Response to RC2

Title: "Biogeochemical Layering and Transformation of Particulate Organic Carbon in the Tropical Northwestern Pacific Ocean Inferred from $\delta^{13}C$"

In this document, we present the response to Referee's comments repeated in blue.

Thank you very much for your constructive feedback and valuable suggestions.

1. I appreciate the fact that a T-S diagram has been provided. The depth scale in color gradient is not really necessary as it renders the reading of the graph more difficult and since in any case isopycnals are shown. So, either remove the depth scale or consider plotting another parameter instead of depth (DIC, d13C, or may be try plotting nitrate or phosphate, for which you have data).

We appreciate your suggestion regarding the depth scale in the T-S diagram. In response, we have revised the diagram by removing the depth scale (Fig. 1). We believe this enhances the clarity of the water mass distribution.

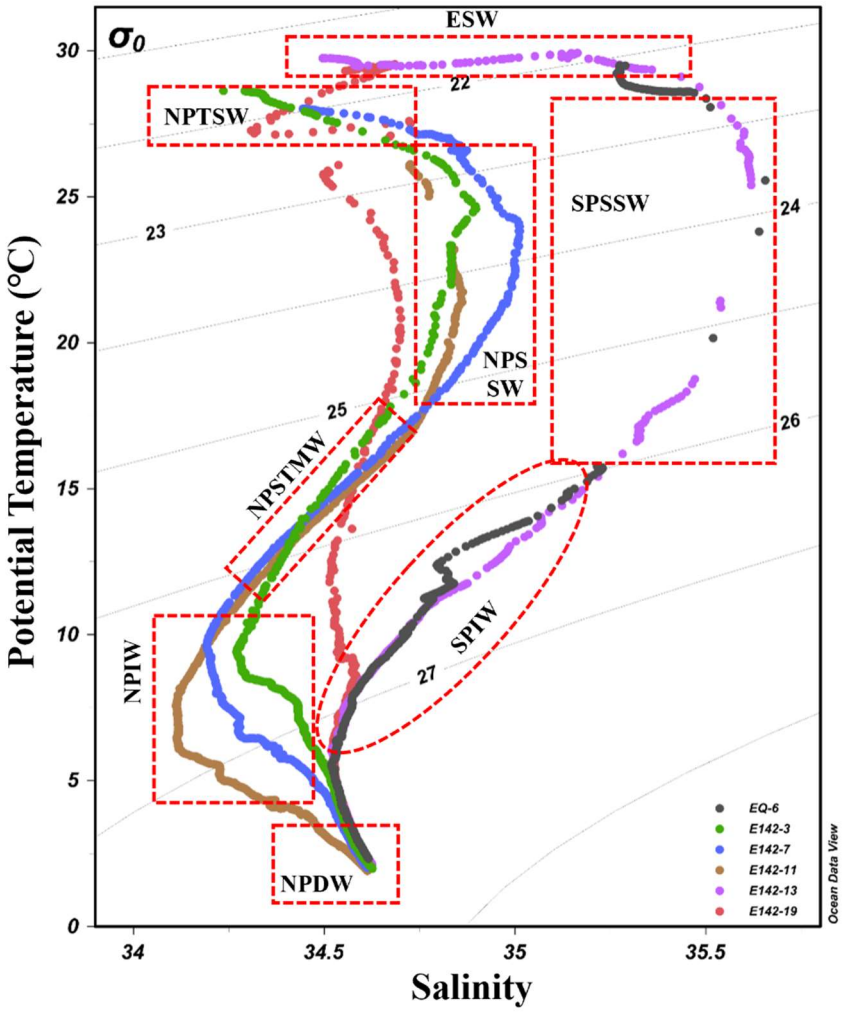

Figure 1. Relationship between potential temperature (θ) and salinity (S) at each sampling station. The water mass distribution is marked with a dotted line. (Source: Tian et al. (2025), manuscript under review)

2. You mention NPSSW, which does not appear in the T-S plot; do you mean NTPSSW?

We apologize for the error in the T-S plot, where NTPSSW was incorrectly labeled. We have corrected this to NPSSW, as originally intended (Fig. 1).

3. In order to address my concern about absence of discussion how water masses might possibly affect the vertical distributions of studied parameters, I wonder whether you could indicate the position of the different water masses present at each of the stations (vertical profiles in Figs 2 and 4).

Thank you for your valuable feedback. In response, we have updated Figures 2 (Fig. 2) and 4 (Fig. 3) to include the vertical distribution of different water masses at each station. This addition aims to better illustrate the influence of water masses on the vertical profiles of the parameters under investigation. We hope these revisions adequately address your concern.

