Tips on Giving a Good Talk, Writing a Good Paper, and Our Path Forward

AOSC 680

Ross Salawitch

Class Web Sites:
http://www2.atmos.umd.edu/~rjs/class/fall2024
https://umd.instructure.com/courses/1367293

Great resource: https://www.defsa.org.za/what-academic-paper

8 October 2024

Student Led Discussions of *Princeton Primers In Climate*

- I will email you a powerpoint file with all graphical elements from *Princeton Primers in Climate* (figures & tables)
- If you want to show text, either scan the pages yourself, obtain an e-copy and take a screen capture, or give me at least 2 days notice of precisely which text passages you would like to use and I will gladly provide
- If you would like to keep to "class" and "handout" mode for slides, I will be happy to print the "handout" version provided I have these via email by 1 pm on day of presentation
- More than happy to have a meeting either in person (best time is after class; other times can be arranged) or over Zoom to review a draft of your presentation

Student Projects

- Each student will give a 12 minute talk (8 to 10 slides) on their research project, on either 3 or 5 December 2024
- Presentations will be in the same order as the discussions
- Those presenting towards the end of the semester ***encouraged to get started soon***
- Each student will also submit a 6 to 8 page single-spaced paper (not including references and figures), on the same topic due ***the day after the presentation***
- Project should be ***new work for this class;*** can be related to your dissertation
- Paper should be a critical review of a topic related to class, that you find interesting. Should cite approximately 5 to 6 papers in the peer-reviewed literature and either "tell a story" (that is, weave a thread) or perhaps weigh to conflicting views and give your opinion ***Please do not use as source material any required readings for this class.***
- Would like a **description** of your research project / paper and at least 2 of the references a week from today https://umd.instructure.com/courses/1367293/quizzes/1725745
- Happy to speak and/or exchange email with students about possible projects
- For emails, most appreciated if subject can begin with "AOSC 680:"
- If given a *complete draft* of your paper ***at least 7 calendar days prior to due date***, I will provide back an edited "mark-up" you can use as input for final submission

Tips on Giving a Good Presentation

Question 1 2.5 pts

Describe something that surprised you from the video "How to Speak" by Patrick Winston: i.e., here I am looking for a suggestion he made for "how to give a good talk" that you did not expect to be present in the list of suggestions. The answer here can either be a suggestion he made with which you either agree or disagree, or something else that surprised you ... other than the actual surprise of him breaking a stick!

Question 2 2.5 pts

Describe an element of the video "How to Speak" by Patrick Winston that you had not previously been part of your "plan of action" for your own talks, and now having seen the video will be a very important consideration for your future talks.

Maryland Today

CAMPUS & COMMUNITY

UMD Graduate Programs Earn High Marks in Latest U.S. News Rankings

Many Specialties Place in Top 25 Nationwide

By Maryland Today Staff / Apr 09, 2024

Highlights of the new U.S. News & World Report graduate program rankings for UMD include No. 3 nationwide for student counseling, No. 4 for education psychology and No. 3 for homeland security.

Photo by Dylan Singleton

Dozens of University of Maryland programs earned high rankings in *U.S. News & World Report*'s 2024-25 Best Graduate Schools lists released Tuesday, with many achieving top-25 placements in overall and specialty categories.

Among UMD's highlights, the College of Education and the School of Public Health both climbed into the top 25, and the College of Computer, Mathematical, and Natural Sciences (CMNS) earned four top-25 accolades, including No. 15 in artificial intelligence.

https://today.umd.edu/umd-graduate-programs-earn-high-marks-in-latest-u-s-news-rankings

U.S. News Ranking: Methodology

RANKING INDICATOR	WEIGHT
Global research reputation	12.5%
Regional research reputation	12.5%
Publications	10%
Books	2.5%
Conferences	2.5%
Normalized citation impact	10%
Total citations	7.5%
Number of publications that are among the 10% most cited	12.5%
Percentage of total publications that are among the 10% most cited	10%
International collaboration – relative to country	5%
International collaboration	5%
Number of highly cited papers that are among the top 1% most cited in their respective field	5%
Percentage of total publications that are among the top 1% most highly cited papers	5%

***Papers & Citations:* 10 + 10 + 7.5 + 12.5 + 10 + 5 + 5 = 60 % of total**

https://www.usnews.com/education/best-global-universities/articles/methodology

U.S. News Ranking: 51 Categories

- Agricultural Sciences +
- Artificial Intelligence +
- Arts and Humanities
- Biology and Biochemistry +
- Biotechnology and Applied Microbiology
- Cardiac and Cardiovascular Systems
- Cell Biology
- Chemical Engineering
- Chemistry +
- Civil Engineering +
- Clinical Medicine
- Computer Science
- Condensed Matter Physics
- Ecology *
- Economics and Business +
- Education and Educational Research
- Electrical and Electronic Engineering
- Endocrinology and Metabolism
- Energy and Fuels +
- Engineering
- Environment/Ecology +
- Environmental Engineering *
- Food Science and Technology
- Gastroenterology and Hepatology
- Geosciences +
- Green and Sustainable Science and Technology *
- Immunology
- Infectious Disease +
- Marine and Freshwater Biology *
- Materials Science +
- Mathematics +
- Mechanical Engineering
- Meteorology and Atmospheric Sciences
- Microbiology
- Molecular Biology and Genetics
- Nanoscience and Nanotechnology +
- Neuroscience and Behavior +
- Oncology +
- Optics
- Pharmacology and Toxicology +
- Physical Chemistry +
- Physics +
- Plant and Animal Science
- Polymer Science
- Psychiatry/Psychology +
- Public, Environmental and Occupational Health +
- Radiology, Nuclear Medicine and Medical Imaging
- Social Sciences and Public Health +
- Space Science
- Surgery
- Water Resources

https://www.usnews.com/education/best-global-universities/articles/subject-rankings-methodology

Baker Paper

Question 3 2.5 pts

According to "How to write your first paper" by Philip N Baker:

a) what part of a paper will be read by the most people

b) when does he advise writing this part of the paper

c) what advice does he give regarding how to approach this part of the paper

Meeting Versus Paper Abstract

Meeting abstract:

