Scientific English

M2 Marine Physics

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Lecture

Introduction

- Brief history of Science and scientific writing

Scientific writing

- Structure and content of a paper
- Writing and revision papers
- Writing reports, proposal, etc ...

Effective Scientific writing

- How to write more effectively

The peer-review process

- What? And How?

Activities

- Read and discuss scientific articles
- Write a short article
  Due date: **Dec. 5th**
- Review articles
  Due date: **Dec. 12th**

Material available at: http://ocean.fsu.edu/~qjamet/share/Scientific_English/

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Tentative paper instructions

Text requirements for your paper:

- 6 publication units (1 PU = 500 words or 1 figure or table)
- Using a standard structure:
  - Abstract
  - Introduction
  - Methods
  - Results
  - Conclusion

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#3 Writing reports, proposal, etc ...

Scientific reports

It is « **an extended scientific article** » though not exactly

The similarity is in the structure:

- The introduction must:
  - introduce the context
  - report the state of the art,
  - identify the new question(s)
  - propose a method and a plan

- The core of the report must describe in details the methodology and the main results, with figures and tables

- The conclusion must recall the main findings, relate them to the original questions and identify the limits of this study or future paths of research on these questions

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Scientific reports

The difference with a journal article lies in the fact that:

- You have **much more space** in a report
- You can address a **wider audience**

Therefore you can provide **more details on the context and method** and you do not have to refer to previous work to avoid these details

You can insert **more figures and tables**, and perhaps also **more tentative ideas or paths of research** in a report.

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#3 Writing reports, proposal, etc ...

Scientific reports

You expect the report to be:

- Well organized
- Concise enough so that you can easily find a piece of information

But you also want to find details about specific subjects

→ ***Keep a balance between details and conciseness***

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#3 Writing reports, proposal, etc ...

The introduction

- Its form and length will depend on the nature of the report
- For a technical report, recall the need for the study and the present state of knowledge (brief)
- For a scientific report, the state of the art will be much more detailed and will lead to the scientific question(s) to be addressed in the report
- As in a paper, the introduction needs to introduce the rest of the writing (plan)

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The core of the report

- Will address the questions separately
- Each section addresses one question or one part of a question
- Each subsection addresses one part of the answer to the question
- Each paragraph addresses one idea
- Transitions between paragraphs are welcome
  (the author knows what comes next, the reader doesn't)

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The core of the report

- Needs many illustrations (not limited as in a paper)
- Can include references to previous work with the aim of supporting or criticizing previous results
- A summary of the main results at the end of each long section is welcome
- Series of figures or proofs/detailed calculations should be put in appendix (except if these latter constitute the main results of the work).

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The core of the report

- The presentation will differ if the work is a technical report/ users' manual, a data report, or a scientific report
- Technical reports, users' manuals :
  the reader expects to find many details on each subject covered
- Data report :
  were the data collected, how, with which accuracy, how were the data processed, how were they qualified, what is their final accuracy, how do they compare with previous data ?

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#3 Writing reports, proposal, etc ...

The conclusion

- Needs to underline the major points of the work with their relative importance
- Needs to show how the original questions were answered, and what is left unanswered, or less accurately determined
- Can provide new directions for further research

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#3 Writing reports, proposal, etc ...

Scientific report

Make it clear what is yours !

- If you use a result, observation or generalisation that is not your own, you must state where in the scientific literature that result is reported
- The only exceptions are cases where every researcher in the field already knows it -- *dynamics equations need not be followed by a citation of Newton*
- Which parts of the report are **descriptions of previous knowledge** and which parts are **your additions to that knowledge** should be obvious to the reader.

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#3 Writing reports, proposal, etc ...

Scientific report

Make it clear what is yours !

- If you are writing in the passive voice, you must be more careful about attribution than if you are writing in the active voice:
  - *"The sample was prepared by heating yttrium..."* does not make it clear whether you did this or not.
  - *"I prepared the sample..."* is clear.

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Review Articles

https://www.nature.com/articles/s44222-024-00256-4

Aims and scope: synthesize and critically evaluate the most important research findings within a specific field to gauge its progress and identify new research opportunities

- Should be timely and sufficient recent primary research to justify a crucial discussion (e.g. 30 relevant primary research papers published within the 2-3 years)
- Dedicated to a large audience, not specifically familiar to the field
  → mechanisms and concepts need to be clearly explained
- Organize the critical discussion by themes, conflicting conclusion and bottlenecks
- Be as specific as possible, avoid confusion
- Make sure to clearly highlights established findings or hypotheses

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Some review journals

Review of Geophysics (RoG)

https://agupubs.onlinelibrary.wiley.com/hub/journal/19449208/aims-and-scope/read-full-aims-and-scope

- Invitation-only journal
- Send a proposal with biblio, co-authors list, scientific question, abstract, outline
- No page limits and free of charges

