

MAJOR COMMENT

This study presents an analysis of the surface and subsurface characteristics of mesoscale eddies observed during eight Seaglider missions near the Perth submarine canyon. The authors combine in-situ measurements collected between 2010 and 2017 and remote sensing data to describe the interactions with nine mesoscale eddies. Detailed descriptions of the eddies' physical characteristics, such as temperature, salinity, chlorophyll concentration, and mixed layer depth are provided, highlighting differences between eddy types and their potential impact on local oceanography.

The dataset itself is compelling and valuable, revealing the potential for intriguing patterns such as the absence of anticyclonic eddies above the shelf. However, the current manuscript is limited by its mostly descriptive approach, with minimal scientific analysis beyond basic characterization of eddy features. While the observational data are rich and has the potential to yield substantial insights, the authors have not fully utilized this potential to extract significant scientific findings. Without new and significant findings, the paper reads more as an overall data report rather than a scientific study.

I recommend that the authors incorporate some statistical analysis of the data, moving the manuscript's results beyond a descriptive focus and exploring the eddy dynamics and interactions quantitatively. Metrics on eddy intensity, variability (seasonal?), or nutrient entrainment would add a valuable quantitative dimension to the work. An analysis of the relationship between eddy characteristics (such as chlorophyll concentration and temperature profiles) and regional physical processes could provide new insights. Such analyses would allow for a clearer demonstration of the eddies' impact in the region, helping to elevate the manuscript from descriptive to analytical work. It is up to the authors to decide what processes they want to study, but new scientific findings are necessary to be included.

As such, I recommend the authors make major revisions to the paper, addressing these issues and with the expectation that the authors would focus their revision efforts on the inclusion of further scientific analysis. After the authors undertake these significant revisions, this study could become a noteworthy contribution to our understanding of mesoscale eddies in this unique region.

Some additional minor comments related to several grammar and syntax problems in the paper are provided below, along with some other specific suggestions in addition to the major comment above. The authors will need to have the text edited carefully, removing all grammatical/syntax errors, before it can be published. I would be happy to review an improved version of this paper if is submitted after editing.

MINOR COMMENTS:

Line 24: "oases" should be in quotations

Line 43: add a comma after "WA"

Line 66-67: You state that the paper's aim is to define the vertical structure of the eddies you measured by glider. I am not sure if this aim by itself is enough to justify publication of this work. Your aim should be to show something new related to these measurements, and shouldn't be limited to simple description of the data. As a reader, at this point I hope to find more than a mere description of the eddies characteristics in the upcoming sections.

Line 110-111: Something is strange about this sentence, please rephrase/edit.

Line 137-139: What is the likelihood of generating artifacts during the process of interpolation? More specifically, can you quantify the error introduced by detecting eddies onto a heavily interpolated field? Please address.

Line 149-150: Incomplete sentence - please check & edit.

Line 155-156: Sentence does not make sense, please rephrase.

Lines 191-192: It is difficult to gather this from Figure 1b. I can see that there is a collection of anticyclonic eddies closer to the coast, but it is hard from the figure to tell if this is the majority of them. Can you report the number of on-shelf AC eddies vs. Off-shelf AC eddies here? (The only thing I can really gather from figure 1b is the *absence* of cyclonic eddies near the coast.)

Line 200: You've mentioned "cyclonic/anti-cyclonic" elsewhere in the draft - better to keep with that terminology throughout the paper to refer to rotation direction.

Line 201: "(represented by yellow arrows in Figure 3)"

Lines 203-206: Not clear, there are several grammatical and description issues in these lines. Please rephrase & edit. Please have this paper revised and corrected for English writing.

Lines 431-433: Sentence is incomplete, please revise.

Lines 435-439: The fact that cyclonic eddies associated with upwelling didn't indicate higher chlorophyll in this case is a potentially interesting finding that should be explored further. This is an opportunity to go beyond the mere description of the data and include some findings.

Line 446: "Chlorophyll" (missing an L)

Lines 446-449: Please reword this sentence, the mechanism it describes needs to be made more clear.

Lines 451-452: Check grammar.

Lines 452-454: Again, some awkward grammatical description. To be clear, the entrainment of productive water was not impeded – rather, the direct observation of whether it occurred or not is what was impeded. Please rephrase to state correctly.

Looking at Figure 13, what I can see is a filament of high Chl at the upper edge of the eddy coming from the coast (panel c). I can see it to a much lesser degree in panel b, but less convincingly. In panel a, how can you be sure that is entrainment?

Lines 463-464: Check grammar.

Figure 1: Panel “b” in its current spaghetti plot format is not useful to the reader. The eddy tracks plotted like this are not discernible, and the figure hardly provides any insight into the actual behavior of the eddies. I suggest reworking this figure into a more discernible plot, perhaps by making use of the mean pathways/directions or by otherwise cleaning up the way the eddy tracks are displayed visually.

Figure 3: Check this description for grammar, it is not correct as written.

Figure 4: The way you’ve plotted these sections twice in the same figure (first from 0-900 m, then again from 0-500 m) is repetitive and unnecessary. Please choose only one depth range and eliminate the other (either 0-900 or 0-500). You can make better use of space for the figure that way and there will be no unneeded repetition. I leave it up to you how to reorganize the panels, but remove the repetition.

Figure 13: Check the colorbar on this figure: negative Chl values?

Figure 14: I do not think this figure helps. There is not much that can be gathered by this figure, except perhaps for some basic qualitative depictions. Aside from being shown an awkward scale and angle, it does not illustrate the characteristics of the eddies as you claim in the caption.