Dear Reviewer:

Thank you for the comments concerning our manuscript entitled "A daily reconstructed chlorophyll-a dataset in South China Sea from MODIS using OI-SwinUnet" (ID: ESSD-2024-6). Those comments are all valuable and very helpful for revising and improving our paper, as well as the important guiding significance to our researches. We have studied comments carefully and have made correction which we hope meet with approval.

Revised portion are highlighted using the "Track Changes" function in the paper. The main corrections in the paper and the responds to the Reviewer's comments are as flowing:

Responds to the Reviewers' comments:

Reviewer #1:

MAJOR COMMENTS

1. **The first comments is about the input. Why did the author select anomalies for SwinUnet's inputs from the first and last 15 days, respectively? (To put it another way, could this last for three days or a week?)**

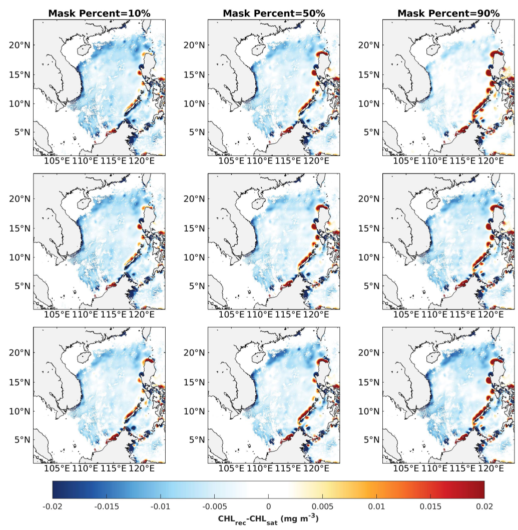
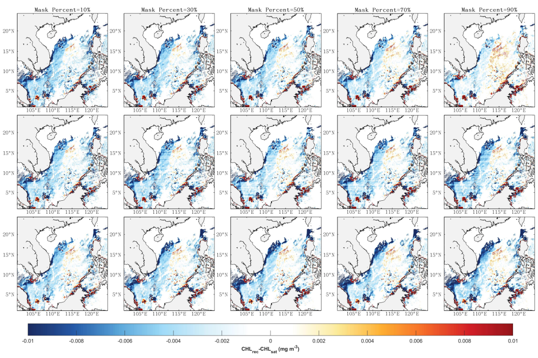
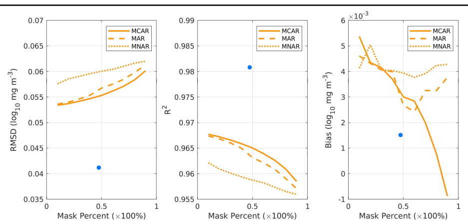
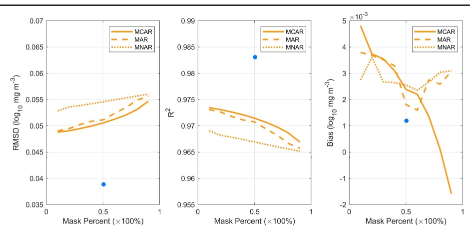
   Response: There are a large number of mesoscale processes such as eddies and fronts in the South China Sea, and their time scales range from a few days to several months. Theoretically, the longer the duration of the input variables, the more useful features the model can learn from the training. However, practically speaking, it is not possible to maximize the length of the input variables without any limitations, and the choice of fifteen days for the model inputs is a combination of many factors. Such a choice covers a complete mesoscale process as much as possible, while taking into account the computational efficiency. If three or seven days are used instead of fifteen days, the model will learn the features of the mesoscale process relatively poorly.

   In the revised manuscript, we have explain the reason for choosing 15 days of data before and after as input to the model (Lines: 180-186).