AMS
American Meteorological Society

10.4 Stratospheric Inorganic Bromine Loading Inferred from CONTRAST and ATTREX Observations: Implications for Tropospheric Residual BrO

Tuesday, 24 January 2017: 5:00 PM More
4C-3 (Washington State Convention Center)

R.J. Salawitch, Univ. of Maryland, College Park, MD; and P. Wales, S. Choi, J. Joiner, T. Canty, D. C. Anderson, D. Chen, T. Koenig, and E. Atlas

Recorded Presentation

The CONvective TRansport of Active Species in the Tropics (CONTRAST) and Airborne Tropical TRopopause EXperiment (ATTREX) aircraft campaigns sampled the tropical Western Pacific in the winter of 2014. In this region strong convection provides an efficient pathway to transport biogenic very short lived (VSL) bromocarbons and their degradation products from the marine boundary layer to the stratosphere where they contribute to ozone depletion. A stratospheric tracer-tracer relation will be developed based on CONTRAST and ATTREX whole air sampler observations of CFC-11 and bromocarbons. This relation will be used to calculate the release of inorganic bromine from VSL source gas injection and long-lived bromocarbons as function of CFC-11. Additionally, a photochemical box model will be used to infer inorganic bromine loading from CONTRAST BrO observations from CIMS and DOAS instruments taken in the lower stratosphere. The inferred inorganic bromine loading will be combined with the tracer-tracer relation to provide an estimate of VSL product gas injection. This work will provide an observations-based method for calculating stratospheric inorganic bromine loading (Bry) from CFC-11, a commonly measured stratospheric tracer, to be used in future modelling studies. We will provide illustrative examples of the impact of the Bry vs CFC-11 on the calculation of tropospheric residual BrO.

https://ams.confex.com/ams/97Annual/webprogram/Paper315414.html

Meeting Versus Paper Abstract

JGR Atmospheres

Stratospheric Injection of Brominated Very Short-Lived Substances: Aircraft Observations in the Western Pacific and Representation in Global Models

Pamela A. Wales, Ross J. Salawitch, Julie M. Nicely, Daniel C. Anderson, Timothy P. Canty, Sunil Baidar, Barbara Dix, Theodore K. Koenig, Rainer Volkamer, Dexian Chen, L. Gregory Huey ... See all authors

First published: 14 May 2018 | https://doi.org/10.1029/2017JD027978 | Citations: 32

Paper abstract:

251 words ☺

Abstract We quantify the stratospheric injection of brominated very short-lived substances (VSLS) based on aircraft observations acquired in winter 2014 above the Tropical Western Pacific during the CONvective TRansport of Active Species in the Tropics (CONTRAST) and the Airborne Tropical TRopopause EXperiment (ATTREX) campaigns. The overall contribution of VSLS to stratospheric bromine was determined to be 5.0 ± 2.1 ppt, in agreement with the 5 ± 3 ppt estimate provided in the 2014 World Meteorological Organization (WMO) Ozone Assessment report (WMO 2014), but with lower uncertainty. Measurements of organic bromine compounds, including VSLS, were analyzed using CFC-11 as a reference stratospheric tracer. From this analysis, 2.9 ± 0.6 ppt of bromine enters the stratosphere via organic source gas injection of VSLS. This value is two times the mean bromine content of VSLS measured at the tropical tropopause, for regions outside of the Tropical Western Pacific, summarized in WMO 2014. A photochemical box model, constrained to CONTRAST observations, was used to estimate inorganic bromine from measurements of BrO collected by two instruments. The analysis indicates that 2.1 ± 2.1 ppt of bromine enters the stratosphere via inorganic product gas injection. We also examine the representation of brominated VSLS within 14 global models that participated in the Chemistry-Climate Model Initiative. The representation of stratospheric bromine in these models generally lies within the range of our empirical estimate. Models that include explicit representations of VSLS compare better with bromine observations in the lower stratosphere than models that utilize longer-lived chemicals as a surrogate for VSLS.

https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2017JD027978

AGU Journal Abstract Requirement

AGU ADVANCING EARTH AND SPACE SCIENCE

General guidelines

Please prepare your manuscript following our checklists and templates listed under our How to Submit resources.

Length

For most journals, Research Articles are allowed to be up to 25 publication units (PU), where 1 PU is 500 words or 1 display element (figure or table). The title, authors, affiliations, key points, keywords, text in tables (but not captions) and references are excluded from word counts. Longer papers are assessed an excess length fee. Research Letters for *Geophysical Research Letters* have a maximum length of 12 publication units. *Longer papers are not considered in GRL and will be returned for shortening.* For most journals, Commentaries are limited to 6 publication units (recommended length is about 2000 words and 1-2 figures).

Complete information about Publication Fees and length is here.

LaTeX

For LaTeX, use the AGU template. AGU LaTeX templates are also on Overleaf or Curvenote, cloud-based LaTeX authoring systems that allow direct submission to AGU journals. Please DO NOT introduce any extraneous formatting, new commands, macros, or shortcuts, as they are not compatible with our publishing process. Papers with extensive extraneous formatting, macros, or shortcuts (including \def,\newcommands, \renewcommands, and especially those commands with #) will be returned for correction.

Companion manuscripts

AGU will consider papers that are companions or so related that publication and citation should be coordinated. AGU can work with other journals to coordinate publication. If you are submitting companion papers, please indicate this and any information regarding coordination in your cover letter and provide clearly labeled copies of all papers as part of your submission. Please provide regular updates to the editors on the progress of related papers, especially at revision. If there are multiple companions, we strongly recommend that you contact our staff and the journal editors in advance.

Other papers under consideration elsewhere and related to your AGU submission should also be included for the editors and the relation explained in the cover letter. AGU will not publish manuscripts with any references that are not yet published. If the citation of such manuscripts is approved by the editor, AGU will hold final publication until the cited literature is accepted and publicly available.

Sample identification

AGU recommends use of International Geo Sample Numbers (IGSNs) for all samples reported in AGU Journals. IGSNs provide a unique identifier allowing samples to be linked across publications and searched through a central repository. We strongly encourage authors to register samples and obtain IGSNs and use them throughout their manuscript and tables. We recognize IGSNs during our production process and will provide links in manuscript tables to the registered sample descriptions.

