: a simple tool to assess errors in transport schemes". In: *Geoscientific Model Development* 8.5, pp. 1299–1313. DOI: 10.5194/gmd-8-1299-2015.
- Lin, Shian-Jiann, William Putman, and Lucas Harris (Nov. 28, 2017). "THE GFDL FINITE-VOLUME CUBED-SPHERE DYNAMICAL CORE". In: p. 58.
- McCormick, M. Patrick, Larry W. Thomason, and Charles R. Trepte (Feb. 1995). "Atmospheric effects of the Mt Pinatubo eruption". In: *Nature* 373.6513, pp. 399–404. DOI: 10.1038/373399a0.
- Mills, Michael J. et al. (Mar. 16, 2016). "Global volcanic aerosol properties derived from emissions, 1990–2014, using CESM1(WACCM)". In: *Journal of Geophysical Research: Atmospheres* 121.5, pp. 2332–2348. DOI: 10.1002/2015JD024290.
- Mote, Philip W. et al. (1996). "An atmospheric tape recorder: The imprint of tropical tropopause temperatures on stratospheric water vapor". In: *Journal of Geophysical Research: Atmospheres* 101 (D2), pp. 3989–4006. DOI: 10.1029/95JD03422.
- Petty, Grant W. (2006). *A first course in atmospheric ra-diation*. 2nd ed. Madison, Wis: Sundog Pub. xii, 459 p.
- Randall, David (Oct. 25, 2010). The Evolution of Complexity In General Circulation Models.
- Robock, Alan (May 2000). "Volcanic Eruptions and Climate". In: *REVIEWSOF GEOPHYSICS*, p. 29.
- Robock, Alan (Feb. 15, 2002). "The Climatic Aftermath". In: *Science* 295.5558, pp. 1242–1244. DOI: 10.1126/science.1069903.

- Rosen, James M. (Oct. 1, 1971). "The Boiling Point of Stratospheric Aerosols". In: *Journal of Applied Meteorology and Climatology* 10.5, pp. 1044–1046. DOI: 10. 1175/1520-0450(1971)010<1044: TBPOSA>2.0. CO; 2.
- Self, Stephen et al. (Jan. 1, 1993). "The Atmospheric Impact of the 1991 Mount Pinatubo Eruption". In.
- Sheng, J.-X. et al. (Oct. 19, 2015). "A perturbed parameter model ensemble to investigate Mt. Pinatubo's 1991 initial sulfur mass emission". In: *Atmospheric Chemistry and Physics* 15.20, pp. 11501–11512. DOI: 10.5194/acp-15-11501-2015.
- Stenchikov, Georgiy et al. (June 27, 1998). "Radiative forcing from the 1991 Mount Pinatubo volcanic eruption". In: *Journal of Geophysical Research* 1031, pp. 13837–13858. DOI: 10.1029/98JD00693.
- Tilmes, Simone et al. (Nov. 1, 2018). "CESM1(WACCM) Stratospheric Aerosol Geoengineering Large Ensemble Project". In: *Bulletin of the American Meteorological Society* 99.11, pp. 2361–2371. DOI: 10.1175/BAMS-D-17-0267.1.
- Toohey, Matthew et al. (Nov. 11, 2016). "Easy Volcanic Aerosol (EVA v1.0): an idealized forcing generator for climate simulations". In: *Geoscientific Model Development* 9.11, pp. 4049–4070. DOI: 10.5194/gmd-9-4049-2016.
- Watts, Jonathan (Dec. 3, 2020). "China plans rapid expansion of 'weather modification' efforts". In: *The Guardian*.
- Waugh, Darryn and Timothy Hall (Dec. 2002). "AGE OF STRATOSPHERIC AIR: THEORY, OBSERVATIONS, AND MODELS: AGE OF STRATOSPHERIC AIR". In: *Reviews of Geophysics* 40.4, pp. 1–1–1–26. DOI: 10.1029/2000RG000101.
- Williamson, David, Jerry G. Olson, and Byron A. Boville (Apr. 1, 1998). "A Comparison of Semi-Lagrangian and Eulerian Tropical Climate Simulations". In: *Monthly Weather Review* 126.4, pp. 1001–1012. DOI: 10.1175/1520-0493(1998)126<1001: ACOSLA>2.0.CO; 2.
- Wolfe, Edward W. and Richard P. Hoblitt (1998). "Overview of the Eruptions". In: Fire and Mud: Eruptions and Lahars of Mount Pinatubo, Philippines. Univ of Washington Pr.
- Yao, Weiye and Christiane Jablonowski (2013). "Spontaneous QBO-like oscillations in an atmospheric model dynamical core". In: *Geophysical Research Letters* 40.14, pp. 3772–3776. DOI: 10.1002/grl.50723.
- Yao, Weiye and Christiane Jablonowski (Sept. 1, 2016).
 "The Impact of GCM Dynamical Cores on Idealized Sudden Stratospheric Warmings and Their QBO Inter-

actions". In: *Journal of the Atmospheric Sciences* 73.9, pp. 3397–3421. DOI: 10.1175/JAS-D-15-0242.1.

Yue, G. K. et al. (1994). "Stratospheric aerosol acidity, density, and refractive index deduced from SAGE II and NMC temperature data". In: *Journal of Geophysical Research: Atmospheres* 99 (D2), pp. 3727–3738. DOI: 10.1029/93JD02989.