The study of Satellite-detected sea surface chlorophyll-a blooms in the Japan/East Sea: magnitude and timing by Wang et al. applied satellite observations over 20 years for identifying the chlorophyll bloom in the Japan/East Sea. By comparing with all the major physical parameters, e.g., wind, eddies and fronts, they find the impact of solar radiation and stratification are actually more important to determine the bloom of phytoplankton. The presented information is interesting, but the scientific soundness should be further confirmed. In particular, the satellite observations are limited in the surface, but the nutrient supply at subsurface is also predominant. A major revision is necessary for presenting the credibility of their conclusion and improving the description.

Major comments:

The dynamical dependence between interannual index and regional chlorophyll should be further investigated. It is not surprising to find some statistically significant correlation, but the underlying mechanisms should be further explored. The authors tried to present a dependence between ENSO and chlorophyll bloom via the intensity of Tsushima Warm Current. If this is the case, the intensity of the current should be added for presenting a comprehensive relationship. In particular, the lag among ENSO, warm current, front, chlorophyll is of great interesting.

Thanks for the reviewer's comments. Based on the analysis of several spring bloom cases, Yoo and Kim (2004) suggests that ENSO events could modify the location and maintenance of subpolar fronts by influencing the intensity of Tsushima Warm Current, and eventually change initiation region and timing of the spring bloom. Based on this result, we treated ENSO events as a candidate to affect the chlorophyll bloom and try to check its effects statistically. However, the correlation results suggests that there is not a clear dependence between ENSO and chlorophyll bloom, as shown in Fig.10 in the original version of paper. Thus, we suggest that the ENSO events' effects are not as simple as suggested in case studies, and could be covered by the interaction of different physical processes. Therefore, the correlation between the ENSO and warm current, fronts, chlorophyll is not included in the paper, and the figures can be find below.

As suggested by the reviewer, here we calculated the lag correlation between ENSO and Tsushima Warm Current transport anomalies (TUSA), between TUSA and front probability anomalies (FPA), between TUSA and SST anomalies (SSTA), between TUSA and sea surface chlorophyll-a concentration anomalies (SSCA), which are the possible action steps of TUSA on the SSCA, as suggested by Yoo and Kim (2004). As shown in Fig. 1, each one of the results is not significantly correlated at any given lagging time, suggesting the SSCA is more likely to be affected by local physical processes, rather than ENSO events.