Data and software

AGU requires that all data needed to understand, evaluate, and build upon the reported research must be available at the time of peer review and publication. Additionally, authors should make available software that has a significant impact on the research. Additional information can be found in the AGU Data & Software for Authors guidance.

Preparing your manuscript

For submission, we prefer to receive a single file containing your manuscript, figures, and tables; you can use our checklists and templates in Word and LaTeX. Supporting information and large tables should be uploaded separately.

Your manuscript should be arranged in the following order:

1. Title page including authors' names and affiliations
2. Key Points
3. Abstract and Plain Language Summary (required for some journals)

https://www.agu.org/Publish-with-AGU/Publish/Author-Resources/Text-requirements

Meeting Versus Paper Abstract

Meeting abstract:

A33O-3017 - ECS, Climate Feedback, and TCRE: A Comparison of CMIP6 Values to Estimates Inferred from the Century-Long Climate Record

A33O-3017 ECS, Climate Feedback, and TCRE: A Comparison of CMIP6 Values to Estimates Inferred from the Century-Long Climate Record

Ross J Salawitch[1], Austin Patrick Hope[2], Laura McBride[3], Timothy Canty[4], Walter Robert Tribett[2] and Brian Francis Bennett[5], (1)University of Maryland, College Park, Department of Atmospheric and Oceanic Science, College Park, MD, United States, (2)University of Maryland College Park, Department of Atmospheric and Oceanic Science, College Park, MD, United States, (3)University of Maryland College Park, Department of Chemistry and Biochemistry, College Park, MD, United States, (4)University of Maryland, College Park, MD, United States, (5)University of Maryland, Department of Atmospheric and Oceanic Science, College Park, MD, United States

Moscone South - Poster Hall

Abstract

We will present an analysis of Equilibrium Climate Sensitivity (ECS), climate feedback, and Transient Climate Response to Cumulative Emissions (TCRE) inferred from archived output of near surface air temperature (SAT) provided by the General Circulation Models (GCMs) that have participated in the sixth phase of the Coupled Model Intercomparison Project (CMIP6). The CMIP6 values of ECS and climate feedback will be based on analysis of the global mean surface temperature anomaly (GMST) computed from SAT, for GCMs that participated in the abrupt-4×CO_2 experiment. The CMIP6 values of TCRE are based on analysis of GMST from GCM runs that use prescribed future abundances of greenhouse gases from the Shared Socioeconomic Pathway (SSP) 3 – 7.0 scenario, for which about 6/7 of the radiative forcing of climate in 2100 is due to the rise in CO_2. We will also present values of ECS, climate feedback, and TCRE found using our Empirical Model of Global Climate (EM-GC), a multiple linear regression energy balance model that quantitatively accounts for natural influences on GMST such as major volcanic eruptions, the 11-year solar cycle, ENSO, and variations in the strength of the Atlantic Meridional Overturning Circulation as well as anthropogenic influences due to rising greenhouse gases, tropospheric aerosols, and land use change (Hope et al., doi:10.1007/978-3-319-46939-3_2, 2017). The EM-GC simulations are constrained by observations of GMST since the late 1800s and oceanic heat content (OHC) since the early 1960s. Most importantly, the EM-GC provides a framework for quantifying the impact on ECS, climate feedback, and TCRE of incomplete knowledge of the radiative forcing due to tropospheric aerosols as well as uncertainty in OHC. Empirically-based estimates of ECS, climate feedback, and TCRE, all with uncertainties, will be compared to the CMIP6-based values of these three quantities. We'll conclude by offering some thoughts on the reason for the differences apparent in our preliminary analysis: i.e., most of the CMIP6 GCMs appear to be warming more rapidly than the actual climate system.

https://agu.confex.com/agu/fm19/meetingapp.cgi/Paper/596330

Paper abstract:

Earth Syst. Dynam., 12, 545–579, 2021
https://doi.org/10.5194/esd-12-545-2021

Earth System Dynamics
Open Access
EGU

Comparison of CMIP6 historical climate simulations and future projected warming to an empirical model of global climate

Laura A. McBride[1], Austin P. Hope[2], Timothy P. Canty[2], Brian F. Bennett[2], Walter R. Tribett[2], and Ross J. Salawitch[1,2,3]

