Supplemental materials for:
Ocean biogeochemistry in the Norwegian Earth System Model version 2 (NorESM2)

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1   Content descriptions

This supplementary materials contains plots of quasi-conservative climatology PO (phosphate-oxygen) tracer for the Atlatic section from observations and NorESM models. In addition, plots of climatology fields similar to that in the main document, but from NorESM2-LM model version are presented.

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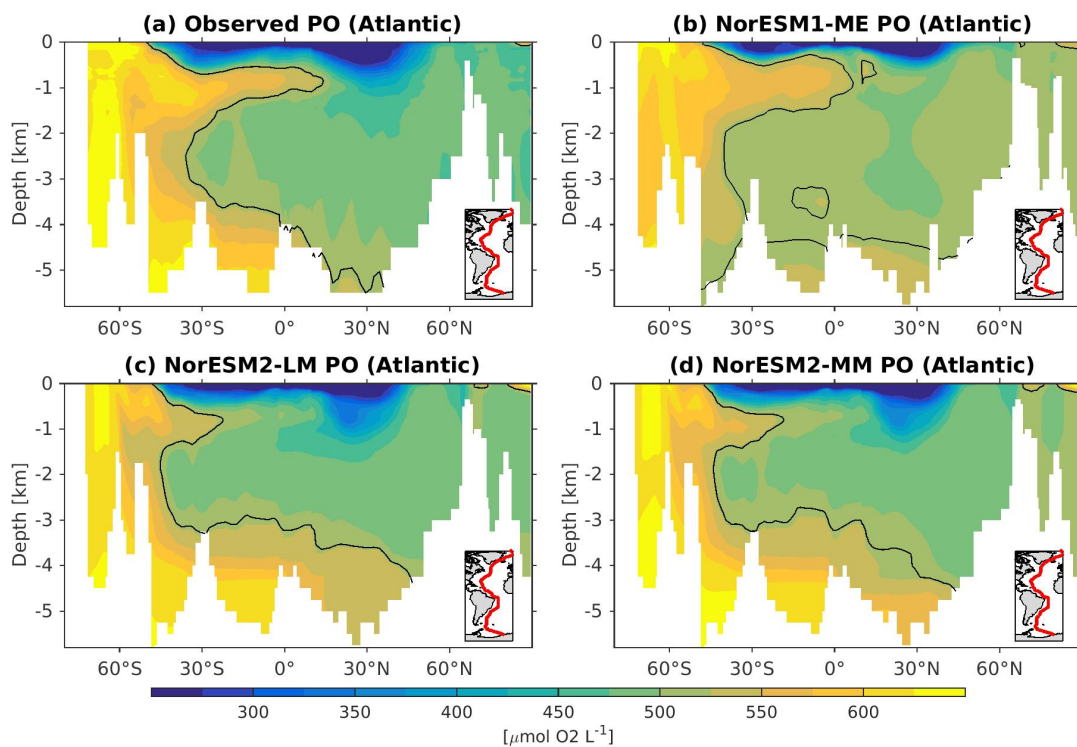
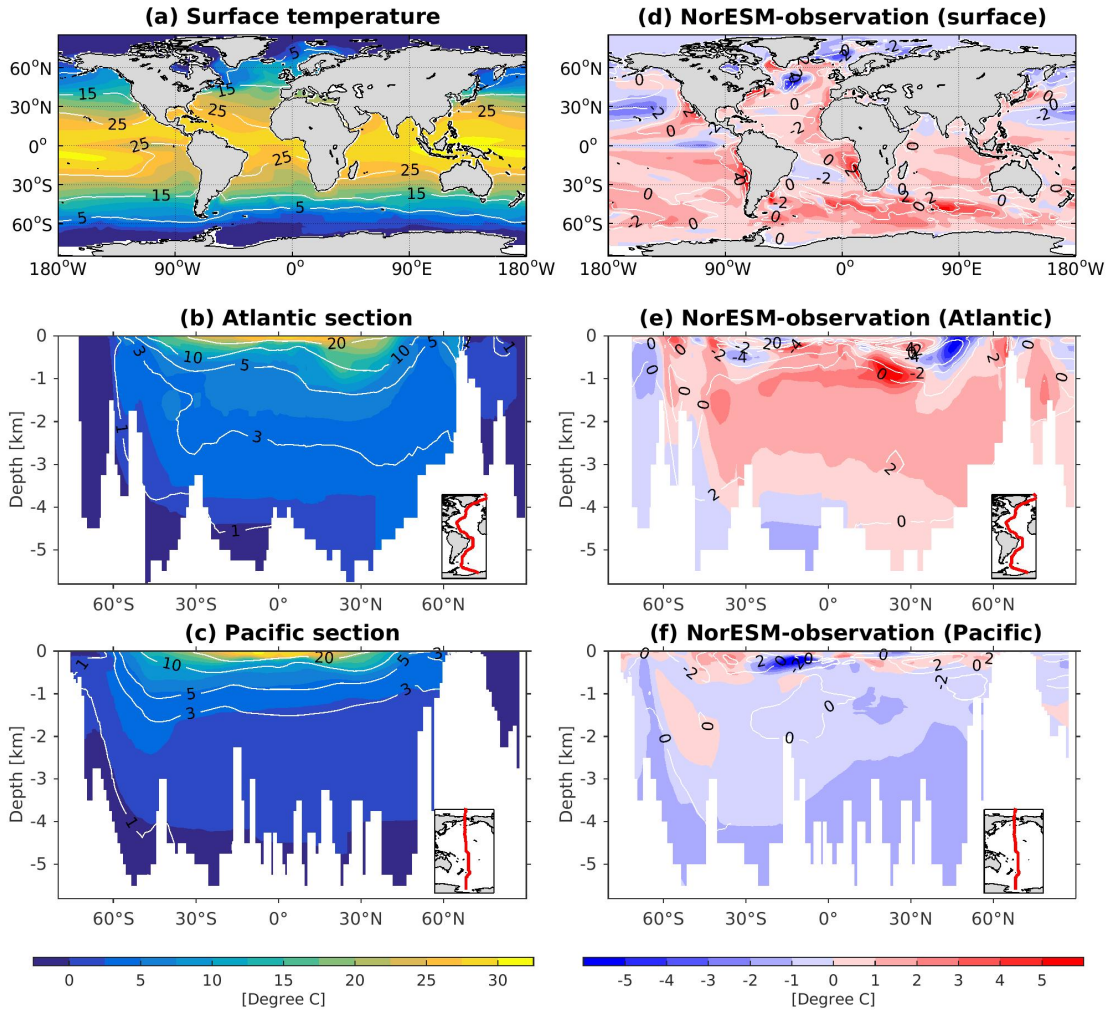
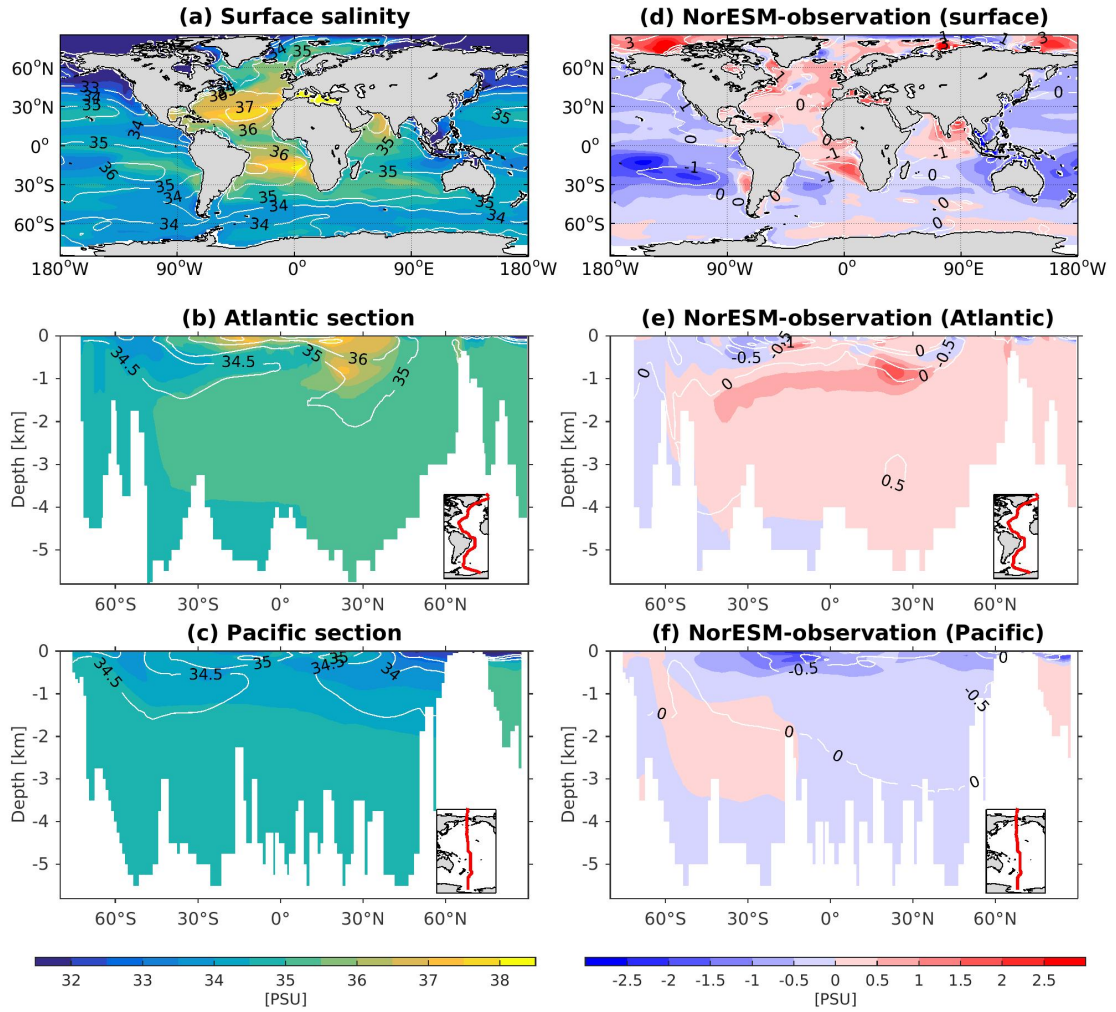