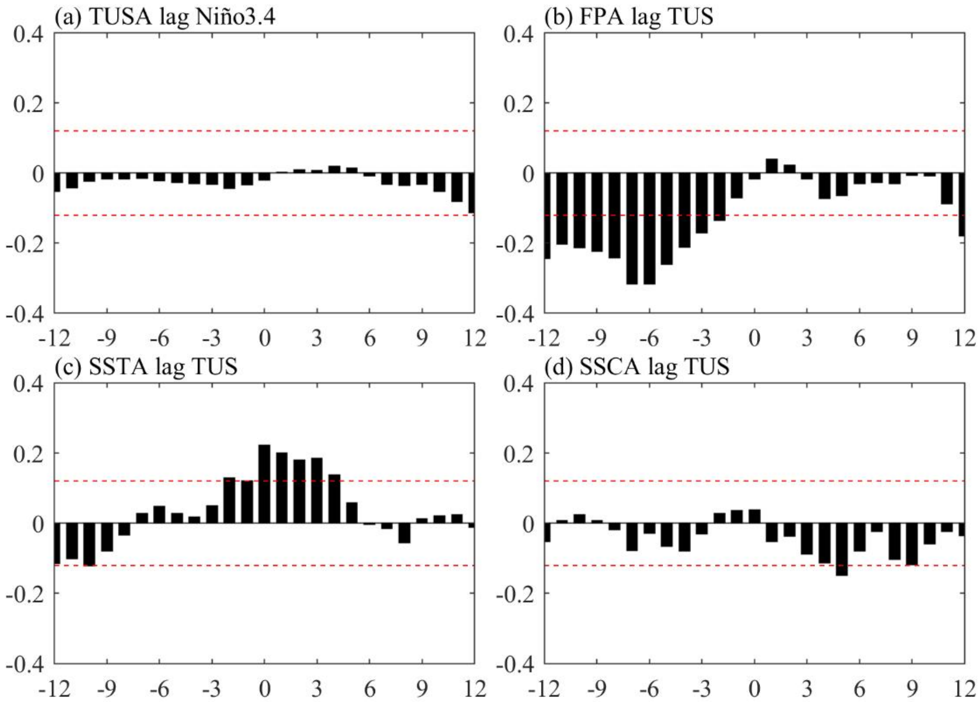

Figure S1. The lag correlations between (a) Tsushima warm current transport anomalies (TUSA) and Niño3.4 index; (b) front probability anomalies (FPA) and TUSA; (c) area averaged sea surface temperature anomalies (SSTA) and TUSA; (d) area averaged sea surface chlorophyll-a concentration anomalies (SSCA) and TUSA. The red dashes represent the 95% confidence level.

Highly similar method has been formerly applied in other oceans, e.g., the South China Sea. But they presented more robust features with intercorrelation at seasonal/semiseasonal and interannual variability that the authors should consider to implement in this study. In particular, the seasonal/semiseasonal cycles are usually prominent for all the parameters (Legaard and Thomas, 2006) and a significant correlation can be achieved all the time by adding a lag. It is more meaningful to explore the dependence at interannual variability after removing the seasonal/semiseasonal cycle.

Thanks for the reviewer's comments. We have reduced the seasonal/semiseasonal cycles in the analysis of interannual variability. Figure 2 shows the first EOF mode (EOF1) of SSC anomalies in the JES, which contributes 22.4% of the total variance. The occurrence frequencies of the peaks of PC1 over months are shown in Figure 2c. The SSC anomalies show more peaks in April and October, coinciding with spring and fall blooms. Therefore, in the manuscript, we show the EOF analyses for the interannual SSC anomalies (remove seasonal variability) during spring (March–May) and fall (October–November), respectively, in order to remove the seasonal and semi-annual signals. As shown in Figure 3, lag correlations show that both the ENSO and AO have insignificant correlation with the interannual variability of fall bloom magnitude.

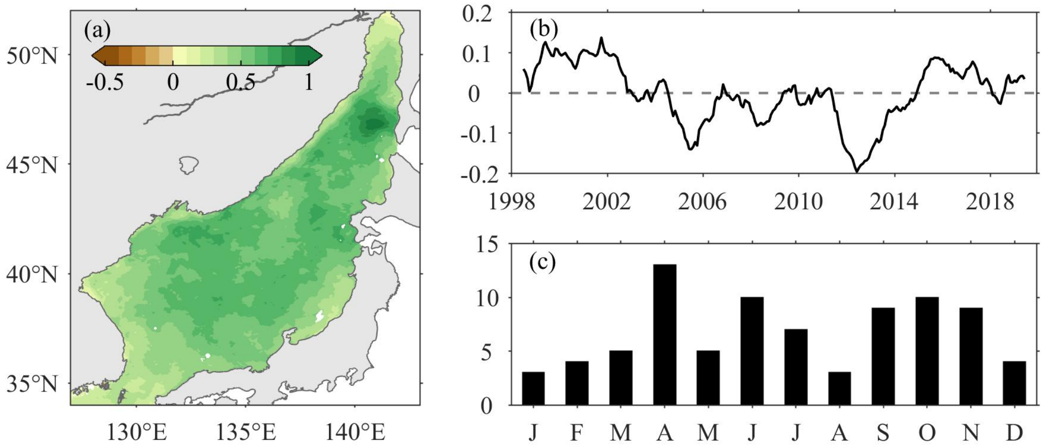

Figure 2. Empirical orthogonal function (EOF) analysis results of monthly mean SSC anomalies in the Japan/East Sea (JES). (a) Spatial pattern of the first empirical orthogonal function (EOF) mode (EOF1); (b) the 13-month running mean time coefficients of EOF1 (PC1); (c) the peak numbers of PC1 in different months.

