

Peer Reviewing for GEOL 2300: Mathematical and Computational Earth Sciences

Baylor Fox-Kemper

September 8, 2015

1 Contacts

The professor for this class is: Baylor Fox-Kemper

baylor@brown.edu

401-863-3979

Office: GeoChem room 133

<http://fox-kemper.com/teaching>, <http://fox-kemper.com/2300>

Some portions of the website are password-protected to ensure that fair use and copyrights are correctly obeyed as I share images from books, etc. You can access these by using:

username: io

password: ocean

2 Getting Help!

I am usually available by email. Office hours will be Mondays & Thursdays 12-1:30 or by appointment (see my schedule at <http://fox-kemper.com/contact>). You can also drop into the Math Resource Center (MRC, <http://www.math.brown.edu/mrc/>) or sign up or drop in to a tutoring session (<http://www.brown.edu/academics/college/support/tutor>).

3 The Basics

In addition to course research projects, which you will describe in written and presentation form, you will each be performing reviews of each others work on some of the assignments where this is appropriate. This will give you an opportunity to revisit the questions asked, and hopefully you will be able to learn common mistakes and scientific presentation and writing more quickly. Also, there are a lot of quandaries that arise in peer-reviewing (e.g., one reviewer loves it and one hates it, or a reviewer makes incorrect statements), so you'll get some experience with those issues by practice in a friendly environment.

3.1 Not Anonymous

We are not reviewing these papers anonymously, which means that you will have to think hard about balancing your desire to be nice with your desire to help. Some things to consider: 1) Point out the positive aspects first, then it's easier for the author to take when the negatives arrive. 2) Be polite and succinct. There is no reason to dwell on a typo or mis-step. The author is under a time crunch as much

as you are. 3) Don't hold back a critique because it seems to harsh to you on first glance—*use your writing skills to make the critique have the same content but sound less harsh.*

If problems arise in the reviewing process, please contact me immediately. I can help mediate.

4 How do the Grades Work?

I will have the final say on the grades for each assignment, but will take into account the two reviewers' scores and comments. Roughly, they will be a weighted average of 50% from me and 25% from the two reviewers. Thus, each reviewer should provide an AGU Guideline-based score (see section below).

5 File Formats

5.1 You will submit your homework in pdf format

I don't want your peer reviewers to actually change the content of your homework. I want you to consider each of the review comments and think about what to do with it. Thus, submitting a homework as a pdf is good, because it is easy to mark them up by adding notes or writing separate comments, but it is not easy to alter them.

As we get into the semester, where such reviews are coming, I'll let you know the details. You may also choose to submit your homework on paper to my office or in class, but please don't email me .doc files or other .xls, etc. I spend too much time converting file formats as it is!

5.2 You will submit your review in plain text if possible.

You will submit the main part of your review in plain text (e.g. a .txt file or just cut and pasted into Canvas). That way the author can quickly cut and paste it. If you need to use pdf markup comments (via crocodoc in canvas) or add images with equations or or whatever, that's OK.

6 Science Reviewing: The AGU Guidelines

The following pages are taken from the instructions to reviewers for Geophysical Research Letters. They are a useful guideline for reviewing the scientific writing for our class, with the following adaptations:

- Interpret descriptions of **scientific merit** in the classroom context: e.g., 'important new science at the forefront of an AGU discipline' corresponds to 'important new science at the forefront of what we are learning in class' or 'would convey or exemplify an important topic to a student in this or a similar class'
- Interpret descriptions of **publication quality** in the proceedings volume context: e.g., 'if a submitted manuscript meets GRL standards' equates to 'if a submitted manuscript meets the standards of our proceedings'.
- Presentation categories can be used directly

You can roughly associate these descriptions as what I am looking for when grading the papers (i.e., this is my rubric).

6.1 AGU Peer Review Instructions

Editorial Instructions to Reviewers (A reminder of current GRL Policy)

Geophysical Research Letters aims to provide rapid publication of forefront research that has an immediate impact on the science community. The journal features articles from a broad range of geophysical disciplines. We ask your help as a reviewer in evaluating both scientific content (Categories 1-4) and presentation quality (A-C) to determine if a submitted manuscript meets GRL standards.

We welcome and will pass on to authors any specific suggestions which would materially improve the quality of a manuscript. [. . .]

Scientific Quality: Scientific quality of the manuscript is fundamental to publication, and the following Categories 1-4 are meant to aid the reviewer and Editor.