2. **Secondly, the author's method of demonstrating the model's reconstruction performance under various mask percent settings is commendable, but it appears that the graph's performance findings are not sufficiently clear (see from Fig. 12). Here, two recommendations are made: first, select an alternative reconstruction product at a time when there will be a sufficient difference to support the author's position; and second, include graphs with mask percentages of 30% and 70%, i.e., set the plot step size to 20% to reflect more specific information about the changes.**

   Response: Thanks for this useful comment. We have selected an image with more pronounced differences to show the specific performance of the model under the three different masking schemes. More detailed variations are shown for conditions where the mask percentage varies from 10% to 90% (in steps of 20%). Since a new figure has been added to the revised manuscript, the original serial numbers of Fig. 12 and 13 have been changed to Fig. 13 and 14. Fig. 13 "Spatial distribution" and Fig. 14 "Performance" have been replaced due to the change in remote sensing imaging time. From the comparison of the old and new versions of these two figures, it can be seen that the large differences between the reconstruction results and satellite-derived values in the "spatial distribution" figure are mostly distributed in the near-shore area, and the changes in the statistical metrics in the "performance" figure have similar characteristics. This shows that our proposed reconstruction model has good robustness.

The old and new version of Fig. 13 and Fig. 14 are listed below:

Old	New
 Fig. 13	 Fig. 13
 Fig. 14	 Fig. 14

3. **Thirdly, in my opinion, one of the best parts of this research is the use of reconstructed data in specific instances of mesoscale eddies. A useful database for researching the ecological effects of small- and mesoscale ocean phenomena may be produced if the chlorophyll data reconstructed using OI-SwinUnet, as suggested by the authors, are able to accurately restore the chlorophyll information of the missing regions.**

Response: Thanks for this comment. We hope to provide a spatiotemporally complete chlorophyll-a concentration dataset that can satisfy the need for weather-scale observations and can accurately reveal the localized episodic occurrences of phytoplankton. From the results, the chlorophyll perturbations of eddies at different life stages can be depicted in more detail using reconstructed data compared to direct observations from satellites.

4. **Fourthly, the authors link upwelling to the high chlorophyll values seen along the Vietnamese coast throughout the summer. Have other studies verified that upwelling at this location results in changes in chlorophyll, and can relevant literature be shown to bolster the authors' claims?**

Response: Thanks for this comment. The upwelling along the eastern coast of Vietnam forms during May-September and reaches its mature stage during July-August (Fang et al. 2012; Voss et al. 2006). Past studies have shown that this summer upwelling is always in the form of a jet-like cold tongue (or cold patch) originating off the coast of Vietnam between 9° and 15° N (Hein et al. 2013). After generation, the cold tongue may extend eastward or northeastward into the central South China Sea (Gan et al. 2006). In the offshore region, the upwelling is usually accompanied by the Vietnamese cold eddy (Hu and Wang 2016). In addition to the cold water observed in upwelling regions, high chlorophyll-a concentrations are often reported (Ho et al. 2000; Li et al. 2014; Zhao and Tang 2007). By providing deep nutrient-rich water, upwelling stimulates the growth of phytoplankton in the euphotic zone, thus significantly altering the trophic state of the Vietnamese nearshore region (Bombar et al. 2010). Driven by transport in offshore currents, upwelling nutrients and stimulated high Chl-a (≥ 0.2 mg m^{-3}) can extend from the coast to 116°E, creating 'Chl-a jets' (Chen, Xiu and Chai 2014).

We have added these content in the revised manuscript (Line: 485-497).

