

Aaron Match

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PROFILE	I study stratosphere-troposphere dynamics and photochemistry using theory, observations, and models.
JOB	Cornell University, Ithaca, NY • Department of Earth and Atmospheric Sciences • Supervisor: Prof. Peter Hitchcock ▪ Postdoctoral Associate, co-wrote NSF grant: “From surface warming to stratospheric change” 2024- New York University, New York, NY • Center for Atmosphere Ocean Science (CAOS), Courant Institute of Mathematical Sciences • Supervisor: Prof. Edwin P. Gerber ▪ NSF Postdoctoral Research Fellow in Atmospheric and Geospace Sciences 2021-2024
EDUCATION	Princeton University, Princeton, NJ ▪ Ph.D. Atmospheric and Oceanic Sciences (AOS) 2015 – 2021 • Thesis: <i>The Unified Internal Dynamics and Global Interactions of the Quasi-Biennial Oscillation</i> • Advisor: Prof. Stephan Fueglistaler Cornell University, Ithaca, NY ▪ B.S. Atmospheric Science, minor Mathematics, summa cum laude, Research Honors 2011 – 2015 • Thesis: <i>Diagnosing the structure of finite amplitude wave activity in the polar stratosphere</i> • Advisor: Prof. Gang Chen
PUBLICATIONS	1. A. Butler, D. Seidel, S.C. Hardiman, N. Butchart, T. Birner, <u>A. Match</u>, 2015: Defining sudden stratospheric warmings. <i>Bulletin of the American Meteorological Society</i>, 96, 11, 1913–1928. 2. <u>A. Match</u>, S. Fueglistaler, 2019: The buffer zone of the Quasi-Biennial Oscillation. <i>Journal of the Atmospheric Sciences</i>, 76, 11, 3553–3567. 3. <u>A. Match</u>, S. Fueglistaler, 2020: Mean flow damping forms the buffer zone of the Quasi-Biennial Oscillation: 1D theory. <i>Journal of the Atmospheric Sciences</i>, 77, 1955–67. 4. <u>A. Match</u>, S. Fueglistaler, 2021: Anomalous dynamics of QBO disruptions explained by 1D theory with external triggering. <i>Journal of the Atmospheric Sciences</i>, 78, 2, 373–383. 5. <u>A. Match</u>, S. Fueglistaler, 2021: Large internal variability precludes global warming signal detection in observed lower stratospheric QBO amplitude. <i>Journal of Climate</i>, 34, 24, 9823–9836. 6. <u>A. Match</u>, E.P., Gerber, 2022: Tropospheric expansion under global warming reduces tropical lower stratospheric ozone. <i>Geophysical Research Letters</i>, 49, 19, 1–12. 7. <u>A. Match</u>, E.P., Gerber, S. Fueglistaler, 2024: Beyond self-healing: Stabilizing and destabilizing photochemical adjustment of the ozone layer. <i>Atmos. Chem. Phys.</i>, 24, 10305–10322. 8. <u>A. Match</u>, E.P., Gerber, S. Fueglistaler, 2025: Protection without poison: Why does tropical ozone maximize in the stratosphere?. <i>Atmos. Chem. Phys.</i>, 25, 4349–4366 9. <u>A. Match</u>, E.P., Gerber, 2025: The double dip: How tropospheric expansion counteracts increases in extratropical stratospheric ozone under global warming. <i>GRL</i>, 52, e2024GL112409. 10. C. Orbe et al., incl. <u>A. Match</u>, 2026: Experimental protocol for phase 1 of the APARC QUOCA (QUasi-biennial oscillation and Ozone Chemistry interactions in the Atmosphere) working group, <i>Geosci. Model Dev.</i>, 19, 773–794. 11. <u>A. Match</u>, B. Schaffer (co-first authors), S. Fueglistaler, 2026: On the inherent ambiguity of extreme event costs attributed to climate change. <i>AGU Advances</i>, 7, 7, e2026AV002546

AWARDS & SCHOLARSHIPS	AGU Editor's Citation for Excellence in Reviewing (JGRA: 2023, 2024; GRL: 2025)	2025
	NSF Postdoctoral Research Fellow in Atmospheric and Geospace Sciences	2021-2023