Science Category 1: The manuscript meets one or more of the following criteria:

- Important new science at the forefront of an AGU discipline
- Innovative research with interdisciplinary/broad geophysical application
- Instrument or methods manuscript that introduces new techniques with important geophysical applications

If the manuscript falls in Category 1, please give sufficient detail as to which of these criteria and why.

Science Category 2: The manuscript is potentially Category 1 but significant clarification/revision is needed. For example, the manuscript presents:

- Some unclear or incomplete scientific reasoning
- Inadequate presentation of data
- An instrument/method where the geophysical application is not obvious

If possible, please specify the revisions that might allow this manuscript to meet Category 1 criteria.

Science Category 3: The paper is publishable in the refereed literature but is unlikely to become a Category 1 paper. For example:

- It is a scientifically correct paper but not obviously a significant advance in a geophysical field
- A solid paper with little immediate impact on the research of others (e.g., a routine application of a standard research technique, or a new measurement/laboratory method with limited geophysical application)
- A good but basically incremental improvement to existing data sets, models, or instruments

Science Category 4: This paper is basically unpublishable in an AGU journal:

- There are major scientific errors in the manuscript
- Essentially the same material has been published or is being considered for publication elsewhere
- The technique is not useful
- The research area is not representative of an AGU discipline

Presentation Categories: These categories measure the maturity of the submitted manuscript in terms of language, communication, and GRL criteria.

Presentation A : Manuscripts should meet ALL of the following:

- Abstract is succinct (< 150 words), accurate, and comprehensible to a non-specialist
- Manuscript is generally well-written, logically organized, and adequately illustrated
- Figures and tables are understandable and readable (when sized for GRL)
- English usage and grammar is adequate, with few spelling/typographical errors (please specify any minor fixes)

- Manuscript appears to fit GRL's 4-page limit

Presentation B: Manuscripts are potentially "A" manuscripts with suitable revision. Please give explicit direction as to which sections/features need revision, extension or reduction. For example:

- Abstract needs to be rewritten/shortened
- Manuscript is not well written, is not logically organized, or is inadequately illustrated
- Manuscript needs to be (and can be) shortened
- English usage, grammar, or spelling errors detract from the paper

Presentation C: Manuscripts cannot readily be revised by the authors into Presentation "A" without a major re-write. For example:

- Specific ideas cannot be adequately presented within the 4-page GRL limit
- Organization and illustration of the manuscript make it too difficult to review fairly
- English usage, grammar, and/or spelling errors are endemic and require substantial copy-editing before this manuscript can be reviewed adequately

[...]

Michael J. Prather

Editor-in-Chief

15 March 1999

7 Example Reviews

Here is a good example of three reviews for a paper from a class of mine, but this example is still a useful guide. Note their length, level of detail, breakdown of scientific vs. presentation issues, and specific suggestions for how to fix things. Also, notice that they are not free from typos, spelling errors, etc.

A good review does not contain many "schoolmarm" suggestions. For many of you, this part will be very unfamiliar. When reviewing a scientific paper, it is not your job to correct grammar, punctuation, spelling, etc. So, it is unlike reading a term paper for a friend! There is a technical editor at the journal who will do that for the author after you are done, and there is a writing fellow for our class who will help with this part. You should only mention these issues if there are so many as to limit the presentation score, or ones that are just hidden typos that you mention just to be nice.

Your job is to think about the science: Do the numbers seem right? Is the method sensible? Do the conclusions follow from the experiment? Are the hypotheses actually tested? Does the abstract reflect the most important results without wandering off into issues beyond the scope of the paper?

Typically, you should begin with a short summary of the paper (otherwise, how does the author know you read and understood it?), then you can describe some of the paper's strengths, then it's major weaknesses, finally you can list all the typos and small mistakes.

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My Review

Summary: You compare the SST found from ARGO and Reid-Mantyla datasets in the Nino3.4 region and find that the mean state differs more than an official ENSO worth.

Strengths:

--Nice choice of problem, it satisfies the pedantic assignment with an interesting application

--Wow, there's a lot of ARGO data. The histograms are totally different!

Major Problems:

--I think you've got too much cold data, and I expect it is because 20m is too deep to count as SST. Do you have enough Reid-Mantyla data to go shallower?

--In your discussion of normal distribution, it is apparent from your histograms that they are not normally distributed. Also, from your longitude vs. temp plots, it's clear that you've got some weird cold stuff thrown in with the clustered surface values.

--I think you need to do some more digging in the data. It is apparent that you don't just have ssts here. You should do some investigating about the depth of the cold tongue vs. season and then make a choice of your upper bin.

Minor Problems:

--Probably NOAA's ENSO 3.4 index not product.