Newly Added References

Fang, G., Wang, G., Fang, Y., & Fang, W. (2012). A review on the South China Sea western boundary current. *Acta Oceanologica Sinica, 31*, 1-10

Voss, M., Bombar, D., Loick, N., & Dippner, J.W. (2006). Riverine influence on nitrogen fixation in the upwelling region off Vietnam, South China Sea. *Geophysical Research Letters, 33*, L07604

Hein, H., Hein, B., Pohlmann, T., & Long, B.H. (2013). Inter-annual variability of upwelling off the South-Vietnamese coast and its relation to nutrient dynamics. *Global and Planetary Change, 110*, 170-182

Gan, J., Li, H., Curchitser, E.N., & Haidvogel, D.B. (2006). Modeling South China Sea circulation: Response to seasonal forcing regimes. *Journal of Geophysical Research, 111*, C06034

Hu, J., & Wang, X.H. (2016). Progress on upwelling studies in the China seas. *Reviews of Geophysics, 54*, 653

Ho, C.R., Kuo, N.J., Zheng, Q., & Soong, Y.S. (2000). Dynamically active areas in the South China Sea detected from TOPEX/POSEIDON satellite altimeter data. *Remote Sensing of Environment, 71*, 320-328

Li, Y., Han, W., Wilkin, J.L., Zhang, W.G., Arango, H., & Zavala-Garay, J. (2014). Interannual variability of the surface summertime eastward jet in the South China Sea. *Journal of Geophysical Research: Ocean, 119*, 7205-7228

Zhao, H., & Tang, D.L. (2007). Effect of 1998 El Niño on the distribution of phytoplankton in the South China Sea. *Journal of Geophysical Research, 112*, C02017

Bombar, D., Dippner, J.W., Doan, H.N., Ngoc, L.N., Liskow, I., Loick-Wilde, N., & Voss, M. (2010). Sources of new nitrogen in the Vietnamese upwelling region of the South China Sea. *Journal of Geophysical Research, 115*

Chen, G., Xiu, P., & Chai, F. (2014). Physical and biological controls on the summer chlorophyll bloom to the east of Vietnam. *Journal of Oceanography, 70*, 323-328

MINOR COMMENTS

1. **Is the "satellite-derived" in the x-axis of Fig.7 extracted from aqua or terra, or is the data merged from two sensors? please clarify this.**

   Response: Thanks for this comment. The "satellite-derived" represents merged products from Aqua and Terra. We have clarify this information in Fig. 7's caption.