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Some review journals

Frontiers in Marine Science - Review

https://www.frontiersin.org/journals/marine-science/for-authors/article-types

- Should present:
  - Different schools of thought or controversies
  - Fundamental concepts, issues, and problems
  - Current research gaps
  - Potential developments in the field
- Usual submission and peer-reviewed process (submit the full review and wait for revision)
- Usual structure (Abstract, introduction, Sections/Subsections, conclusion)
- 12,000 max word count ; 15 Figures/Tables

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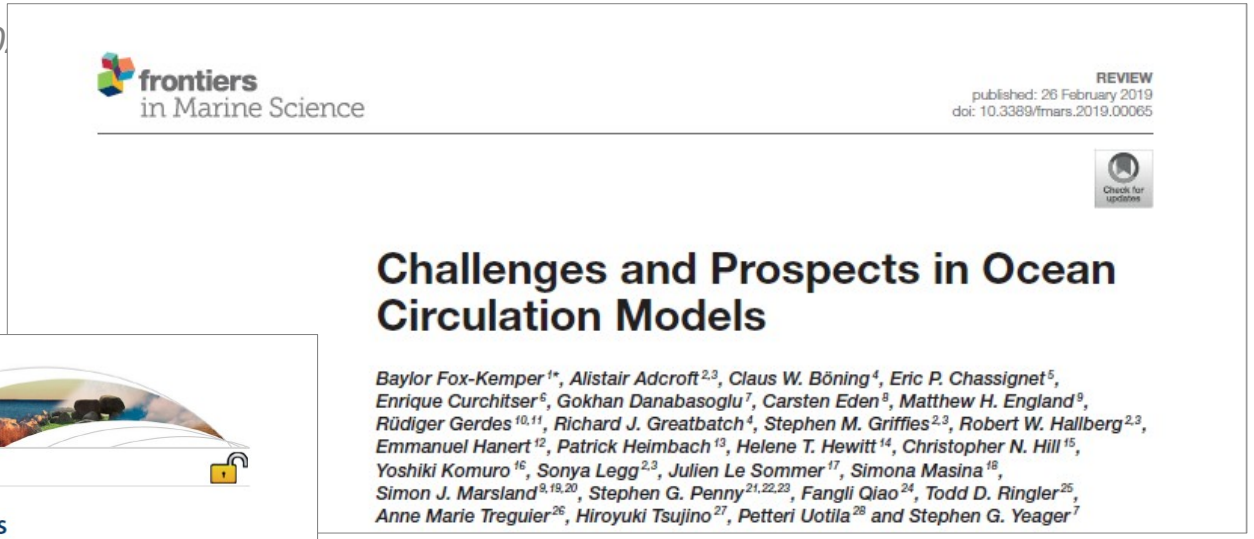
Review Articles

https://www.nature.com/articles/s44222-024-00

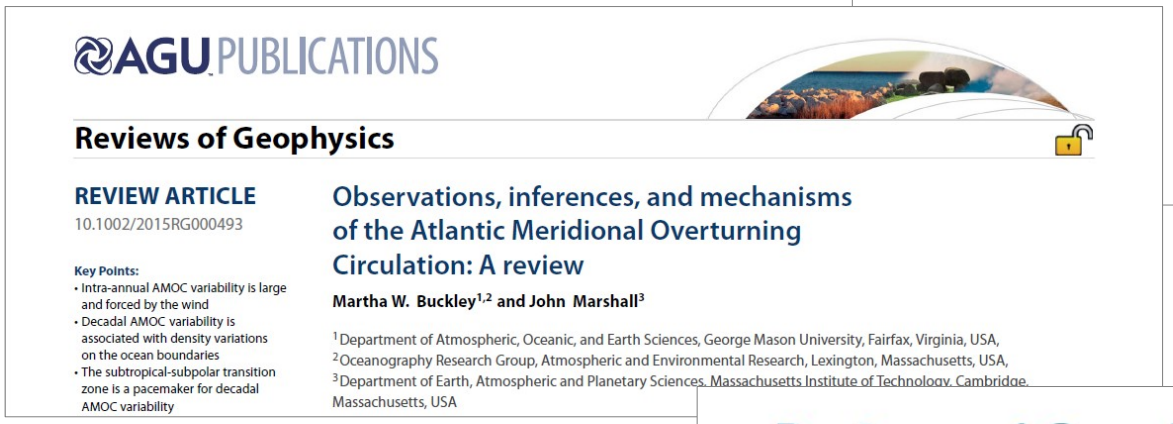


frontiers in Marine Science

REVIEW
published: 26 February 2019
doi: 10.3389/fmars.2019.00065

Challenges and Prospects in Ocean Circulation Models

Baylor Fox-Kemper[1*], Alistair Adcroft[2,3], Claus W. Böning[4], Eric P. Chassignet[5], Enrique Curchitser[6], Gokhan Danabasoglu[7], Carsten Eden[8], Matthew H. England[9], Rüdiger Gerdes[10,11], Richard J. Greatbatch[4], Stephen M. Griffies[2,3], Robert W. Hallberg[2,3], Emmanuel Hanert[12], Patrick Heimbach[13], Helene T. Hewitt[14], Christopher N. Hill[15], Yoshiki Komuro[16], Sonya Legg[2,3], Julien Le Sommer[17], Simona Masina[18], Simon J. Marsland[9,19,20], Stephen G. Penny[21,22,23], Fangli Qiao[24], Todd D. Ringler[25], Anne Marie Treguier[26], Hiroyuki Tsujino[27], Petteri Uotila[28] and Stephen G. Yeager[7]



