

Aaron Match

Department of Earth and Atmospheric Sciences, Snee Hall, Cornell University, Ithaca, NY, USA
aaron.match@cornell.edu <https://aaronmatch.github.io/>

PROFILE I study stratosphere-troposphere dynamics and photochemistry using theory, observations, and models.

JOBS

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: *The Unified Internal Dynamics and Global Interactions of the Quasi-Biennial Oscillation*
- Advisor: Prof. Stephan Fueglistaler

Cornell University, Ithaca, NY

- B.S. Atmospheric Science, minor Mathematics, summa cum laude, Research Honors 2011 – 2015
- Thesis: *Diagnosing the structure of finite amplitude wave activity in the polar stratosphere*
- Advisor: Prof. Gang Chen

PUBLICATIONS

10. C. Orbe et al., incl. [A. Match](#), 2026: **Experimental protocol for phase 1 of the APARC QUOCA (QUasi-biennial oscillation and Ozone Chemistry interactions in the Atmosphere) working group**, *Geosci. Model Dev.*, 19, 773–794.
9. [A. Match](#), E.P., Gerber, 2025: **The double dip: How tropospheric expansion counteracts increases in extratropical stratospheric ozone under global warming**. *GRL*, 52, e2024GL112409.
8. [A. Match](#), E.P., Gerber, S. Fueglistaler, 2025: **Protection without poison: Why does tropical ozone maximize in the stratosphere?**. *Atmos. Chem. Phys.*, 25, 4349–4366
7. [A. Match](#), E.P., Gerber, S. Fueglistaler, 2024: **Beyond self-healing: Stabilizing and destabilizing photochemical adjustment of the ozone layer**. *Atmos. Chem. Phys.*, 24, 10305–10322.
6. [A. Match](#), E.P., Gerber, 2022: **Tropospheric expansion under global warming reduces tropical lower stratospheric ozone**. *Geophysical Research Letters*, 49, 19, 1-12.
5. [A. Match](#), S. Fueglistaler, 2021: **Large internal variability precludes global warming signal detection in observed lower stratospheric QBO amplitude**. *Journal of Climate*, 34, 24, 9823–9836.
4. [A. Match](#), S. Fueglistaler, 2021: **Anomalous dynamics of QBO disruptions explained by 1D theory with external triggering**. *Journal of the Atmospheric Sciences*, 78, 2, 373-383.
3. [A. Match](#), S. Fueglistaler, 2020: **Mean flow damping forms the buffer zone of the Quasi-Biennial Oscillation: 1D theory**. *Journal of the Atmospheric Sciences*, 77, 1955-67.
2. [A. Match](#), S. Fueglistaler, 2019: **The buffer zone of the Quasi-Biennial Oscillation**. *Journal of the Atmospheric Sciences*, 76, 11, 3553-3567.
1. A. Butler, D. Seidel, S.C. Hardiman, N. Butchart, T. Birner, [A. Match](#), 2015: **Defining sudden stratospheric warmings**. *Bulletin of the American Meteorological Society*, 96, 11, 1913–1928.

PUBLICATIONS (IN REVIEW) [A. Match](#), B. Schaffer (co-first authors), S. Fueglistaler: **On the inherent ambiguity of extreme event costs attributed to climate change**. In review.

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
	Recognized 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	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
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	
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 Res. Lett., Atmos. Chemistry and Physics, Quarterly Journal of the Royal Met. Soc., 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	

**SELECTED
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. 21st AMS Conf. on the Middle Atmosphere, Houston, TX (remote) Jan 2022
- **Diagnosing the structure of finite amplitude wave activity in the polar stratosphere***
 - Poster. 20th 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 18th Conf. on the Middle Atmosphere, Phoenix, AZ, USA Feb 2014

*Denotes best student/early career presentation award

**OTHER
PRESENTATIONS**

- **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
- **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

OTHER
PRESENTATIONS
CONT.

- **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 CLAOD 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