Scientific English course

Article: Exchanges between the Ross Sea and the Antarctic Circumpolar Current happen at the Pacific-Antarctic ridge (Emma Bent)
Reviewer: Eva Chamorro Garrido

Summarize the main results of the article in a few sentences:

The result of this study is that there is a greater transport of particles from the Ross Sea to the ACC in the surface layer (50 m) than in a deeper layer (250 m). It also suggests that it may be due to the geostrophic flow and bathymetry of the study area.

Answer the following questions about the structure of the paper:

Overall content:

1. Is the overall purpose of the study and /or central question clear?

   Yes. The study focuses on transport from the Ross Sea to the ACC. But from my point of view is missing a little of emphasis in why the ACC is cooling.

2. Does the interpretation of the findings answer the overall question of the paper?

   Yes, because the objective is to investigate the origin of the water at the location of the strongest freshening and in this paper it is investigated the water coming from Ross Sea.

3. Is every paragraph and sentence in the paper relevant to the overall question?

   No

   If no, point to some examples:

   (3rd paragraph conclusion, it is confused because they generate a question which is not approached throughout the study

   At the surface, to obtain the total current, one must add the geostrophic flow to the Ekman transport (Fieux, 2017). But in some cases, one effect is stronger than the other. This is a question we asked in this study: are particles crossing the front because of a strong Ekman transport or mostly geostrophic flow?

(Last paragraph conclusion)

As noted in the introduction, the motivation of this work is to understand why the southeast Pacific has freshened and cooled over the past decade. This study is a first step towards answering this question: we have shown that exchanges of water occur between the Ross Sea and the ACC, but do they then exchange with the Pacific as well? In the next stage of this work, we would carry a similar analysis to identify the origins of the surface waters from the southeast Pacific.

4. Are there portions of the text that could be omitted?

Yes

If yes, point to some examples:

"Before starting the particle analysis"

"To test our hypothesis"

5. Is the overall organization of the paper clear and effective?

No

Suggestions for improvement:

I suggest reviewing the content of methods as it has results (Figure 2 I suggest to present it in another way.

I suggest combining the discussion and results part because I don't think it's necessary to establish two different sections, they have similar content.

Individual sections:

1. Does the title adequately represent the content of the paper?

Yes

Suggestions for improvement:

I suggest to delete " happen at the Pacific-Antarctic ridge " because this location is not addressed until the end of the paper.

2. Does the abstract clearly and concisely summarize the paper and state the main results? Does is contain all needed information (context, need, task, object, findings and conclusion)?

Yes, the abstract is very complete because it has each of the parts mentioned above (context, need, task, object, findings and conclusion).

3. Does the introduction provide enough context to the readers? Does it state the need for the work? Does it state clearly what has been done to address it?

From my point of view in the introduction is missing previous information about the study. It present the study but the topic is not presented.

(1st paragraph)

"The top 2000 m of the Southern Ocean have warmed (Roemmich et al., 2015) and freshened in recent decades (Wong et al., 1999; Aoki et al., 2005; Durack et al., 2012). On the other hand, analyzing Argo data for years 2006-2013, Roemmich et al. (2015) have shown that during that time period, the surface waters of the southeast Pacific (south of 50°S), have cooled and freshened (Wong et al., 1999; Durack et al., 2012). "

Comment: From my point of view is not clear for readers. Is confusing.

4. Does this paper put the progress it reports in the context of existing published work? Is there adequate referencing and introductory discussion?

In the introduction we find references to previous studies regarding ACC heating and cooling. On the other hand, hardly any information is presented on the transport and origin of ACC water. It may be that this information does not exists, actually the Southern Ocean is still little studied.

5. Are the material and methods used in the study clearly explained? Can you point out what is special, unexpected, or different in the approach compared to existing published work? Does it contain too many technical details?

The method is well explained.
The article does not speak of previous studies about transport towards the ACC, so it is not possible to highlight new special points in the method used.

The following paragraph could be reduced and focus more on the last sentence where it explains the reason of the initial location to take the particles.

"Before starting the particle analysis, we validated the model by comparing its output to observations of sea surface height (SSH) fields created by Archiving, Validation, and Interpretation of Satellite Oceanographic Data center (AVISO, 2018) and to the tem- perature and salinity products given by WOCE/Argo Global Hydrographic Climatology (WAGHC) (Gouretski, 2018). From this analysis of the model, we concluded that the southern front of the ACC has to be chosen more north than usual to ensure that particles that do cross the front really make it into the ACC."