--Bibliography formatting could be nicer. Use a reference name in the place you want to reference, and then a table of complete references or urls at the end.

--You are giving the st dev of the datapoints, not the st dev of the mean. If each obs was uncorrelated with the others, the latter should be \sqrt{N} smaller.

Overall, this is a nice beginning and a great topic. You need to do some more digging to understand what the data is telling you. It would be much nicer if there was a clearer description of where and why the temperatures are different between the two datasets.

B2

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Reviewer 1: B3

Report of Referee on Defining the Mean Temperature State of the Eastern Tropical Pacific: Neutral ENSO by **A STUDENT**

In this paper, the author calculated the mean sea surface temperature (SST) in ENSO 3.4 region from two different data sets: Reid-Mantyla and Argo. Interestingly, the calculated mean SSTs differ by 0.59 C, which is larger than ENSO threshold of 0.5 C. In my opinion, however, the author does not provide sufficient discussions on his results. For improvement of the paper, the following issues should be addressed in the revised paper;

1. Which of the data sets represents better the mean SST in ENSO 3.4 region? If any, what could be the sources of error?
2. Figure 2 shows the anomaly in Argo data. The anomalous temperatures of around 5 C are too low. This may indicate that the anomaly is due to the instrumental or calculational error.
3. What is the meaning of bias in the last sentence of the results section?
4. The time periods of study for the each dataset should be stated in the abstract.
5. The standard mean SST that NOAA uses to determine ENSO index should be mentioned in the text and be compared with the authors results.

6. The spatial map of ENSO 3.4 area may be informative to readers.
7. The longitude values in Figures 1 and 2 are not consistent. The author needs to choose one of them (-170 or 190). It may be better to use 170W to 120W as x-axis.
8. For convenience in the comparison, the author should use the same temperature range for Figures 1 and 2 and for Figures 3 and 4.

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Reviewer 2:

****A STUDENT**** - Defining the Mean Temperature State of the Eastern Tropical Pacific:
Neutral ENSO
Grade: A3

Abstract ----

It would be nice to have SST and ENSO3.4 spelled out. I don't know what the '3.4' on the end of ENSO; hopefully I'll find out in the paper. With respect to the final sentence, which difference is greater? The ARGO or the R-M data, something else?

Introduction ----

At the end of the first paragraph, how do the greater western Pacific temperatures reflect the Pacific Warm Pool and Western Boundary Current? I may be misinterpreting your intended use of 'reflecting'.

In paragraph 3, I would change "In the ENSO3.4 region, its data spans roughly 40 years and all seasons, although not every season every year (see Figure1.)", to read "The ENSO3.4 data spans roughly 40 years through all seasons; however, there are some gaps in the dataset (see Figure1)." After this you should have the actual Figure1 for easy reference.

Would it be helpful to give a maximum depth of the ARGO floats? I think specifying that they were first deployed in "the year 2000" would help.

I think the last paragraph of the introduction would fit well into the abstract.

Methods ----

It's not exactly clear to me how each dataset was sampled. They seem pretty similar, but the description is not terribly explicit to distinguish between the two. You have a nice justification/explanation of how the depth vs. pressure selection is validated.

I don't think the PDF curves on Figures 3 & 4 really help, just distraction from the histogram.

Theory ----

No need to emphasize the "both" so much. Your reasoning seems reasonable to me.

Results ----

I think you might be a little overkill on the significant figures.

Visual measurement is a bit iffy. Is there some statistic you could use (skewness for example)?

Conclusions ----

The second sentence is a run-on. Break it up into distinct bits of information.

Wouldn't the range be a better measure of temperature variation in the tropics instead of standard deviation?

General ----

The citation format should be more succinct in the body of the paper and then in detail in the reference section.

Make sure not to leave bits and pieces of sections hanging out alone on separate pages when possible.

You should have each figure immediately after you reference it and not before.

All in all a well-laid-out paper. I think most of the deficiencies are easily revised.

8 Canvas Tips

We will be using Canvas to aid in the peer reviewing process. After assignments are turned in, you will be able to access those to which you are assigned to review. You can click to see the uploaded pdf. You can add text, upload files, etc., on the right-hand side of the window. PLEASE DO NOT ATTACH .doc or .pdf FILES FILLED WITH PLAIN TEXT. Cut and paste plain text into the boxes instead. You can also add comments to markup particular locations in the text you are reviewing. With a little experimentation, you will see how this works. When you are done with your review, you can submit it. Once you submit, I don't think you can go back and see it again. See the example figure below for the layout of some typical reviews. See how the plain text is displayed on the right and the markups are displayed within the document.

