We thank for the constructive suggestions. The comments are fully considered in the revised manuscript accordingly. Below are our response to the comments one by one.

Review #3:
This paper explores the mechanism for phytoplankton bloom off the west coast of the Taiwan Strait in winter. The authors use the ROMS-based coupled physical-biological model to simulate the observed offshore bloom in winter in the TWS and claim that the bloom is induced by stratification of the water column and the offshore transport of nutrient carried in the coastal jet driven by the NE monsoon during relaxation of the northeasterly. The scientific arguments are reasonable but very qualitative. Hence, there is plenty of room for improvement towards more quantitative and rigorous discussion. The writing of the paper serves the purpose, though language editing would be desirable to improve readability and clarity.

The offshore phytoplankton bloom in the Taiwan Strait is an interesting phenomenon, which previously observed on several winter cruises, but has yet to be properly explained in terms of the triggering physical and biogeochemical conditions. The authors have conducted numerical experiments to explore the physical and biological processes behind the observed blooms. However, very little detailed information is provided as how the model is driven and how sensitive the model is to the forcing and boundary conditions. While the authors focus their efforts mostly on the model results and derived quantities from the model output, almost no quantitative comparisons have been made between the model variables and observations. Therefore, it is not clear how representative the numerical experiment is in terms of resembling the reality. This paper will be more convincing, if the authors can properly address a few key points described below.

Q-1. Model setup: The wind forcing functions for the control and the case study should be shown in greater detail. It is necessary to compare the wind forcing with actual wind field shown in the two observational cases so as to demonstrate that the wind forcing can reasonably represent the wind relaxation condition in the TWS. The values of the parameters used in the model should be listed in an electronic supplement. In addition, light is also critical to phytoplankton growth, but nothing is mentioned about the variation in short wave radiation or PAR. It is reasonable to speculate that short wave radiation may be stronger during NE wind relaxation as the weather is usually nicer. How this contributes to algal growth is worth investigation in the numerical experiment.
Response: In the manuscript, we use an artificial wind field to represent the relaxation of the northeasterly wind, called relaxed-wind case. The artificial wind is interpolated linearly from climatological wind to 1/4 of the climatological wind in the TWS. Meanwhile the model result forced by the climatological wind is compared with the relaxed-wind case. Nevertheless, we accept your advice. The model is re-run with 6-hourly NCEP wind in1998. The model result is shown in Fig 1, which resembles the result (Fig 2) with the artificial wind forcing.
We will add the detailed descriptions of the NPZD model and the parameters setting in the revised manuscript.
When the model is forced by the NCEP data, the variation of the short wave radiation is considered in the model. From the Fig 3, it shows short wave radiation obviously increases on 1 March, 1998, which accelerates the phytoplankton growth and the bloom occurrence in the strait.

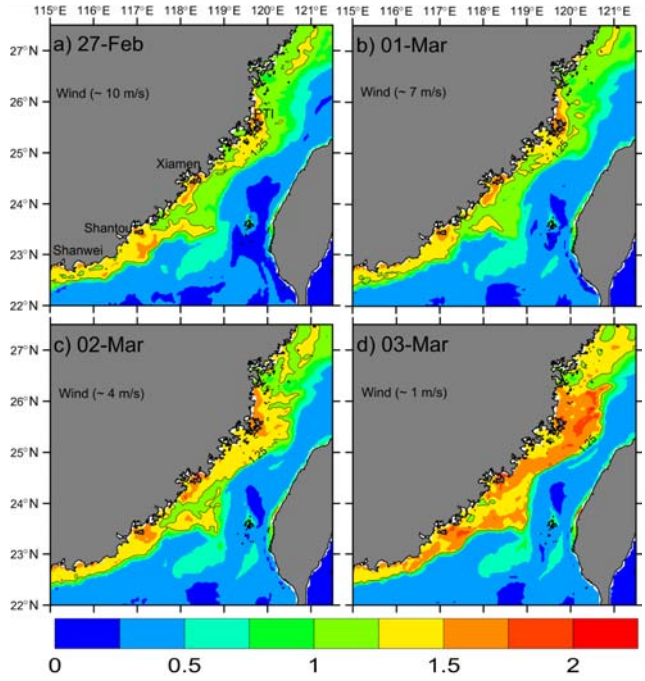

Fig 1. Simulated surface chlorophyll distributions in 1998.