The sixth phase of the Coupled Model Intercomparison Project (CMIP6) is the latest modeling effort for general circulation models to simulate and project various aspects of climate change. Many of the general circulation models (GCMs) participating in CMIP6 provide archived output that can be used to calculate effective climate sensitivity (ECS) and forecast future temperature change based on emissions scenarios from several Shared Socioeconomic Pathways (SSPs). Here we use our multiple linear regression energy balance model, the Empirical Model of Global Climate (EM-GC), to simulate and project changes in global mean surface temperature (GMST), calculate ECS, and compare to results from the CMIP6 multi-model ensemble. An important aspect of our study is a comprehensive analysis of uncertainties due to radiative forcing of climate from tropospheric aerosols (AER RF) in the EM-GC framework. We quantify the attributable anthropogenic warming rate (AAWR) from the climate record using the EM-GC and use AAWR as a metric to determine how well CMIP6 GCMs replicate human-driven global warming over the last 40 years. The CMIP6 multi-model ensemble indicates a median value of AAWR over 1975–2014 of 0.221 °C per decade (range of 0.151 to 0.299 °C per decade; all ranges given here are for 5th and 95th confidence intervals), which is notably faster warming than our median estimate for AAWR of 0.157 °C per decade (range of 0.120 to 0.195 °C per decade) inferred from the analysis of the Hadley Centre Climatic Research Unit version 5 data record for GMST. Estimates of ECS found using the EM-GC assuming that climate feedback does not vary over time (best estimate 2.33 °C; range of 1.40 to 3.57 °C) are generally consistent with the range of ECS of 1.5 to 4.5 °C given by the IPCC's Fifth Assessment Report. The CMIP6 multi-model ensemble exhibits considerably larger values of ECS (median 3.74 °C; range of 2.19 to 5.65 °C). Our best estimate of ECS increases to 3.08 °C (range of 2.23 to 5.53 °C) if we allow climate feedback to vary over time. The dominant factor in the uncertainty for our empirical determinations of AAWR and ECS is imprecise knowledge of AER RF for the contemporary atmosphere, though the uncertainty due to time-dependent climate feedback is also important for estimates of ECS. We calculate the likelihood of achieving the Paris Agreement target (1.5 °C) and upper limit (2.0 °C) of global warming relative to pre-industrial for seven of the SSPs using both the EM-GC and the CMIP6 multi-model ensemble. In our model framework, SSP1-2.6 has a 53 % probability of limiting warming at or below the Paris target by the end of the century, and SSP4-3.4 has a 64 % probability of achieving the Paris upper limit. These estimates are based on the assumptions that climate feedback has been and will remain constant over time since the prior temperature record can be fit so well assuming constant climate feedback. In addition, we quantify the sensitivity of future warming to the curbing of the current rapid growth of atmospheric methane and show that major near-term limits on the future growth of methane are especially important for achievement of the 1.5 °C goal of future warming. We also quantify warming scenarios assuming climate feedback will rise over time, a feature common among many CMIP6 GCMs; under this assumption, it becomes more difficult to achieve any specific warming target. Finally, we assess warming projections in terms of future anthropogenic emissions of atmospheric carbon. In our model framework, humans can emit only another 150±79 Gt C after 2019 to have a 66 % likelihood of limiting warming to 1.5 °C and another 400±104 Gt C to have the same probability of limiting warming to 2.0 °C. Given the estimated emission of 11.7 Gt C per year for 2019 due to combustion of fossil fuels and deforestation, our EM-GC simulations suggest that the 1.5 °C warming target of the Paris Agreement will not be achieved unless carbon and methane emissions are severely curtailed in the next 10 years.

660 words ☹

https://esd.copernicus.org/articles/12/545/2021/

AGU Journal Abstract Requirement

AGU ADVANCING EARTH AND SPACE SCIENCE

Abstract

The abstract (1) states the nature of the investigation and (2) summarizes the important conclusions. The abstract should be suitable for indexing. Your abstract should:

- Be set as a single paragraph.
- Be less than 250 words for all journals except GRL, for which the limit is 150 words.
- Not include table or figure mentions.
- Avoid reference citations unless dependent on or directly related to another paper (e.g., companion, comment, reply, or commentary on another paper(s)). AGU's Style Guide discusses formatting citations in abstracts.
- Define all abbreviations.

Requirement for your Research Paper: *you must include an abstract, between 150 and 250 words, that will appear just after the paper title and your name of the first page of the submitted document, that summarizes the content of your paper for an interested, perspective reader.*

In other words: please express: a) the high level elements of your research paper that you believe a reader will be interested in learning more about, should they decide to read the paper, as well as: b) the high level elements of your paper a reader should "take away", should they not have time to read the rest of the manuscript.

https://www.agu.org/Publish-with-AGU/Publish/Author-Resources/Text-requirements#abstract

Baker Paper: Introduction

Introduction

The introduction should explain why it was important that you performed the study. You should provide a brief background, focussing on the aspects under investigation. Although statements in your introduction should be fully referenced, your readers should be able to understand your introduction without looking up the references. Try to tailor your introduction to the journal you are planning to submit to. For example, if you write a paper on screening for Edwards Syndrome, you will need far greater detail regarding the condition for the *British Medical Journal* than for *Prenatal Diagnosis*. Above all, you should clearly state the question you sought to answer and the hypothesis behind your study.

https://www.sciencedirect.com/science/article/abs/pii/S1751721411002247

Ross comments:

a) in Atmospheric & Oceanic science, we generally write "Here, we investigate how El Niño will respond to climate change using analysis of ensemble runs of a coupled atmospheric/oceanic GCM" and we generally stop short of stating what we found.

b) your research paper is meant to "map" to the Introduction of an actual paper you would lead

Baker Paper: Methods

Methodology

This section is often one of the easiest to write. You should describe how you performed the study, with sufficient detail to enable any reader to repeat the work. If a particular aspect of the methodology has been fully described in a previous publication, it is appropriate to cite the previous paper and only provide brief details. The steps taken to validate the technique or assay should be included, as should inclusion and exclusion criteria of patient selection. You may need to pay particular attention to the statistical methods detailed in the paper; if you have qualms or concerns regarding your statistical analysis, you should discuss these with your co-authors or with a statistician associated with your hospital.

https://www.sciencedirect.com/science/article/abs/pii/S1751721411002247

Ross comments: in our research group, we do not use the word "easy". Nothing we do is easy. This section is however often the most straightforward to write. Here, you really want to:

a) examine the methods section in other papers written by members of your research group, to appreciate your group's style;

b) give the reader at least enough of the bare elements of your methods such that they do not have to read other papers to understand how your data (or model output) have either been obtained or analyzed.

Baker Paper: Results

Results

You should spend some time deciding how best to present your data; your findings could be described in the form of tables, graphs or written text. You should try not to duplicate the presentation of your data in more than one form. The results section is not the place for any speculation or interpretation of your findings; you should leave any such considerations to the discussion.

https://www.sciencedirect.com/science/article/abs/pii/S1751721411002247

Ross comments; in Atmospheric & Oceanic science:

a) most if not all of the figures of your paper would be described in Results

b) generally we do in fact interpret our findings in Results

c) please please please: describe figures before you interpret figures

Describe Figures Before You Interpret Figures

Figure 3 shows the effect of varying the value of AER RF_{2011} on projections of GMST in our EM-GC framework for the same SSP4-3.4 GHG scenario. The middle box in Fig. 3a, b, and c shows the contribution to GMST of GHGs, LUC, AER, and net human activities. As the value of AER RF_{2011} decreases and aerosols cool more strongly, the value of climate feedback (model parameter λ_{Σ}) rises, and the net contribution of the human impact on GMST by the end of the century increases. Depending on which value of AER RF_{2011} is used, the rise in GMST by the year 2100 for the SSP4-3.4 pathway could range from 1.5 °C (Fig. 3a) to 2.8 °C (Fig. 3c) relative to pre-industrial.

