

REVIEW

Manuscript ID: os-2021-116
Title: Counter-rotating eddy pair in the Luzon Strait
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Reviewer's comments:

Based on satellite remote sensing observation data and Hybrid Coordinate Ocean Model re-analysis, the work studies a counter-rotating eddy pair in the Luzon Strait. The study proposes a mechanism explaining the formation of the counter-rotating eddy pair and observes its seasonal variation over a period of time long enough to classify the pair as a persistent phenomenon rather than a transient regime. The findings are backed by the results and can be a valuable contribution to the field. However, there are some reservations which prevent me from recommending this study for publication in its present form. My overall impression is that the authors did invest a lot of work in this research but cut short on explaining many details without which it makes it difficult to read and understand. I recommend a major revision in hopes that the authors can significantly improve the manuscript.

- The Introduction is lengthy, and presented in a way like it is irrelevant to the study. Discussing the results of some works on the Luzon Strait without explaining how this study complements and/or extends these works, and how the previous results are related to the study looks like it is unimportant for the authors to highlight the position of their work in the state of the art. I would recommend to take the opposite approach.
- The motivation behind the work is unclear. The reader might think of the counter-rotating eddy pair as being a local phenomenon of minor importance. The authors should discuss why they study the counter-rotating eddy pair, why this study is important, and how it contributes to the state of the art.
- The English language has to be improved. In many places, the authors should use Present Indefinite instead of Past Simple (see, e.g. L14-20).
- Remove all web-links from the text and put them in the References.
- Explain how the eddies in Figure 2 as well as the counter-rotating pair have been extracted from data, otherwise it feels like you take a neighbourhood around some local extrema.
- Some figures show fields without explaining whether it is a snapshot, time-mean, or something else; see, e.g. Figures 1 and 3.
- Provide a colorbar and units for Figure 2.
- L109: ... to present, ... What is present? Be specific.
- L121: The wind data was provided by the NCDC. What is the rationale for referring to (Zhang et al., 2006) in line 125?
- L150: "The overbar denotes time averaged" → "The overbar denotes a time average (or a time mean) over 70 days". Adjust the following text accordingly.
- Explain in detail how you calculated the period of the counter-rotating eddy pair. Did you extract it from the Fourier analysis of the SSHA time series?
- One reference in line 135 is enough, remove Zhang et al., 2015; Zhang et al., 2017.

- Explicitly define deviations (the primes) in (1)-(3).
- L144: "Where" → "where"
- Give a reference for (4).
- L159: "Where" → "where"
- Do not define the variables in (4) that have already been defined above.
- All the constants in (1)-(4) have to be defined, give the values used in the study.
- Provide a formula for the calculation of time series of the SSHA.
- L183: Remove "in order to obtain a time series".
- Are Figs.4(b)-(c) an average over the positive and negative intensity index, respectively?
- What do you mean by "We counted the temporal distribution of the positive and negative intensity index values." ?
- Explain how you compute RV and RVA in Figs. 8 and 15, respectively.
- Remove produce in line 206.
- Remove "However" in line 382.