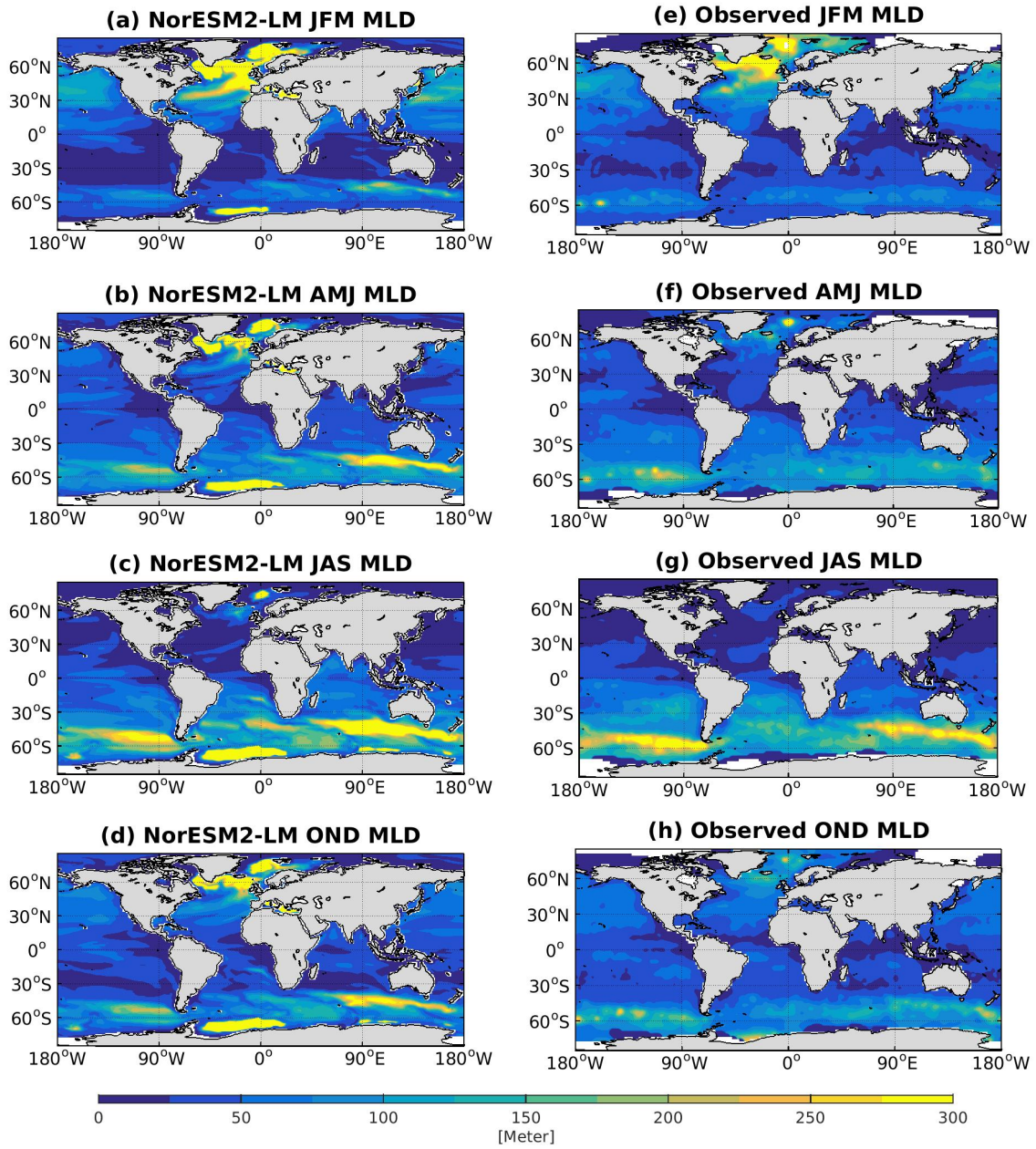
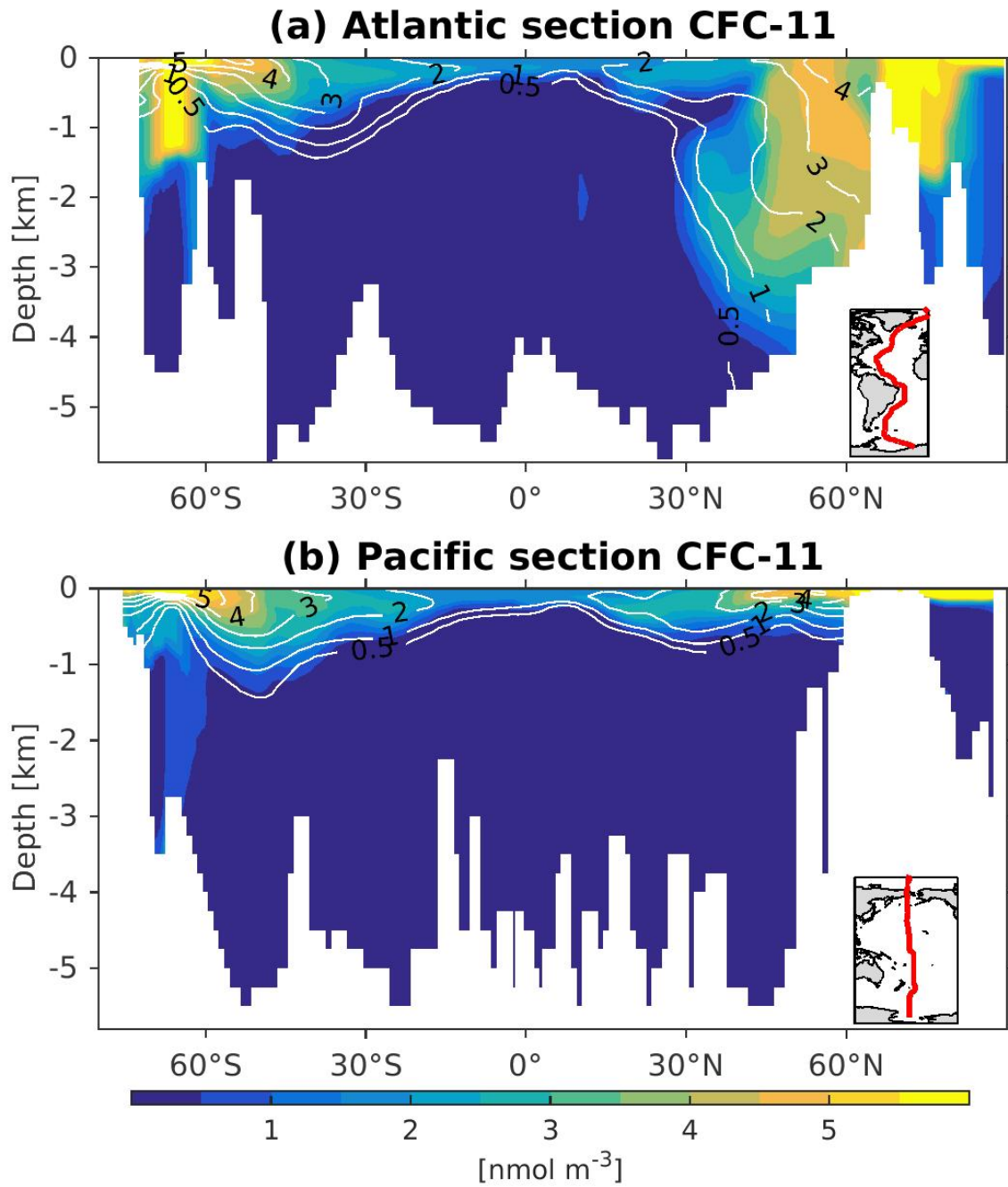
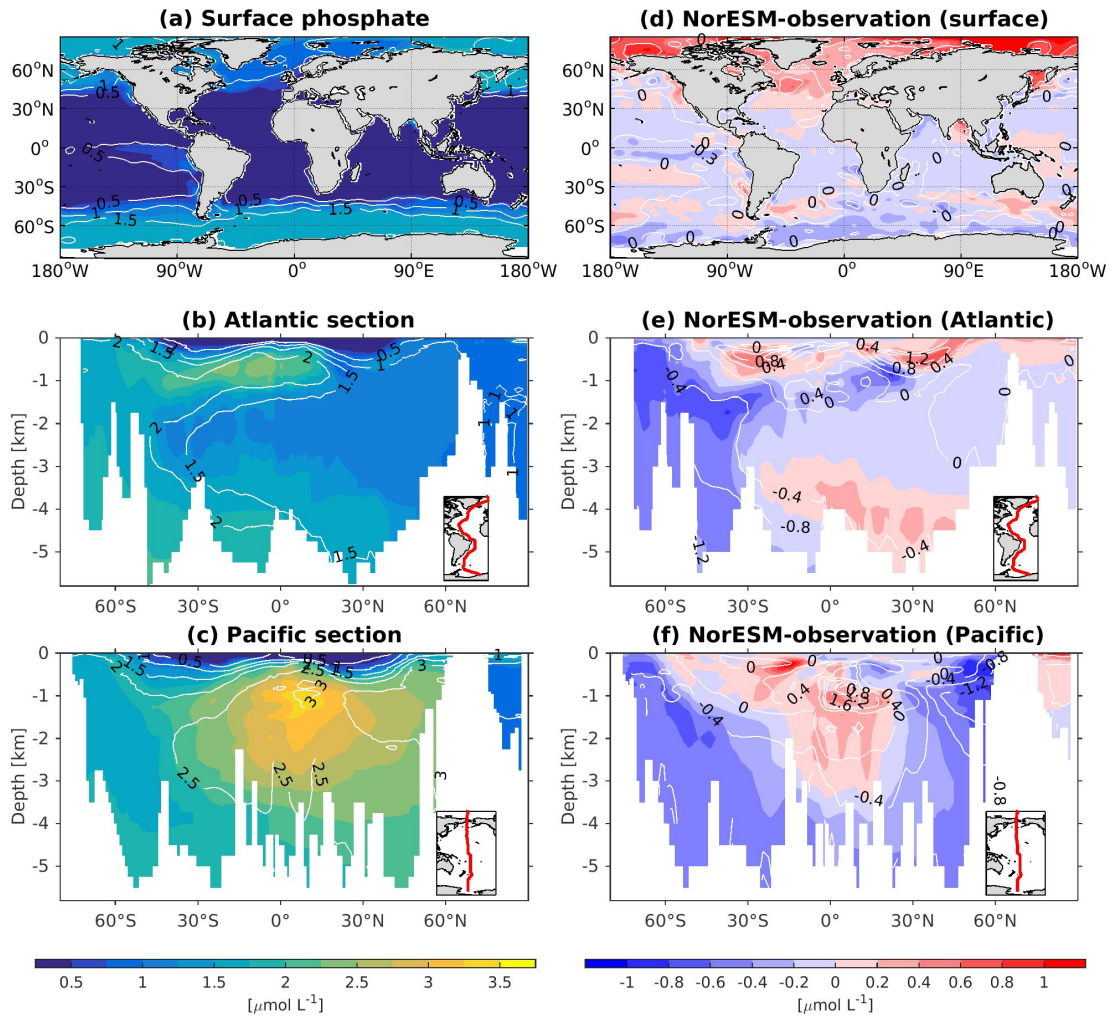