Description

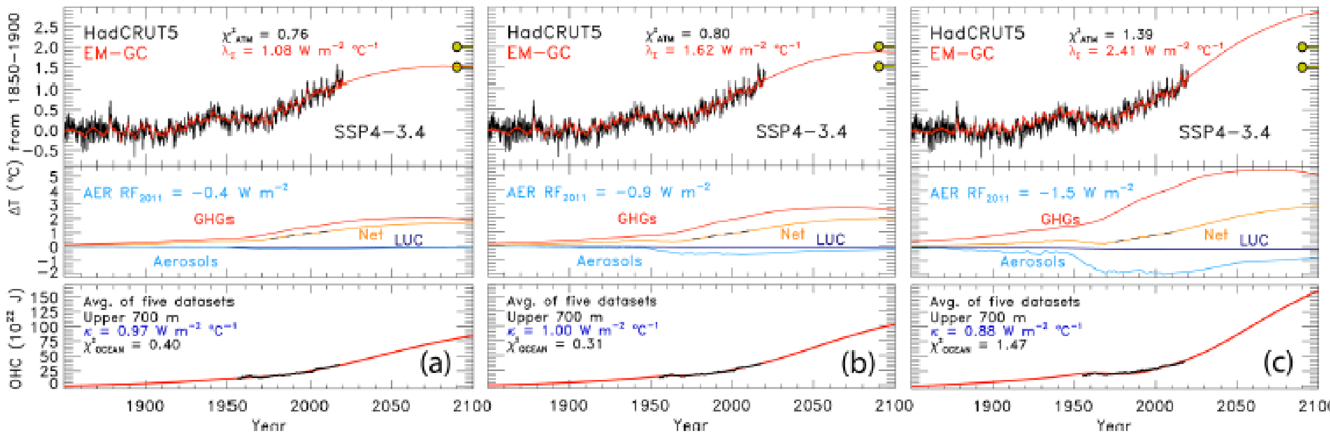


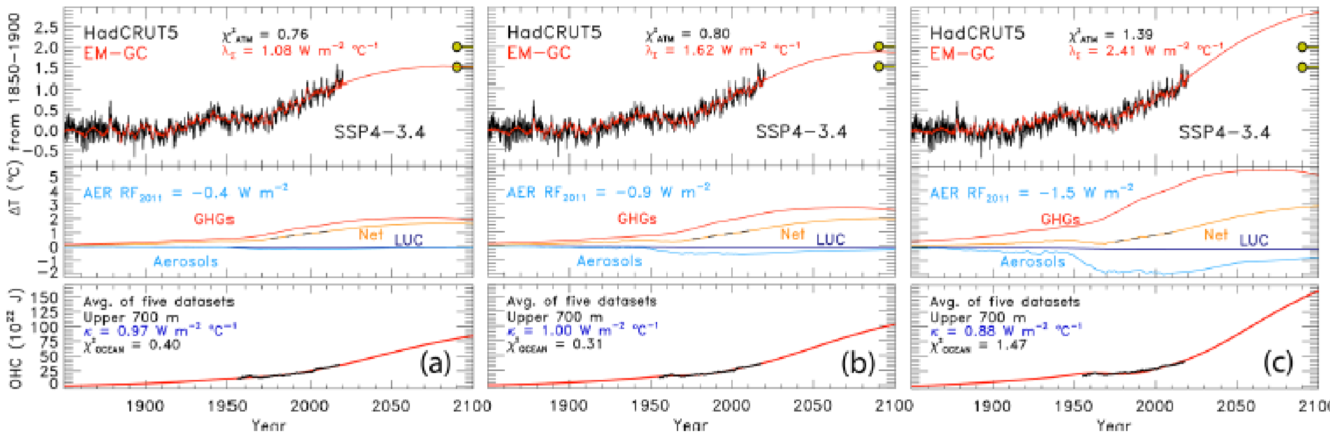
Figure 3. Measured (HadCRUT5) and EM-GC simulated GMST anomaly (ΔT) relative to a pre-industrial (1850–1900) baseline, as well as projected ΔT to the end of the century for SSP4-3.4. The top box in each panel displays observed (black) and simulated (red) ΔT, as well as the values of λ_{Σ} and χ^2_{ATM} for each model run. The Paris Agreement target (1.5 °C) and upper limit (2.0 °C) are shown (gold circles). The middle boxes show the contribution of GHGs, aerosols, and land-use change to ΔT, as well as the net human component. The bottom boxes compare observed (black) and modeled (red) values of OHC for simulations constrained by the average of five data sets (see text) and also provides the numerical values of κ needed to obtain best fits to the OHC record as well as best-fit values of χ^2_{OCEAN}. The only difference between (a), (b), and (c) is the time series for RF due to tropospheric aerosols used to constrain the EM-GC; values of AER RF_{2011} for each time series are (a) -0.4 W m^{-2}, (b) -0.9 W m^{-2}, and (c) -1.5 W m^{-2}.

McBride et al., 2021: https://esd.copernicus.org/articles/12/545/2021/

Describe Figures Before You Interpret Figures

Figure 3 shows the effect of varying the value of AER RF_{2011} on projections of GMST in our EM-GC framework for the same SSP4-3.4 GHG scenario. The middle box in Fig. 3a, b, and c shows the contribution to GMST of GHGs, LUC, AER, and net human activities. As the value of AER RF_{2011} decreases and aerosols cool more strongly, the value of climate feedback (model parameter λ_Σ) rises, and the net contribution of the human impact on GMST by the end of the century increases. Depending on which value of AER RF_{2011} is used, the rise in GMST by the year 2100 for the SSP4-3.4 pathway could range from 1.5 °C (Fig. 3a) to 2.8 °C (Fig. 3c) relative to pre-industrial.

