This manuscript investigates the spatial and temporal responses of chlorophyll-a to spring dust optical depth across the Chinese marginal seas from 2003 to 2023. By utilizing daily anomalies from reanalysis products and a reconstructed gap-filled Chl-a dataset (OCNET), the study delivers an important and timely message: synoptic-scale atmospheric forcing and air–sea heat exchanges act as crucial physical pathways modulating regional upper-ocean stratification and biological variations, rather than focusing solely on the commonly studied nutrient fertilization effects. The manuscript is generally well-written, clearly structured, and addresses a topic of significant relevance to marine atmospheric chemistry and coastal ecology.

The contrasting patterns discovered between the Northern Region (cyclone-induced warming and moisture leading to initial Chl-a suppression and delayed enhancement) and the Southern Region (anticyclone-induced cooling and drying leading to rapid mixed-layer deepening and immediate Chl-a increase) are scientifically compelling and robustly analyzed. Overall, the manuscript is suitable for publication in the journal after addressing a small number of minor comments. In particular, some technical descriptions would benefit from enhanced clarity, and the quantitative interpretations should be slightly tempered given the uncertainties inherent in the reanalysis products. These are relatively minor issues that can be readily addressed in revision.

Specific comments

Regarding data and methodology clarification, the authors utilize the OCNET neural network ensemble to generate a gap-free daily Chl-a product. Although the dataset shows strong overall agreement with satellite-derived Chl-a, the present analysis focuses on optically complex coastal waters and short-lived dust events. Please clarify whether, and if so how, OCNET performance has been evaluated for Chinese marginal seas and under high-DOD conditions, when the original ocean-colour retrievals may be limited or affected by aerosol contamination. A brief discussion of potential smoothing of localized episodic extremes and the resulting uncertainty in event-scale Chl-a anomalies would help contextualize confidence in the short-term responses.

Line 47: “Sea of Japan” should be revised to “Sea of Japan / East Sea.” Including “East Sea” follows international naming practice and improves geographic neutrality and accuracy.

Line 57: "though the response vary" -> "though the responses vary"

Line 91: "which obtained from" -> "which was obtained from".

Line 175: “response to dust” → “responses to dust”

Line 344: "contribute comparatively minimal" -> Please revise to "contribute comparatively minimally".

Figure 1: It would be helpful to label the locations of major regional seas, such as the Bohai Sea and Yellow Sea, on the map to improve readability of the study area.

Figure 8: The temporal ordering of the lag-day bars is not immediately clear. Please add explicit lag-day labels or ticks to make the evolution from lag 0 to lag 10 easier to interpret.