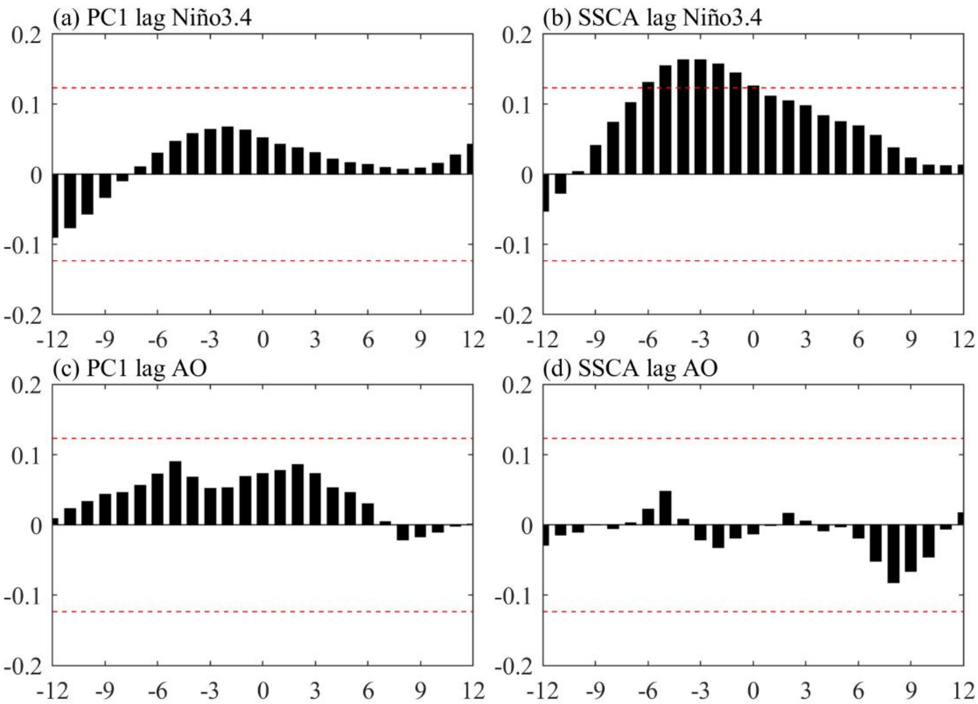

Figure 3. The lag correlations between (a) PC1 and Niño3.4 index; (b) SSCA and Niño3.4 index; (c) PC1 and AO index; (d) SSCA and AO index. The red dashes represent the 95% confidence level.

The authors should explore some better manner to present the seasonal signal in Figure 6. The information is very straightforward and multiple images are not necessarily needed to show the features. Similar method has been applied in the Kuroshio Extension region that can be applied here as well where similar patterns can be combined.

Thanks for the reviewer's suggestions. We have reduced the 12 subgraphs of Figure 6 to 6.

Most of the correlations are very small between blooms and interannual index (Figure 10) that are not statistically significant. The figure can be moved into supplementary material.

Thanks for the reviewer's suggestions. We have moved the Figure 10 into supplementary material.

Minor comments:

In Figure 1, though it is a schematic image, the Subpolar front is not corrected presented and *please refer to Xi et al. (2022) for a more realistic pattern. Kuroshio is wrongly spelled. Change the 'Pacific' to horizontal direction.*

Thanks for the reviewer's comments. We have adjusted the position of the subpolar front and added the sentence "The dark black line indicates the position of the subpolar front (Xi et al., 2022; Zhao et al., 2016)." in the title of Figure 1.

Figure 2: Reduce the size of dots. List the equation of linear regression in the figure.

Revised.

Figure 3: Reduce the color range from 0.2~5 to 0.3~3 or some others that can emphasize the difference. Add the contour of 0.55 as a reference like Figure 4.

Revised.

Figure 4: Reduce the color range from 0.1~10 to 0.1~6 or some others that can emphasize the difference.

Revised.

The same colorbars should be applied respectively for spring bloom / fall bloom in Figure 11.

Revised.

Define PAR in the abstract at their first appearance. And it was wrongly spelled as PAT.

Revised.