Interpretation



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McBride et al., 2021: https://esd.copernicus.org/articles/12/545/2021/

Baker Paper: Results

Results

You should spend some time deciding how best to present your data; your findings could be described in the form of tables, graphs or written text. You should try not to duplicate the presentation of your data in more than one form. The results section is not the place for any speculation or interpretation of your findings; you should leave any such considerations to the discussion.

https://www.sciencedirect.com/science/article/abs/pii/S1751721411002247

Ross comments; in Atmospheric & Oceanic science:

a) most if not all figures of your paper would be described in Results

b) generally we do in fact interpret our findings in Results

c) please please please: describe figures before you interpret figures

Very helpful tip: best to have figures nearly finalized before you start writing.
If so, your paper will almost "write itself" ☺

Baker Paper: Discussion

Discussion

You should consider whether the study has answered the questions that it was designed to address and whether the hypothesis proposed in the introduction has been proven. You should consider the implications of your work; are changes to clinical practice indicated or are further investigations warranted? This section provides an opportunity to speculate, to extrapolate, and to consider your findings with respect to previous literature — highlighting areas of agreement and explaining areas of disagreement. You may choose to identify caveats to the study, or modifications which would improve any future studies.

https://www.sciencedirect.com/science/article/abs/pii/S1751721411002247

Ross comments:

a) **in the McBride et al. 2021 paper, as well as many other papers in Atmospheric and Oceanic science, this "discussion" appears in a section called "Conclusions"**

b) **check the journal requirements as well as papers recently published in the journal, in question, as to whether a section called "Discussion" separate from "Conclusions" is needed.**

Baker Paper: References

References

Do not neglect this section; you need to ensure that it is free from errors and omissions. An author that you have forgotten to cite, or who you have misinterpreted, may be a reviewer of your paper. Readers will rapidly become frustrated if they cannot find the reference you have quoted, due to a typographical error. Different journals have different preferences for the style and format of references; the use of a reference manager software package will facilitate changing this style if your paper is rejected and needs to be submitted to a different journal.

https://www.sciencedirect.com/science/article/abs/pii/S1751721411002247

Ross comments:

- **a) Citation managers such as Endnote or Mendeley, quirky as they may be, save the writer an enormous amount of time and effort.**
- **b) If you do not use a citation manager, “now* would be a great time to get started.**

Baker Paper: Abstract

Abstract

Although the abstract precedes the introduction, you are probably best advised to defer writing this until the rest of the manuscript has been completed. The abstract is the most important part of the paper; far more people will read it than the body of the paper. Your abstract should thus be as clear and informative as possible. The abstract also needs to be as concise as possible, and many journals have a word limit. Some journals require abstracts to be structured (hypothesis/rationale, methods, results, conclusion); others request a single paragraph. You should review a few abstracts in the journal you are submitting to, in order to appreciate the format required.

https://www.sciencedirect.com/science/article/abs/pii/S1751721411002247

Ross comments:

a) Not only do I write abstracts last, but:

b) When commenting on draft papers from students, I always read their draft abstract last!

Baker Paper: Cover Letter

Covering letter

Once the final draft is approved by all co-authors, you need to send your paper to the editor of the journal, along with a letter which details your submission and why the journal should consider your manuscript. You should be both concise and explicit in highlighting both the importance and the potential impact of your work. The author identified for correspondence does not need to be the first author; if you are about to change hospital it may be more sensible to choose one of your co-authors to correspond with the editor.

https://www.sciencedirect.com/science/article/abs/pii/S1751721411002247

Ross comments:

a) From AGU: the phrase "cover letter" appears five times at:
https://www.agu.org/Publish-with-AGU/Publish/Author-Resources/Text-requirements

b) EGU does not describe any need for a "cover letter" at either:
https://www.earth-system-dynamics.net/submission.html
or:
https://www.earth-system-dynamics.net/submission.html#assets

c) Cover letters are used by the Nature & Science family of journals and can indeed by quite important for avoiding the dreaded "desk rejection"

Baker Paper: Paper Review

The response

Journals vary massively in their response times. At least two referees will need to assess your paper and you can only wait for the editor's reply. Responses can be divided into three categories:

- An acceptance without modification: this is most unusual — but celebrate.
- An invitation to respond to criticisms: your paper will usually be accepted if you can respond to the comments made by the editor/reviewers. You need to draft a detailed response which addresses each point in turn. Some of the criticisms are likely to be valid and sensible, but others may not be so reasonable. In your response, you should explain whether you have accepted each of the comments (having made appropriate revisions to the paper), or why the suggested alterations are inappropriate or unnecessary. It never does any harm to compliment the reviewer when suggested alterations enhance your paper. The editor may then accept you paper or suggest additional changes.
- Rejection: Disappointing, but you are in good compa (James Joyce, JK Rowling, William Golding, amon many others). Many papers are accepted by journals higher impact than the original journal chosen. You shou consider each of the criticisms made, and then revise yo paper in response to comments which you feel constructive and helpful. After discussion with your authors, you should then decide where to resubmit yo manuscript. If your paper is repeatedly rejected, you ne to reflect whether publication is merited.

https://www.sciencedirect.com/science/article/abs/pii/S1751721411002247

Ross comments:

a) **First bullet (accepted without modification) ain't ever happened, for any of my papers**

b) **Reviewers may suggest to an editor whether a paper should be accepted with minor modification (aka "provisional acceptance"), require major modification, or be rejected. However, decision on the paper is made by the editor.**

c) **The quickest road to paper acceptance is to make some change to the paper in response to each and every reviewer comment: most editors do not want to read why "you're right and the reviewer is wrong"**

Baker Paper: Galley Proofs

Proofs

Shortly before an accepted paper is published, the corresponding author will receive proof copies from the publisher. Despite months having passed since the original submission, you will be expected to respond rapidly. You should read the proof copies carefully and correct any typographical errors, but no major changes should be made at this stage.

Most importantly, if you have got as far as reading this article, then do not falter; get the first draft of your paper written. It was almost certainly be easier than you fear.

https://www.sciencedirect.com/science/article/abs/pii/S1751721411002247

Ross comment: yup!