	Recognition for Service and Outreach by Princeton Department of Geosciences	2021
	Princeton Energy and Climate Scholar	2017 – 2019
	NSF Graduate Research Fellowship (GRFP)	2016 – 2019
	Centennial Fellowship in the Natural Sciences, Princeton University	2015 – 2019
	Merrill Presidential Scholar, Cornell University (Top 1% of Cornell graduating seniors)	2015
	Academic Excellence in Atmospheric Sciences Award, Cornell University (Top GPA in major)	2015
	SUNY Chancellor's Award for Student Excellence	2015
	Barry M. Goldwater Scholarship	2014 – 2015
	NOAA Ernest F. Hollings Scholarship	2013 – 2015
	Orville Family Endowed Scholarship, American Meteorological Society	2014
	Freshman Undergraduate Scholarship, American Meteorological Society	2011
TEACHING	Guest lecture, EAS 6920: Earth's Water Cycle, Prof. Angeline Pendergrass	Fall 2026
	Guest lecture, EAS 5555: Earth System Modeling, Prof. Daniele Visioni	Spring 2026
	Substitute lecture, EAS 3420: Atmospheric Dynamics, Prof. Peter Hitchcock	Spring 2025
	Assistant-in-Instruction, GEO 361: Earth's Atmosphere. Prof. Stephan Fueglistaler	Fall 2019
	Assistant, FRS 151: Time Capsules for Climate Change. Prof. Rob Socolow	Fall 2018
MENTORING	Co-mentor: CorGGLE (Cornell Geopaths Geoscience Learning Ecosystem): Monserrath Velez	2025
	Co-mentor: Cornell Atmospheric Science Master's Student, Dylan Winchell	2025
OUTREACH	Founding member, Climate Up Close. Climate scientists who tour the US presenting a non-prescriptive synthesis of the science of climate change.	2019-Pres.
	• Nebraska (2025), New Hampshire Lakes Region (2024), Chicago (2023), Central New Jersey (2022), Florida Panhandle (2022), Philadelphia (2020), Central PA (2019)	
	• Podcasts: Three Degrees [Link] , Lincoln KZUM's Our Street ("Climate change" 6/23/25) [Link]	
	• Newspaper interviews: [NHPR] , [Concord Monitor]	
	Co-presenter, "Setting climate activism in a broader context of environmental and social action"	
	• Chisuk Emuna Congregation, Harrisburg, PA	2022
	Co-presenter, Princeton Day School Energy and Climate Scholars, 3 presentations	2018-2019
	Co-organizer, AOS workshop on Tropical Dynamics, Princeton University	2017
	Co-organizer, AOS workshop on Climate Engineering, Princeton University	2016
PROFESSIONAL ACTIVITIES	▪ Member, ISSI Team on INFO-QBO: Investigating the Feedback from Ozone in the QBO	2025-
	▪ Community Lead, Quasi-biennial oscillation and Ozone Chemistry interactions in the Atmosphere (QUOCA) Working Group 3 on Analytical Models and Linearized Ozone Parameterizations	2025-
	▪ Co-organizer of Atmospheric and Climate seminars, Cornell EAS	2024-2025
	▪ Co-organizer of department seminars, NYU Center for Atmosphere Ocean Science	2022-2024
	▪ Student member, AMS Middle Atmosphere Committee	2021
	▪ Student member, AMS Atmospheric and Oceanic Fluid Dynamics Committee	2017-2019
	▪ Reviewer: Geophysical Research Letters, Atmospheric Chemistry and Physics, Quarterly Journal of the Royal Meteorological Society, Journal of Climate, Journal of Atmospheric Science, Journal of Geophysical Research: Atmospheres, npj-Atmospheric Science, Nature Climate Change, Nature Communications, Journal of Advances in the Modeling of Earth Systems, American Journal of Physics	

RESEARCH INTERNSHIPS	NOAA Hollings: Geophysical Fluid Dynamics Laboratory, Princeton, NJ	2014
	• Project: “Sensitivities of stratospheric aerosol dispersal to variations in location and timing” • Advisors: Jasmin John and Dr. Larry Horowitz	