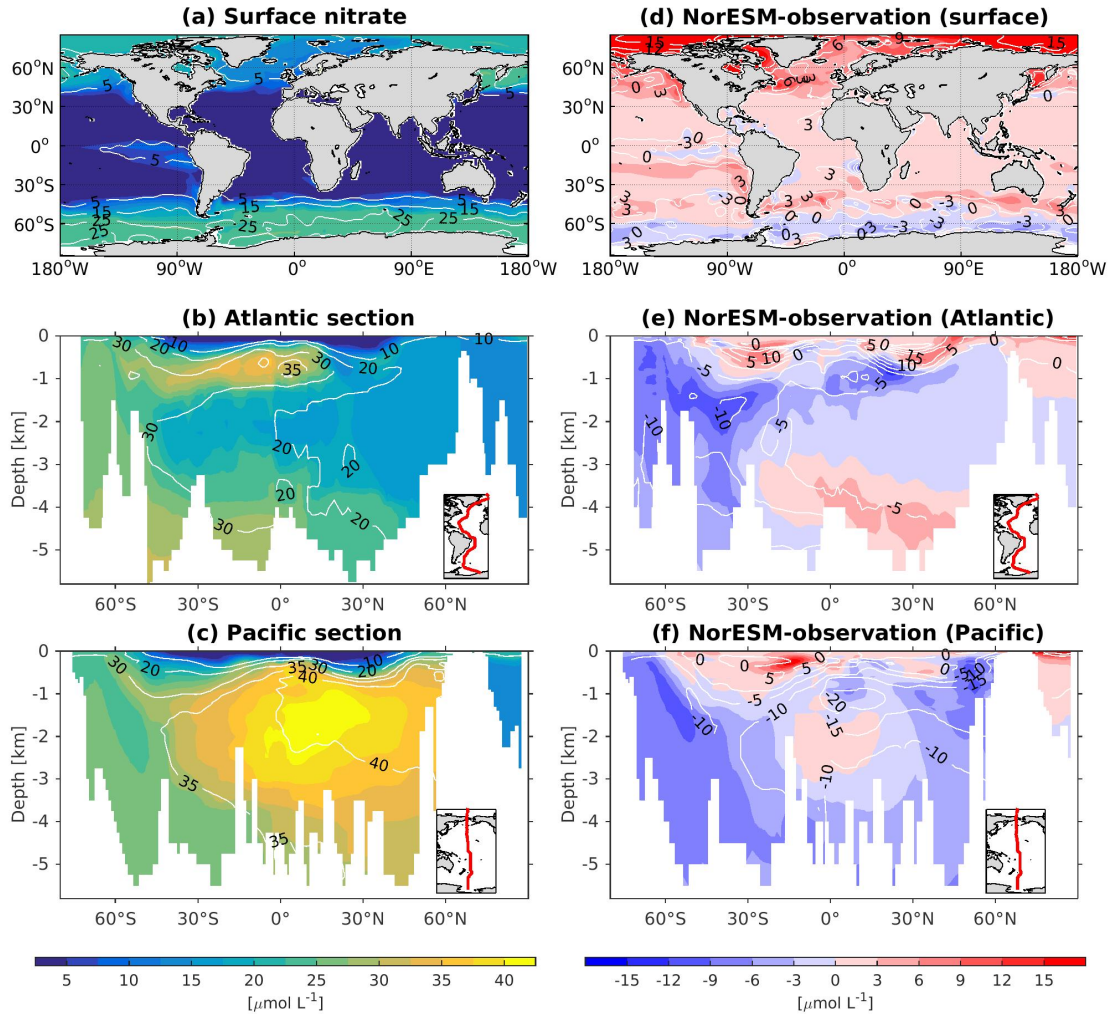
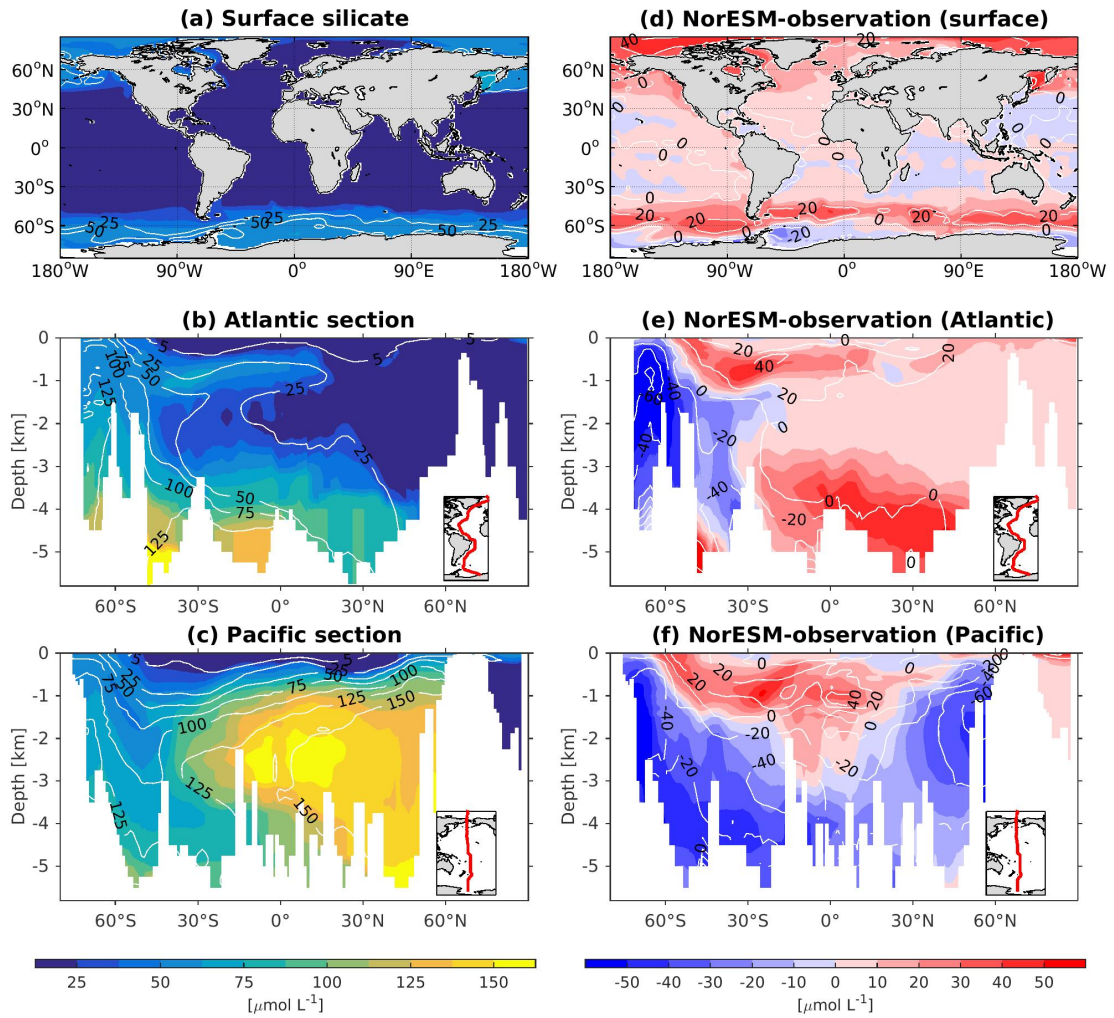
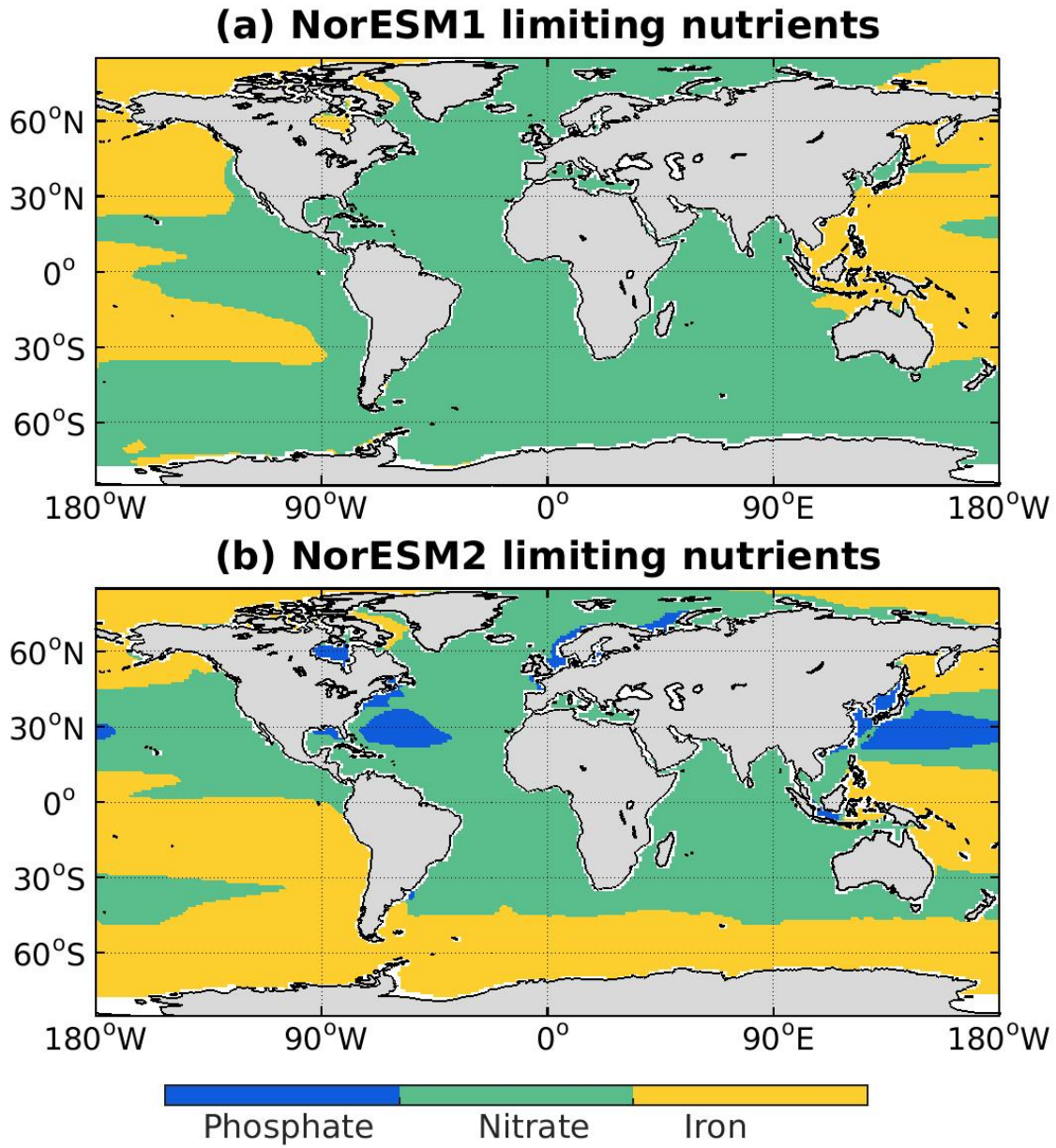
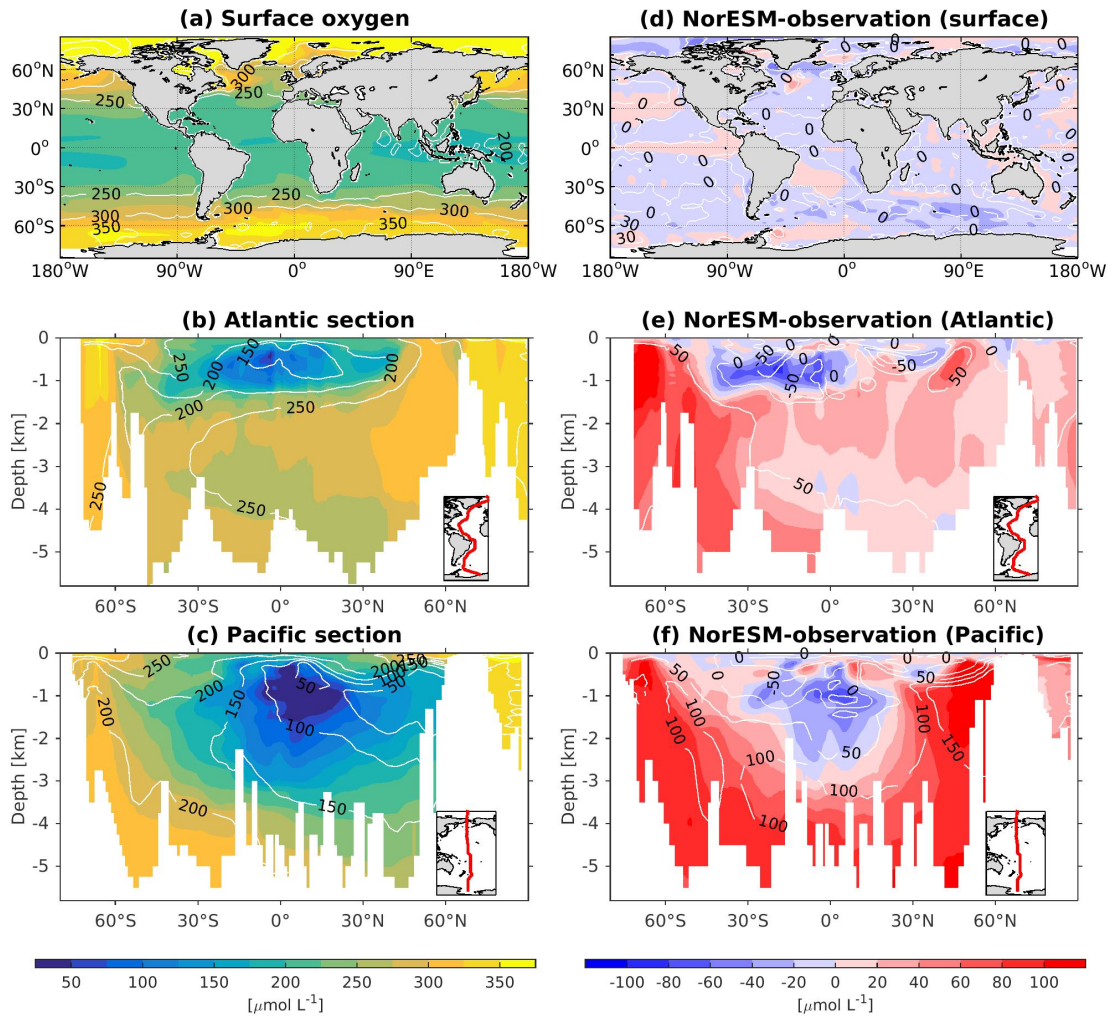