AGU PUBLICATIONS

Reviews of Geophysics

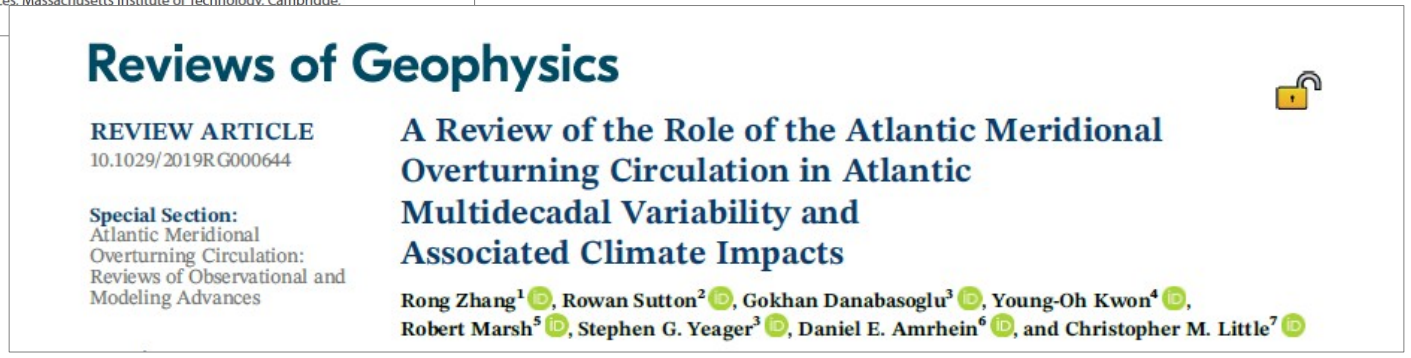
REVIEW ARTICLE
10.1002/2015RG000493

Key Points:
- Intra-annual AMOC variability is large and forced by the wind
- Decadal AMOC variability is associated with density variations on the ocean boundaries
- The subtropical-subpolar transition zone is a pacemaker for decadal AMOC variability

Observations, inferences, and mechanisms of the Atlantic Meridional Overturning Circulation: A review

Martha W. Buckley[1,2] and John Marshall[3]

[1]Department of Atmospheric, Oceanic, and Earth Sciences, George Mason University, Fairfax, Virginia, USA, [2]Oceanography Research Group, Atmospheric and Environmental Research, Lexington, Massachusetts, USA, [3]Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA



Reviews of Geophysics

REVIEW ARTICLE
10.1029/2019RG000644

Special Section:
Atlantic Meridional Overturning Circulation: Reviews of Observational and Modeling Advances

A Review of the Role of the Atlantic Meridional Overturning Circulation in Atlantic Multidecadal Variability and Associated Climate Impacts

Rong Zhang[1], Rowan Sutton[2], Gokhan Danabasoglu[3], Young-Oh Kwon[4], Robert Marsh[5], Stephen G. Yeager[3], Daniel E. Amrhein[6], and Christopher M. Little[7]

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Proposal

https://scientific-publishing.webshop.elsevier.com/research-process/writing-scientific-research-project-proposal/

In an increasingly project-oriented research environment, proposals are the way to fund your research!
(for better or worse)

Proposal structure depends upon where you want to submit your proposal. Template are usually provided (and you must adhere to it!).

But some generic guidelines remain

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Proposal

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Title

- Descriptive and concise
- Catchy and informative at the same time
- Your title should pique the interest of the reader

Abstract should include

- Research question
- Your rationale for the study
- Any applicable hypothesis
- Your methodology

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Proposal

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Introduction

- The opening paragraph of your research proposal is the most important
- Introduce the research problem in a creative way
- Demonstrate your understanding of the need for the research.

Background

- Brief history of the topic and link it to a contemporary context
- Identify key researchers and institutions also looking at the problem

Literature Review

- Synthesize prior research
- Place your proposed research into the larger picture
- Show that your work is original, and adds to the current knowledges

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Research Design and Methodology

- Very clearly and logically written and organized section
- Show that you know what you are going to do,
  how you will do it, and that you are skilful

Preliminary Implications

- Outlining how your research will extend current knowledge
  and impact future research needs
- If you have preliminary results to support your proposed research
  explain it and critically discuss it

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Conclusion

- This section reinforces the significance and importance of your proposed research, and summarizes the entire proposal

References/Citations

- Include full and accurate, but most of the time in a reduced format, list of reference
- Avoid too exhaustive citations
- Highlights your personal references

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Proposal

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A small guide of call for projects:

http://ocean.fsu.edu/~qjamet/share/Scientific_English/Un_petit_guide_LOPS_pour_les_projets_janv_23.pdf