	NSF REU: Center for Multiscale Modeling of Atmospheric Processes, Fort Collins, CO	2013
	• Project: “Dynamically motivating a definition for sudden stratospheric warmings” • Advisor: Prof. Thomas Birner	
INVITED/AWARDED PRESENTATIONS	▪ Understanding the stratospheric ozone response to surface warming	
	• Invited talk. AMS Annual Meeting. Houston, TX	Jan 2026
	▪ A conceptual model of the tropical [O₃] profile*	
	• Invited talk. QBOi-SNAP-QUOCA joint workshop. Cambridge, UK	Mar 2025
	▪ Protection without poison: Why tropical ozone maximizes in the interior of the atmosphere	
	• Invited talk. AGU Fall Meeting 2024. Washington, DC	Dec 2024
	▪ The buffer zone of the QBO: Theory of formation and future projections	
	• Invited talk. 21 st AMS Conf. on the Middle Atmosphere, Houston, TX (remote)	Jan 2022
	▪ Diagnosing the structure of finite amplitude wave activity in the polar stratosphere*	
	• Poster. 20 th Conf. on Atmos. and Oceanic Fluid Dyn., Minneapolis, MN, USA	Jun 2015
	▪ Sensitivities of stratospheric aerosol dispersal to variations in location and timing*	
	• Talk. AMS 18 th Conf. on the Middle Atmosphere, Phoenix, AZ, USA	Feb 2014
	*Denotes best student/early career presentation award	
OTHER PRESENTATIONS	▪ On the inherent ambiguity of extreme event costs attributed to climate change	
	• Cornell Weather Conference, Ithaca, NY	Sep 2026
	▪ A conceptual model of the tropical ozone profile through the stratosphere and troposphere	
	• Thomas Birner’s group meeting at LMU, Munich, Germany	Jun 2026
	▪ Understanding Earth’s changing stratosphere and troposphere	
	• Yale Department of Earth and Planetary Sciences Seminar, New Haven, CT	Mar 2026
	▪ Interpreting differences between the frequency-change and intensity-change approaches for attributing extreme event costs to climate change	
	• Princeton University, Department of Geosciences Climate Seminar, Princeton, NJ	Oct 2025
	• Cornell University, Atmospheric and Climate Seminar, Ithaca, NY	Oct 2025
	▪ Simple models of tropical ozone and its response to surface warming	
	• NCAR ACOM Seminar, Boulder, CO	Oct 2025
	▪ Exploring coupling between convection and ozone	
	• Northeast Tropical Workshop, Albany, NY	Aug 2025
	▪ Protection without poison: Why tropical [O₃] maximizes around 26 km	
	• University of St. Andrews COAST Seminar, St. Andrews, Scotland	Mar 2025
	• Cornell University, Atmospheric and Climate Seminar, Ithaca, NY	Jan 2025
	▪ The double dip: How tropospheric expansion counteracts increases in extratropical stratospheric O₃ under global warming	
	• Talk. AGU Fall Meeting 2024. Washington, DC	Dec 2024
	▪ On the complementarity of extreme event costs attributed to changes in frequency vs. intensity	
	• Poster. AGU Fall Meeting 2024. Washington, DC	Dec 2024
	▪ Protection without poison: Why tropical ozone maximizes in the interior of the atmosphere	
	• Seminar. NYU CAOS Colloquium, New York, NY	Sep 2024
	• Seminar. UW Atmospheric and Climate Science Seminar, Seattle, WA	Sep 2024
	• Talk. AOFD/MA meeting, Burlington, VT	Jun 2024
	• Seminar. SEAS Colloquium, Lamont-Doherty Earth Observatory, Palisades, NY	Apr 2024
	▪ Beyond self-healing: Stabilizing and destabilizing photochemical adjustment of the ozone layer	
	• Talk. Quadrennial Ozone Symposium, Boulder, CO	Jul 2024
	▪ Explaining ozone layer structure and self-healing	
	• Seminar. NASA GISS, NY, NY	Feb 2024

OTHER
PRESENTATIONS
CONT.