Submission Details

Paper3, submitted Apr 12 at 3:24pm (late)

Grade:
 out of 10

1.81 MB View Feedback

Preview of Paper3-1.pdf x

Comment 2 of 21 Powered by crocodoc

Comment Draw Highlight Text Strikeout

of the error of Sverdrup transport estimates of WBC transport at different latitudes and their components (ignoring density changes) indicate a greater amount of error when applied across Madagascar. Both errors are still substantial at 10 to 40 Sv, depending on the season. Still, resolution of the island circulation might improve Sverdrup estimates at that latitude. One piece of evidence supporting this claim is the reliability of thermal wind in predicting vertical shear in meridional velocity, which is also based on the geostrophic approximation. The correlation of vertical shear and thermal wind shears for transects chosen across Madagascar as seen in figure 4. Godfrey (1989) [1] introduced simple approximations consistent with the Stommel model which will be used to estimate island circulation in this report, hopefully improving estimates of WBC transport.

II. THEORY AND METHODS

For oceanic flows away from the equator, Sverdrup transport, the combination of geostrophic and Ekman flows, is often a good approximation of basin circulation away from the western boundary currents (WBCs). The meridional Sverdrup transport is given by:

$$V_s = \frac{g}{f} \frac{\partial \sigma}{\partial x} \quad (1)$$

The thermal wind in the meridional direction can be written:

$$\frac{\partial v}{\partial z} = f \frac{\partial \sigma}{\partial x} \quad (2)$$

where σ is the buoyancy, g is the acceleration of gravity at Earth's surface, ρ_s are density fluctuations measured against the Boussinesq average, ρ_0 . The density was computed from salinity and temperature data using the GSW oceanic toolbox [6]; pressure variations were assumed to be hydrostatic.

An approximate measure of the circulation around islands was introduced by Godfrey (1989)

where V_s is the Sverdrup volume transport per time and transectal length, $\beta = \frac{\partial \sigma}{\partial x \partial y}$, f is the wind stress; ρ_0 is the mean density in the Boussinesq approximation, Ω is the rotation vector of Earth, θ is latitude, a is the radius of Earth, and (i, j, k) are local orthogonal coordinates with k in the local vertical and j along the meridian.

The correlation coefficient, c , that is used to relate variability in heat, mass, and Ekman flows is computed locally with the discrete data set as:

$$c_{\text{heat}} = \frac{\sum (\phi_s - \bar{\phi}_s)(\sigma_s - \bar{\sigma}_s)}{\left(\sum \sqrt{(\phi_s - \bar{\phi}_s)^2} \right) \left(\sum \sqrt{(\sigma_s - \bar{\sigma}_s)^2} \right)} \quad (3)$$

where ϕ_s are the flow parameters being correlated, $\bar{\phi}_s$ are their spatial means, and sums are over all finite volume elements in the region of interest. This correlation would optimally be weighted by mass or area; however, it should still be a reasonable, albeit slightly less precise measure of correlation without weighting, so that is used here. A value of 1 means ϕ_s and σ_s vary identically in space when centered on their means and normalized by their standard deviations, -1 indicates they vary oppositely, and 0 means they vary independently.

FIG. 2. Monthly variability in sea-surface height (SSH) across the Indian Ocean at 25°S.

Title: Sverdrup Transport in the Southern Indian Ocean
 Author:
 Review: B2

Summary: Using data from the ECCOv4 simulation of MITgcm, the author estimated Sverdrup transport in the Southern Indian ocean, specifically the circulation around Madagascar. The monthly Sverdrup transport calculated by integration across a zonal transect was compared with the "Island Rule" calculation established in preexisting literature. The author found that the model calculation deviated significantly from the Island Rule prediction. It is unclear what caused this strong disagreement, but the author suggests it may result from model resolution or incorrect integration bounds.

Strengths:
 - Nice plots
 - Good description of the Island Rule equation. Also, a cool idea to compare model data to the Island Rule calculation.

Major Problems:
 - I found it very difficult to follow some parts of the paper simply from having no diagram to reference for where currents are and how they relate to each other.
 - The correlation coefficient seems out of place in the paper. You talk about the results of the analysis briefly in the introduction, before the equation has been defined, and then it isn't mentioned again. I think the paper would be stronger either without the correlation coefficient, or with a more detailed description/analysis of the findings (placed after the theory section).

Minor Problems:
 - Some typos, including an incorrect equation

Overall: You asked some interesting questions related to most strengths, but

Figure 1: Example Peer Reviews in Canvas