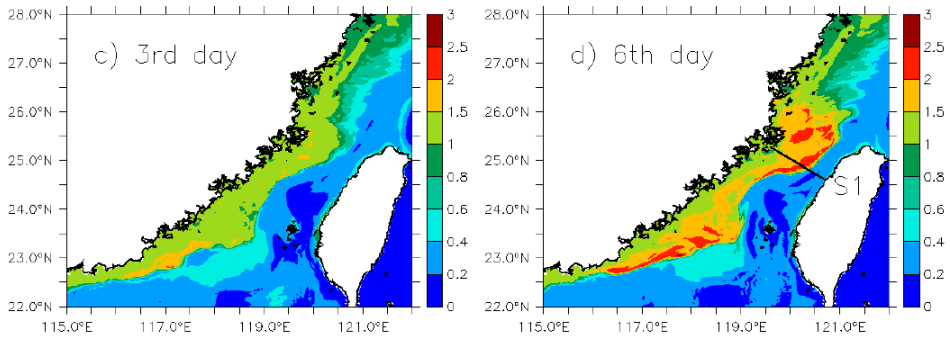

Fig 2. Simulated surface chlorophyll distributions with artificial wind.

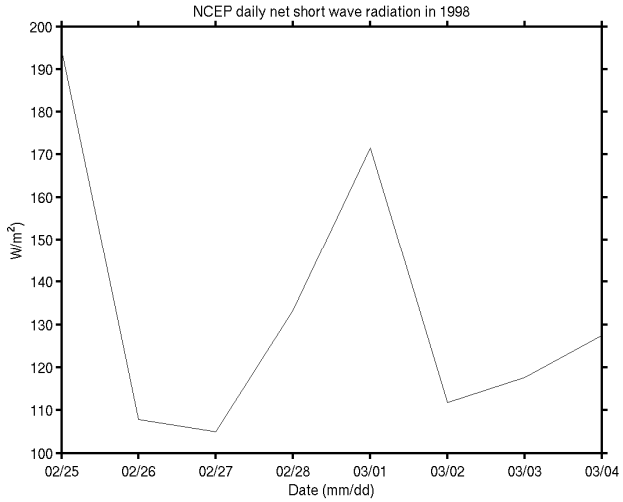

Fig 3. Daily net short wave radiation of NCEP data in the TWS.

2. Model output: The model output, especially, the nutrient distributions, should be compared with observations in greater detail, because the authors argue that eastward dispersion of nutrients carried in the coastal current is one major reason for the phytoplankton bloom during NE wind relaxation. While the title refers to initiation of the algal bloom, the authors should provide a criterion to mark the initiation of the algal bloom. If they are able to do so, they may check on the critical turbulence condition, whether the initiation of the bloom occurs when mixing is reduced to the critical value.

Response: Thank you for your suggestion. We will give more description about the model result compared with observed nutrients in the revised manuscript. The argument of the eastward dispersion of nutrients can be indicated by the comparison of nutrient distributions in strong wind and relaxed wind cases.

Fig.12 in the MS indicates the critical turbulence is about 2×10^{-2} m^2/s at 80 km offshore; in the relaxed wind case when mixing is lower than it the initiation of the bloom occurs, otherwise in the climatological case when mixing is higher the bloom is inhibited. We will add this in the revised paper.

More specific comments may be found in the attached marked pdf file.

Response: Thank you for the detailed corrections.