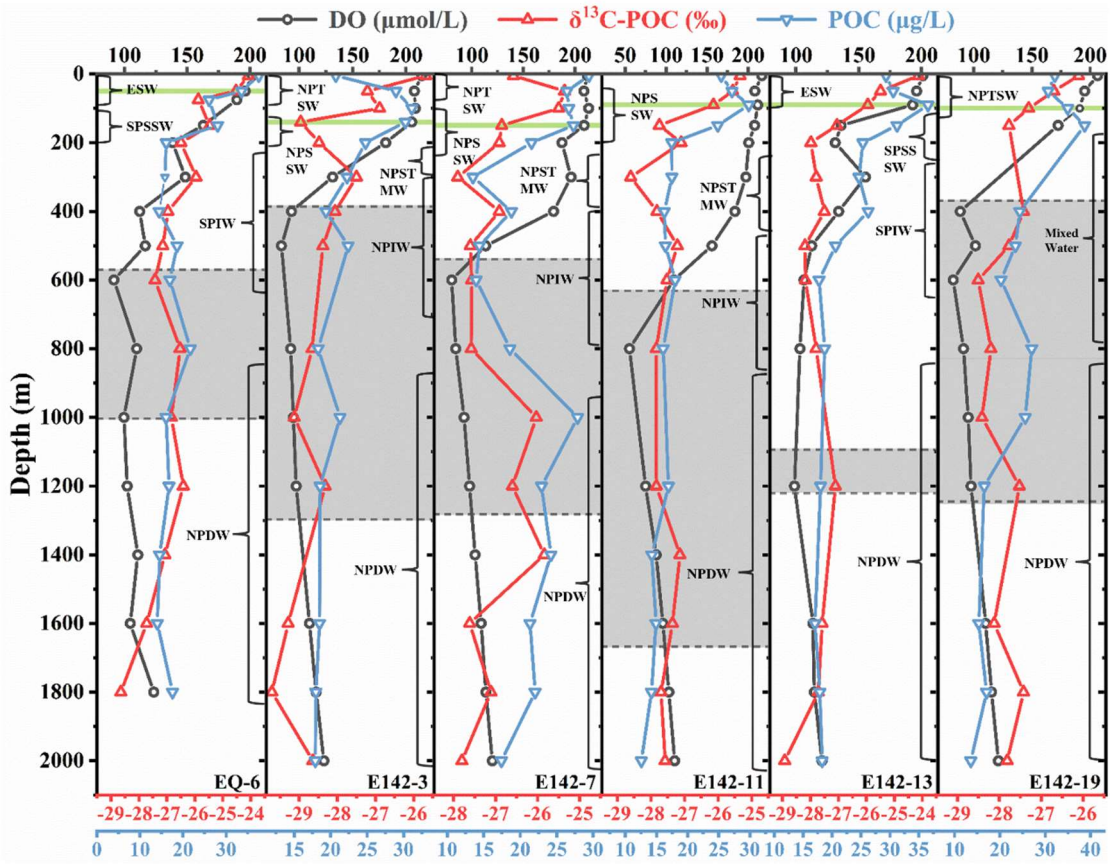

Figure 2. Vertical distribution of DO, δ^{13}C-POC, and POC concentration at each sampling station. The gray area marks the hypoxic zone with DO = 100 μmol/L as the boundary. The green line represents the DCM depth.