- **Beyond self-healing: photochemical adjustments of the ozone layer**
• Seminar. AOS Dynamics Seminar, Princeton University, NJ Jan 2024
- **Extreme Event Attribution workshop: A critical review**
• 2.5-hour workshop. Co-led with Ben Schaffer. Princeton University, NJ Jan 2024
- **Understanding the stratospheric ozone response to global warming**
• Poster. AOFD/MA meeting, Burlington, VT Jun 2024
• Talk. 2023 EGU General Assembly, Vienna, AT Apr 2023
- **Simple models of stratospheric ozone photochemistry**
• Seminar. University of Reading, Reading, UK Apr 2023
• Seminar. Cambridge University, Cambridge, UK Apr 2023
• Seminar. Max Planck Institute for Meteorology, Hamburg, DE Apr 2023
• Seminar. Free University of Berlin, Berlin, DE Apr 2023
• Seminar. Institute of Atmospheric Physics & University of Munich, Munich, DE Apr 2023
• Seminar. Harvard University ClimaTea, Cambridge, MA Feb 2023
- **The buffer zone of the QBO: Theory of formation and response to global warming**
• Talk. QBO Workshop, Oxford, UK Mar 2023
- **Revisiting the ozone response to global warming**
• Talk. AGU Fall Meeting, Strat. and Trop. Composition Changes, Chicago, IL Dec 2022
- **Understanding the stratospheric ozone response to global warming**
• Seminar. SEAS Colloquium in Climate Science, Columbia University, NY, NY Nov 2022
• Seminar. Dept. of Earth and Atmospheric Sciences, Cornell University, Ithaca, NY Nov 2022
• Poster. SPARC General Assembly, Boulder, CO Nov 2022
- **Why does ozone have an interior maximum? How does ozone respond to global warming?**
• Talk. From Spectroscopy to Climate, Princeton Center for Theoretical Science, NJ Aug 2022
- **The decade the QBO faltered: Do disruptions pose a crisis to QBO science?**
• Talk. 23rd Conf. on Atmos. & Oceanic Fluid Dynamics (AOFD), Breckenridge, CO Jun 2022
- **Stratospheric dynamics for tropical tropopause layer (TTL) scientists**
• Seminar. NSF PIRE-CIRRUS student/postdoc seminar Dec 2020
- **QBO inference in reanalyses & idealized models: The buffer zone & disruptions**
• Seminar. NCAR WACCM dev team meeting (remote) Nov 2020
• Seminar. Stanford University CLAOB seminar (remote) Nov 2020
• Seminar. NASA GMAO informal QBO team (remote) Oct 2020
• Seminar. Lutsko group meeting at Scripps Institute of Oceanography (remote) Oct 2020
- **The buffer zone of the Quasi-Biennial Oscillation: formation and variability**
• Poster. American Meteorological Society Annual Meeting, Boston, MA Jan 2020
• Poster. Atmospheric Circulation in a Changing Climate Workshop, Madrid, ES Oct 2019
- **The case for a resilient Quasi-Biennial Oscillation**
• Poster. 22nd Atmospheric and Oceanic Fluid Dynamics Conference, Portland, ME Jun 2019
• Talk. IUGG General Assembly, Montreal, QC, CA Jun 2019
• Talk. Graduate Climate Conference, Woods Hole, MA Nov 2019
- **What can observed temperatures tell us about stratospheric dynamics over the past 40 years?**
• Talk. 19th Conference on the Middle Atmosphere, Portland, OR Jun 2017
- **Stratospheric dynamics following the eruption of Mt. Pinatubo**
• Talk. 2nd Stratospheric Sulfur and Its Role in Climate Workshop, Potsdam, DE Apr 2016
• Poster. EGU General Assembly, Vienna, AT Apr 2016
- **Dynamically motivating a definition for sudden stratospheric warmings**
• Poster. AMS 26th Conference on Climate Variability and Change, Atlanta, GA Feb 2014