

[1] Figure panel labels, it is customary to place the labels (a)(b)(c)... in the upper left corner (either inside or outside) of each panel: Figs. 2, 4, 7, 8, 9, 11, 12, 13, 14, 15, 16, and more in the supplementary material.

Response: The panel labels have been moved to the upper left corner of all relevant figures in both the manuscript and supplementary materials.

[2] P.24, L.9, What is "NS" in the parentheses?

Response: NS refers to a nonlinear system. We have revised the manuscript accordingly to read “an ill-posed nonlinear system problem.”

[3] Figure 7, I understand the last sentence in the caption has been added in response to a comment by Reviewer 2, but the term 'inverse normalization' is still not clear to oceanographers outside of the field. Is it possible to rewrite this? For example, an SST of 20 degrees in Subregion 1 will be  $20 / (35.75 - (-1.5)) = 0.54$  (Table 1). It is not clear to me where this 0.54 goes on Figure 7 (as well as Fig.14).

Response: We appreciate this comment. In the data preprocessing stage, all input variables were normalized using max-min scaling to reduce unit inconsistencies. However, for the purpose of physical interpretability in evaluation and visualization, we applied an inverse max-min transformation to recover the original physical units before plotting.

As a result, Fig. 7 (and Fig. 14) display reconstructed values in physical space (e.g., SST = 20 °C), while normalized values (e.g., 0.54) exist only in the model's internal feature space and are not directly shown in the figures.

We have revised this part as: “Values are shown in their original physical units after inverse max-min normalization, using the parameters provided in Table 1: SST in °C, SCHL in mg/m<sup>3</sup>, and SSW in m/s.”

[4] With regard to the “Author contributions” section, we kindly ask you to use the authors' initials rather than their full names in the next revision.

Response: We have revised the “Author contributions” section accordingly and replaced the full author names with their initials, as requested by the reviewer.

[5] Please re-label supplement materials according to our standards: <https://www.ocean-science.net/submission.html#assets> > Supplements. As for an example, Fig.1 must be labelled as Figure S1, etc.

Response: According to the requirements in <https://www.ocean-science.net/submission.html#assets>, we have revised the supplementary material and renumbered all figures as Fig. S1-S5.