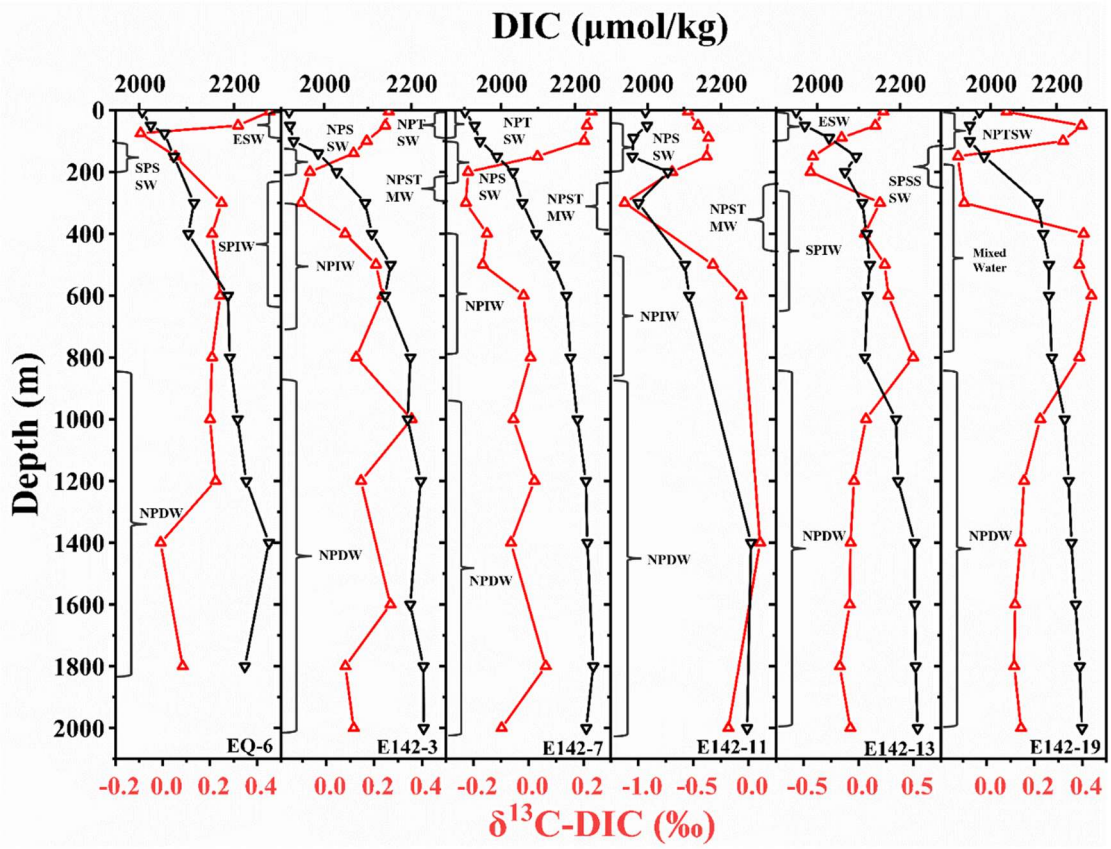

Figure 3. Vertical distribution of DIC concentration and δ^{13}C-DIC at each sampling station. The black line represents DIC, and the red line represents δ^{13}C-DIC.

4. In Fig. 1 you show an arrow marked 'NGCUC' along the PNG coast. It was not identified and discussed.

We appreciate your attention to detail regarding the 'NGCUC' in Figure 1. We have removed the label to avoid confusion (Fig. 4).

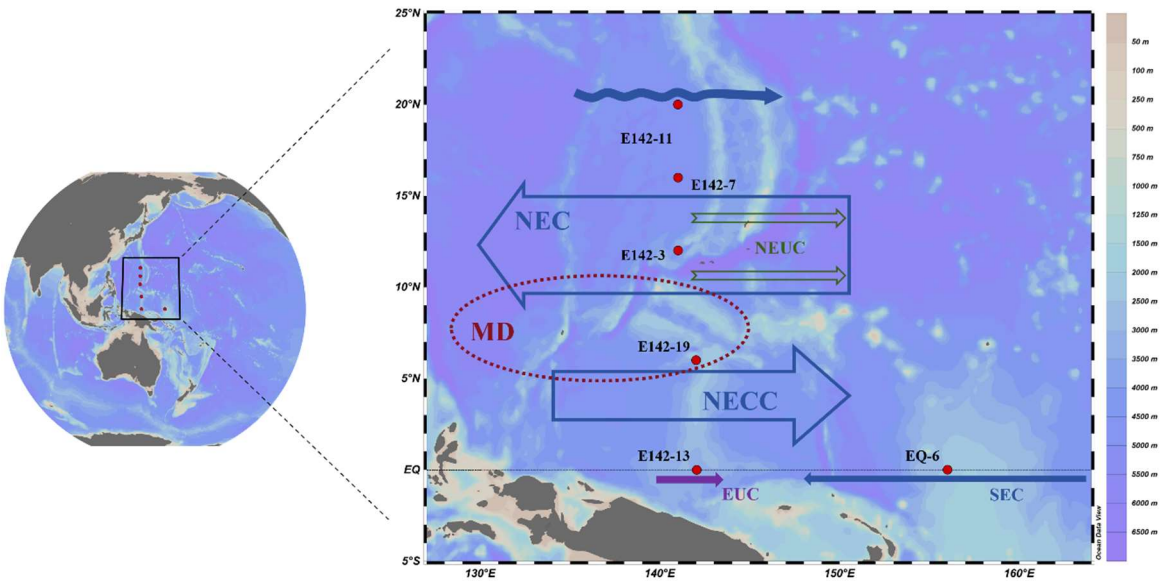

Figure 4. TPWO sampling stations (red dots in the figure) and ocean current distribution. In the figure, blue represents the ocean currents from the surface to the bottom of the thermocline, mainly STCC, NEC, NECC, and SEC; green represents the ocean currents in the subthermocline, mainly NEUC; purple represents the ocean currents from the bottom of the thermocline to the subthermocline, mainly EUC.

We hope these revisions effectively address your concerns. Once again, we are grateful for your thoughtful comments.