Check out this email received a year ago:

Reply | Reply All | Forward | Archive | Junk | Delete | More

From David Wilmouth

To Freja Oesterstroem <foesterstroem@huarp.harvard.edu>, Jessica B. Smith, Jim Anderson, Ross J. Salawitch — 10/6/2023, 12:47 PM

Subject **PNAS proofs**

Hi all,

I just received the PNAS proofs! See attached. I would appreciate everyone reading the paper, and let me if you see any mistakes that need to be fixed.

I've only glanced at the proofs, but I can see that the copy editor has changed some things from the way I submitted them, so if past experience holds, there may be some mistakes introduced by the copy editor.

PNAS wants the revisions in 48 hours... but since that would be Sunday, I'm assuming we're fine responding on Monday. Regardless, we don't have much time to do this.

thanks!
David

2 attachments 10.4 MB — Save All

Mensh & Kording: Ten Rules For Structuring A Paper

1) Focus your paper on a central contribution, which you communicate in the title

2) Write for flesh-and-blood human beings who do not know your work

3) Stick to the context-content-conclusion (C-C-C) scheme

> The vast majority of popular (i.e., memorable and re-tellable) stories have a structure with a discernible beginning, a well-defined body, and an end. The beginning sets up the context for the story, while the body (content) advances the story towards an ending in which the problems find their conclusions. This structure reduces the chance that the reader will wonder "Why was I told that?" (if the context is missing) or "So what?" (if the conclusion is missing).

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Dallas Murphy, book author, New York City; instructor, writing workshops for scientists in Germany, Norway and the United States.

Clarity is the sole obligation of the science writer, yet I find constantly that the 'What's new' element is buried. Answering one central question – What did you do? – is the key to finding the structure of a piece. Every section of the manuscript needs to support that one fundamental idea.

There is a German concept known as the 'red thread', which is the straight line that the audience follows from the introduction to the conclusion. In science, 'What's new and compelling?' is the red thread. It's the whole reason for writing the paper. Then, once that's established, the paragraphs that follow become the units of logic that comprise the red thread.

Scientific authors are often scared to make confident statements with muscularity. The result is turgid or obfuscatory writing that sounds defensive, with too many caveats and long lists – as if the authors are writing to fend off criticism that hasn't been made yet. When they write for a journal gatekeeper rather than for a human being, the result is muddy prose.

Examples such as this are not uncommon: "Though not inclusive, this paper provides a useful review of the well-known methods of physical oceanography using as examples various research that illustrates the methodological challenges that give rise to successful solutions to the difficulties inherent in oceanographic research." Why not this instead: "We review methods of oceanographic research with examples that reveal specific challenges and solutions"?

https://www.nature.com/articles/d41586-018-02404-4

Mensh & Kording: Ten Rules For Structuring A Paper

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3) Stick to the context-content-conclusion (C-C-C) scheme

4) Optimize your logical flow by avoiding zig-zag and using parallelism

Yes!!!

Using parallelism. Similarly, across consecutive paragraphs or sentences, parallel messages should be communicated with parallel form. Parallelism makes it easier to read the text because the reader is familiar with the structure. For example, if we have three independent reasons why we prefer one interpretation of a result over another, it is helpful to communicate them with the same syntax so that this syntax becomes transparent to the reader, which allows them to focus on the content. There is nothing wrong with using the same word multiple times in a sentence or paragraph. Resist the temptation to use a different word to refer to the same concept—doing so makes readers wonder if the second word has a slightly different meaning.

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Yup!

"Rising temperature will lead to an increase in atmospheric water vapor, resulting in further warming: i.e., a positive feedback"

Mensh & Kording: Ten Rules For Structuring A Paper

1) Focus your paper on a central contribution, which you communicate in the title
2) Write for flesh-and-blood human beings who do not know your work
3) Stick to the context-content-conclusion (C-C-C) scheme
4) Optimize your logical flow by avoiding zig-zag and using parallelism
5) Tell a complete story in the abstract
6) Communicate why the paper matters in the introduction
7) Deliver the results as a sequence of statements, supported by figures, that connect logically to support the central contribution
8) Discuss how the gap was filled, the limitations of the interpretation, and the relevance to the field
9) Allocate time where it matters: Title, abstract, figures, and outlining
10) Get feedback to reduce, reuse, and recycle the story

Writing Suggestions From Ross

Grammar:

1) Never ever use “This” as a noun
2) Rarely if ever start sentences with “It”
3) Avoid conversational words such as “thing”, “stuff”, etc
4) Try to use “increase” or “decrease”, “rise” or “fall”, etc. rather than “change”
5) Verb tense should be consistent throughout, and particularly within individual sections, unless there is a very strong reason to do otherwise
6) Not a fan of “In order to”; big fan of word variety in a sentence

Style:

7) Lead paragraphs with simple, declarative sentences
8) One thought per sentence PLEASE
9) Describe figures before you interpret figures
10) Tell a compelling story with a thread & by all means, try to “hold the reader’s hand”

Lead paragraphs with simple, declarative sentences

2 Data and methodology

2.1 Empirical model of global climate

In this analysis we use the empirical model of global climate (EM-GC), which provides a multiple linear regression energy balance simulation of GMST. As detailed in the following paragraphs, the EM-GC solves for ocean heat uptake efficiency (κ) and six regression coefficients to minimize the cost function in Eq. (1).

$$\text{Cost function} = \sum_{i=1}^{N_{\text{MONTHS}}} \frac{1}{\sigma^2_{\text{OBS}i}} (\Delta T_{\text{OBS}i} - \Delta T_{\text{MDL}i})^2 \quad (1)$$

In this equation, ΔT_{OBS} represents a time series of observed monthly GMST anomalies, ΔT_{MDL} is the modeled monthly change in GMST, σ_{OBS} is the 1σ uncertainty associated with each temperature observation, i is the index for each month,

We consider several anthropogenic and natural factors to be components of ΔT_{MDL}. The radiative forcing (RF) due to greenhouse gases (GHGs), anthropogenic aerosols (AER), land-use change (LUC), and the export of heat from the atmosphere to the world's oceans are the anthropogenic components of ΔT_{MDL}. The influence on GMST from total solar irradiance (TSI), the El Niño–Southern Oscillation (ENSO), the Atlantic Meridional Overturning Circulation (AMOC), volcanic eruptions that reach the stratosphere and enhance stratospheric aerosol optical depth (SAOD), the Pacific Decadal Oscillation (PDO), and the Indian Ocean Dipole (IOD) are the natural components of ΔT_{MDL}. Equation (2) shows how we calculate ΔT_{MDL}, the modeled monthly change in GMST.