6. Is the results sections(s) clearly and concisely written? Are there logical and smooth transitions between sections, subsections and between paragraphs?

This section is well written, it makes it easy to understand the results. But is very focused on the comparison between 50 m and 225 m. From my point of view should focus more on transport as it is the objective of the work and not the comparison between different depths.

On the other hand, the last paragraph referring to the density functions is not linked to the rest of the results maybe creating sections would be a good option.

7. Does the conclusion clearly state the most important outcome of the work? Does it address the questions stated in the Introduction? Does the conclusion just summarize the results or does it interpret the findings and explain what they mean?

Yes, the main result is well presented. However, it is not exactly the result that was expected because it has been detected that a greater surface flow exists but not if really this is the cause of the cooling of the ACC.

Throughout the conclusion the results are well interpreted taking into account possible errors. Also, much of the interpretation and explanation is carried out in the discussion section.

8. Are the interpretations and conclusions adequately supported by the evidence presented? That is, are the assumptions valid, is the methodology sound, is the evidence adequate, and do the conclusions logically follow?

Within my limited knowledge of the subject both the methodology used, and the assumptions made are correct. The conclusions do not follow the logic of the article. For example, the main conclusion is the idea that bathymetry has an important role in the transport, while in the bibliography there has been mentioned a possible increase in wind. Neither of these factors are taken into account in the study, therefore for me it is an unreliable conclusion. On the other hand, there are interesting results that are not highlighted in the conclusion. Also, in the conclusion is well written the critical spirit presenting possible errors. But future lines of research would exceed because they are not relevant to the study and for a small article its presence is exceeding.

9. Are all parts of the text, references, graphics and tables necessary for the new results and main points to be understood?

Figure 1 is not essential for the study as well as its corresponding reference (Rintoul, 2011). The location of the ross sea is clear without the presence of the map.

10. Are the graphics and tables clear and their captions self-explanatory?

Caption of Figure 2 contains excess information as it explains part of the results. A briefer and more concise description would be more accurate.

Caption of Figure 3 and 4, I am not sure if it is necessary to specify that both panels have different y-axis.

- **Sentences and Wording**

1. Can you find grammatical mistakes?
   No

2. Can you point to sentences that loose you (too long/complex) and do you have suggestions for improvement?

   Sentences are well-built, they are short and simple. There are no long phrases where you can get lost.

   Confusing "on the other hand" has no sense in the sentence:

   "On the other hand, analyzing Argo data for years 2006-2013, Roemmich et al. (2015) have shown that during that time period, the surface waters of the southeast Pacific (south of 50°S), have cooled and freshened (Wong et al., 1999; Durack et al., 2012). "

3. Are generally the action in verbs, characters in subjects and subjects near verbs? Can you find counter-examples? Can you point out misused nominalizations?

   Nominalizations:

   -we validated the model by **comparing** its output to observations of sea surface height

   Suggestion: To validate the model **we compared** its output to observations of sea surface height.

   -Our study region **representing** the Ross Sea, is closed at 120°E and 110°W

   Suggestion: Our study region **represents** the Ross Sea and is closed at 120°E and 110°W

4. Is the writing cohesive? Does it flow well? Is the part of the sentence that links to the previous sentence at the beginning or the end?

In general is cohesive. But sometimes following sentences are not well connected.

Example:

"The circulation of the Ross Sea is dominated by a cyclonic gyre called the Ross Gyre (Ross G. in Figure 1). North of the Ross Sea flows the ACC. "

5. Are the paragraphs coherent? Do the first and last sentences of paragraphs match? Can you find counter-examples?

The 3rd paragraph of the introduction start with information about the location and a description of the zone and finish talking about a Lagranian model.

"Our study focuses on the Ross Sea, which is located in the Pacific sector of the Southern Ocean (Figure 1) .

We then quantify the number of particles that make it into the ACC. "

6. Is there an abusive use of passive voice?

No

7. Can you find a lot of useless words/phrases?

"On the other hand,"

"Lastly"

"Thanks to"

8. Can you find complex words that could be replaced by simpler ones?

   "hereafter" I dont like it but i dont know how to replace it.

   "threshold" Suggestion: "Criteria" "Limit"

9. Can you find too complex subjects?

   No

10. Can you find inadequately used adverbs/ repetition/ excessive hedging?

    We found "We can see" repeated in many sentences.

11. Is the use of tenses (past/present/future) adequate?

    Yes

- **Other comments?**

  From my point of view is very well written, the English is clear and easy to understand, but is written as a report is missing the article form. The structure and concision in the results is not clear enough as it should be in an article.