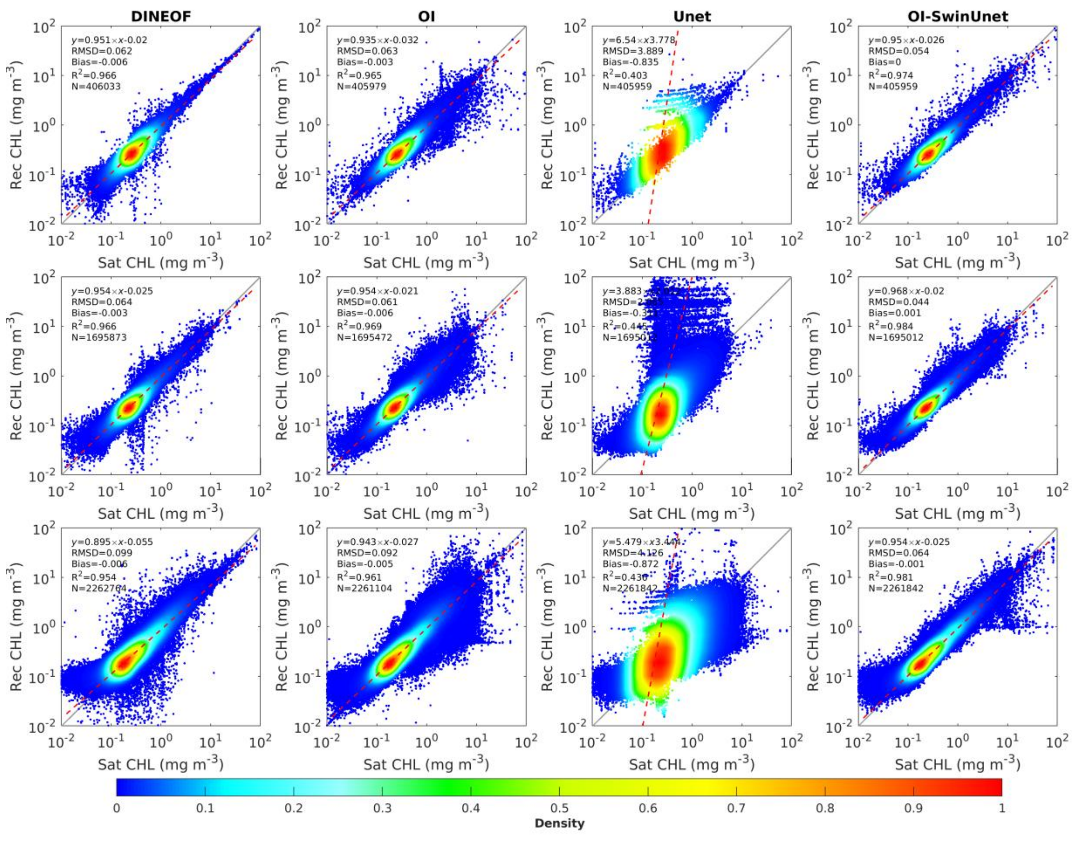


Figure 7: Scatter plots between satellite-derived (**merged products from Aqua and Terra**) and reconstructed chlorophyll-a concentration of different models, data acquired on (Upper panel: 11th February, 2014. Middle panel: February 27, 2015. Lower panel: January 5, 2016)

2. **The better background color of Fig. 1, 2, 3, 4, 16, and 17 is white.**

Response: Thanks for this comment. We have changed the background color to white.

3. **It is recommended that Fig. 10's colormap be changed to something other to make it more clear, such as jet.**

   Response: Thanks for this comment. We have changed the colorbar to jet.

4. **Fig. 16a is rough and it should be improved. The below figure in Fig. 16a shows too little information.**

   Response: Thanks for this comment. We have redrawn Fig. 17(a) (formerly Fig. 16(a)) in the hope of better demonstrating the interaction between plume front and upwelling.

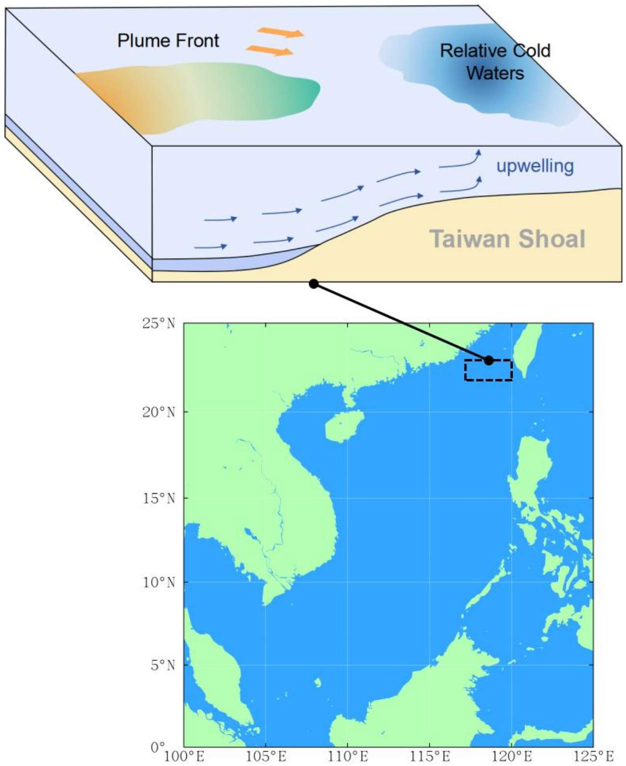


Figure 16(a)

We appreciate for Editors/Reviewers' warm work earnestly, and hope that the correction will meet with approval.

Once again, thank you very much for your comments and suggestions.

Yours sincerely,

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