

Comments on the paper OS-2022-1443 "Intraseasonal variability of the South Vietnam Upwelling, South China Sea: influence of atmospheric forcing and ocean intrinsic variability" by Marine Herrmann, Thai To Duy, Claude Estournel

In this paper, the authors investigate the variability of the South Vietnam Upwelling (SVU) at time scales from day to season and propose a method for estimating the contribution of the ocean intrinsic variability (OIV) to the total variability of SUV. This work is an extension of the previous work, by the same authors, that has been focused on larger time scales of SUV variability. I reviewed the previous paper submitted to Ocean Science Journal in 2022, and recently published, and I appreciated the results on the whole.

The method of investigation of the SVU variability in both studies is based on numerical simulations using SYMPHONIE model which was extensively validated in the previous study. In the present study, the authors employ the approach of ensemble simulations with perturbations of initial conditions. Small scale (spatial scale) perturbations of initial conditions were generated for initializing the model fields. These perturbations are assumed to represent a spectrum of ocean circulation variability. A total of ten simulations, one year long each, were performed to obtain a range of variability which is supposed to represent the real OIV occurring under atmospheric conditions of one particular year chosen for analysis. By applying the proposed method, the authors demonstrate that the contribution of OIV varies significantly in time, during summer months, and in space, in four sub-domains of the SVU.

I find that the method used in this study is original. It provides valuable results which extend the model-based characterization of SVU variability that the authors got started in their previous study. I think that the findings presented in this paper are of considerable interest and worth publishing in Ocean Science Journal.

However, there are numerous minor grammar mistakes that did not disrupt the flow of the article but should be corrected. I provide below a list of recommendations that I hope will be of some help.

Additionally, I would like the following points to be addressed.

- How the tree periods of strong wind forcing (L166) were identified? Two of them start at low wind and end at high wind period of time. In contrast, the first and shortest period of time comprises only dates with high wind speed. How the presented results can be sensitive to the length of time intervals?
- I suggest to provide a better explanation of indicators defined in section 2d,e. For example, what does the "yearly upwelling index UI" mean? What the authors want to show using this indicator? In addition, the word "yearly" is misleading because the time average is calculated over four months of the year.
- What reason did the authors follow to choose the acronyms MI and VI? What does "M", "V", and "I" means? The acronyms do not match the quantities defined in section 2, L155 and L160.
- In L152, the authors introduce the indicator VI for a variable X. They should precise what variables are targeted: temperature is evident, but what else? How MIs for other variables covary? Do they follow a trend similar to UI?

Minor comments and suggestions

- Numbering of sections should be corrected. For example, section 1 (L198) appears after section 4 (L189). Subsections a,b,c,d of section 2 should be changed to 2a, 2b,

L28: NCU shows a behavior different from that revealed in three other upwelling areas.

L29: a large-scale

L30: preventing NCU development.

L37: remove "over the region"

L38: please put (AC) after anticyclonic , and (C) after cyclonic.

L39: South Vietnam (please use this name throughout the whole text).

L64-68: Cut this sentence in two. ... for NCU than for three other upwelling regions. New sentence: In contrast, the influence of circulation, in particular, the spatial organization of (remove "the strongly") chaotic ... was found to be stronger:

L76: a comma is missed before hence.

L87: Assuming "... (wind) and intrinsic variability of ocean dynamics".

Ln88,100: 3D or 3-D ? please harmonize.

LN100: VNC does not match "the Vietnam coastal region". Please correct.

L113: July- August wind : please precise the wind direction. Put 'due' after 'in particular'.

L114: I would suggest "Ensemble simulations".

L139: box T_ref is not shown in Fig. 1.

L161: "contribution" is better than "impact"

L172: remove "see", correct "in Figure 3a.

L175: "speed" instead of "strength"

L178: with a mean "speed"

L183: zonal "extension"

L184: Assuming: jet is stronger (or strongest?) with velocity reaching ... and the mean current speed up to 0.9 m/s.

186: "area" instead of "surface"

L199: Assuming "similar" , not "the same". Some difference can exist.

L215: OIV "is related to"

216: I would remove parentheses: position of the jet which does not vary much, thus affecting ...

L220: They "also" show

L228: Why "in the wake" and not "behind"? Usually the wake has the maximum extension of 8-10 times the size of the object that generated the wake. Is this the case? Please precise.

L233: I find the last statement "hardly affected by OIV" not coherent with considerations given in L231-232. Please verify and correct.

L246: the word "seasonally" means from one season to another. It is not that the authors mean. Please correct.

L252-255: The text needs clarification. The Ekman pumping velocity depends on the curl of the wind stress. If the curl is large enough the Ekman pumping velocity is large. If not, some other factors come into play. A better (more clear and physically consistent) explanation of weak upwelling is required.

L261: what is part 3?

L263: "south" of what? And also put "the" before "positive".

L265: extension "toward" the northeast. The text in L262-266 should be reworded for clarity.

L274: here and in other places: "to less extent".

L278: Remove "The", start with "Variations in zonal ..."

L285: remove "the" before "smaller"

L290: remove "the" before "summer"

Ln300: ... to 37% that is twice larger than ...

L301-302: Should choose between: "same order" and "two times smaller" which are not equal.

L305: I would suggest to put a dot after "areas" and start a new sentence with : Therefore other factors induce ...

L314: It is not possible to see 500% level in Fig. 5. The scale is limited by 300%.

L326: what is part 3 and 4c? Fig 4c?

L337-340: this paragraph contains generalities without providing mechanisms of NCU development. It should be revised.

L341: Assuming " by the alongshore wind component which is northward from 10 of June until the end of August.

L353: "In August" the circulation is stable over larger area than in July.

L350-360: show a very weak (less than 10%) intrinsic variability in space and time, both at daily scale and on average over summer.

L364: OFU shows stronger intrinsic variability (18%), both at daily scale and for the whole summer period, and also in space.

L378: ... different from "that found in three" other areas ...

L386: ... related to strong chaotic variability of mesoscale structures with the order of magnitude similar to interannual variability (37%). If "small" is used, the scale should be clearly defined.

L388: the "effect" of OIV ...

L398: over these two areas.