

## ***Interactive comment on “Two typical merging events of oceanic mesoscale anticyclonic eddies” by Zi-Fei Wang et al.***

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We thank you for the insightful comments and useful suggestions.

Q: 1. Please see if you can have the language and style improved with help from colleagues. Alternatively you can consider professional services. Also please check for typos throughout.

A: We have applied professional services for language.

Q: 2. Make sure all cites are included in the reference list, e.g. Gill and Griffiths

A: We have added the references.

Q: 3. I like one referee’s suggestion of splitting Fig 1 into two and showing the lower

panels later toward the conclusions.

A: We have split it into two by following your and reviewer's suggestion.

Q:4. li45-46: There has been some observational work from the Lofoten Basin (I recall Roshin Raj's paper demonstrating some mergers).

A: We have cited a work from the Lofoten Basin (Bashmachnikov et al., 2017). Now we add Raj's paper (Raj et al., 2016).

Q:5. li54: "without any assumption" is a \*very\* strong statement. You do use 2-layers (or 1 or 3), approximate SLAs as Gaussian, assume  $H_0=H_1=200\text{m}$ , and calculate the velocity and vorticity from geostrophy! etc.

A: We are sorry for the unclear statement. The assumption is not for calculation itself, but for conservation law. We have modified it.

Q:6. li76: SST is not the only contributor to density. Is this a regional statement?

A: Yes, it is a regional statement. Although both SST and SSS contributes to density, density anomaly is dominated by SST anomaly since SSS anomaly is very small.

Q:7. Eq.2 and on with integrals: are these accurate? It's not clear to me how you define the volume. How are the anomalies of  $u$  and  $\rho$  calculated? Please describe how you obtained  $h^2$ .

A: Yes. We have added these accordingly following your and reviewers' suggestions.

Q:8. li198-199: now we have plus/minus (which is good), but what are these? Standard error, standard deviation, uncertainty? Please describe.

A: They are the standard deviation. We add these in text.

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Discussion paper