$$\Delta T_{\text{MDL}i} = \frac{1+\gamma}{\lambda_P} \{\text{GHG}\,\Delta\text{RF}_i + \text{AER}\,\Delta\text{RF}_i + \text{LUC}\,\Delta\text{RF}_i - Q_{\text{OCEAN}i}\} + C_0 + C_1 \times \text{SAOD}_{i-6} + C_2 \times \text{TSI}_{i-1} + C_3 \times \text{ENSO}_{i-2} + C_4 \times \text{AMOC}_i + C_5 \times \text{PDO}_i + C_6 \times \text{IOD}_i \quad (2)$$

The term AMOC_i represents the influence of the change in the strength of the thermohaline circulation on GMST (Knight et al., 2005; Medhaug and Furevik, 2011; Stouffer et al., 2006; Zhang and Delworth, 2007). We use the Atlantic multidecadal variability, based on the area-weighted monthly mean sea surface temperature (SST) in the Atlantic Ocean between the Equator and 60° N (Schlesinger and Ramankutty, 1994), as a proxy for the strength of AMOC. A strong AMOC is characterized by northward flow of energy that would otherwise be radiated to space, which occurs in both the ocean and atmosphere and leads to particularly warm summers in Europe (Kavvada et al., 2013) as well as a number of other well-documented influences in other climatic regions (Nigam et al., 2011). The total anthropogenic RF is used to detrend the AMOC signal. This method provides a more realistic approach to infer the changes in the strength of the AMOC and its effect on GMST than other detrending options (Canty et al., 2013).

Our model explicitly accounts for the export of heat from the atmosphere to the world's oceans (i.e., ocean heat export or OHE). The quantity Q_{OCEAN} in Eq. (2) represents OHE. In our previous analyses (Canty et al., 2013; Hope et al., 2017), Q_{OCEAN} was subtracted outside the climate feedback multiplicative term $(1+\gamma)/\lambda_P$. We have rewritten Eq. (2) to be comparable to the formulation for this term used by Bony et al. (2006) and Schwartz (2012). Due to this update, our model fits the historical climate record with higher values of climate feedback, especially for strong aerosol cooling (see Fig. S1 and the Supplement for more information). We calculate Q_{OCEAN} by simulating the long-term trend in observed ocean heat content (OHC) as shown in Eqs. (4) and (5).

We use the reduced chi-squared (χ^2) metric to define the goodness of fit between the modeled and measured GMST anomaly for the atmosphere and also between simulated and observed OHC. Equations (6) and (7) show the calculation for χ^2 for the atmosphere, and Eq. (8) shows the calculation for χ^2 for the ocean. Minimization of the difference between the measured and modeled GMST anomaly results in the EM-GC being able to replicate the observed rise in temperature over the past 170 years quite well, as shown in Fig. 1. We have added two additional new features to the model to ensure accurate representation of the rise in OHC and the rise in GMST since 1940. The first new feature, Eq. (7), was

The calculation of χ^2_{RECENT} shown in Eq. (7) is used to constrain the model to match the observed changes in GMST over the time frame 1940–2019, a total of 80 years ($N_{\text{YEARS,REC}}$ equals 80). This time frame was chosen to include a full cycle of AMOC, as the strength of the thermohaline circulation tends to vary on a period of 60–80 years (Chen and Tung, 2018; Kushnir, 1994; Schlesinger and Ramankutty, 1994). As noted above, the χ^2_{RECENT} constraint was added to our model framework because without this constraint the model is able to provide numerically good but poor visual fits to the GMST anomaly under certain conditions (i.e., the red line in the top panel of Fig. 1 starts to strongly deviate from the black line beginning in about 2000 under certain conditions). All model simulations shown below have $\chi^2_{\text{RECENT}} \leq 2$, representing a good fit to the observed rise in GMST over the past 80 years, which results in modeled GMST that replicates observed GMST for the entire time series.

Figure 1 shows the observed (HadCRUT5) and modeled GMST anomaly from 1850–2019 and the various anthropogenic and natural components that constitute modeled GMST. Figure 1a shows the value of climate feedback, 1.62 $\text{W m}^{-2}\,{}^\circ\text{C}^{-1}$, that is needed to achieve a best fit to the climate record for this simulation, resulting in values of $\chi^2_{\text{ATM}} = 0.80$ and $\chi^2_{\text{OCEAN}} = 0.31$. Figure 1b is the total contribution of human activity to variations in GMST, which includes GHGs, AER, LUC, and the export of heat from the atmosphere to the ocean. For the simulation shown, the aerosol radiative forcing is $-0.9\ \text{W m}^{-2}$, the best estimate given by IPCC 2013 (Myhre et al., 2013). This panel also notes the best estimate of the time rate of change in GMST attributed to humans from 1975–2014, or the attributable anthropogenic

Altering the training period of our model has a slight effect on our results (see Figs. S2, S3, and the Supplement for information on various training periods). We project relatively similar results for end-of-century warming for training pe-

Writing Suggestions From Gary Provost

This sentence has five words. Here are five more words. Five-word sentences are fine. But several together become monotonous. Listen to what is happening. The writing is getting boring. The sound of it drones. It's like a stuck record. The ear demands some variety.

Now listen. I vary the sentence length, and I create music. Music. The writing sings. It has a pleasant rhythm, a lilt, a harmony. I use short sentences. And I use sentences of medium length. And sometimes when I am certain the reader is rested, I will engage him with a sentence of considerable length, a sentence that burns with energy and builds with all the impetus of a crescendo, the roll of the drums, the crash of the cymbals—sounds that say listen to this, it is important.

So write with a combination of short, medium, and long sentences. Create a sound that pleases the reader's ear. Don't just write words. Write music.

-Gary Provost

https://www.amazon.com/100-Ways-Improve-Your-Writing/dp/0451627210/