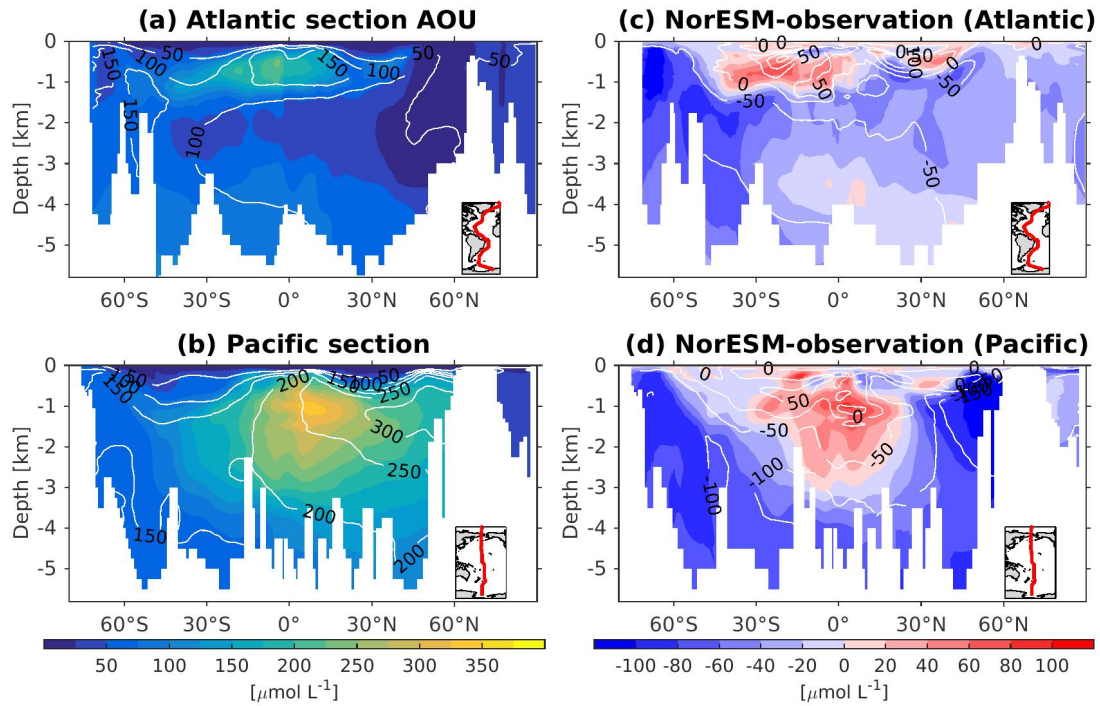
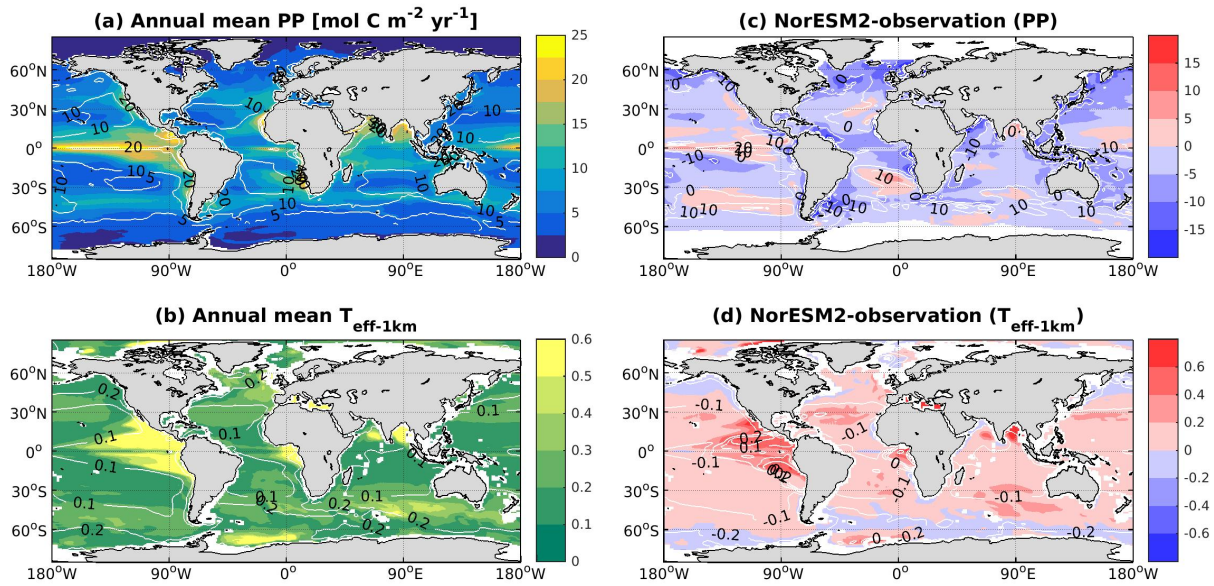
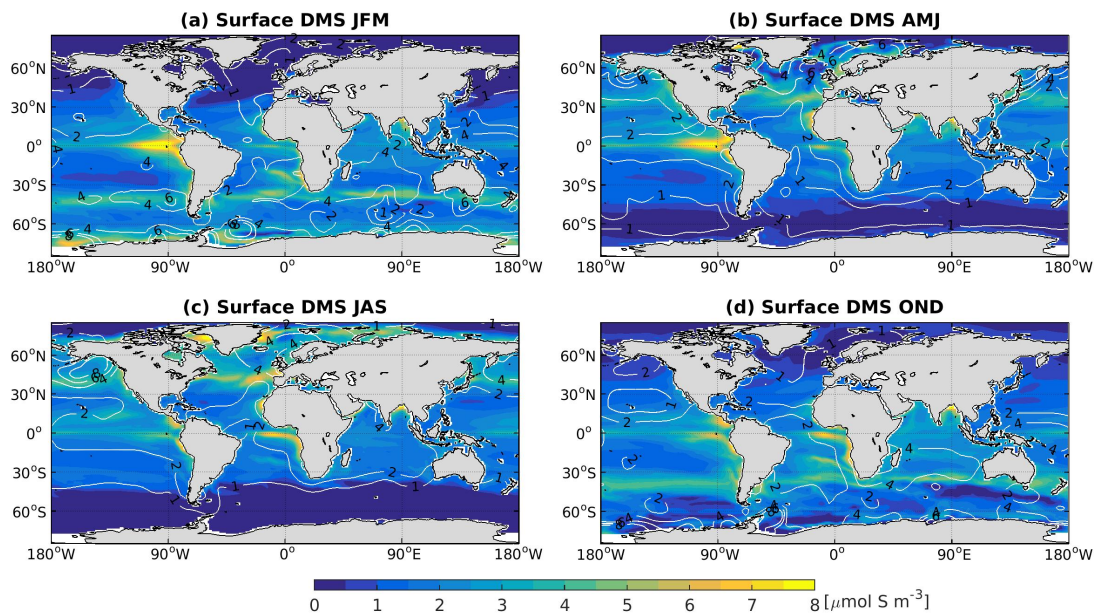
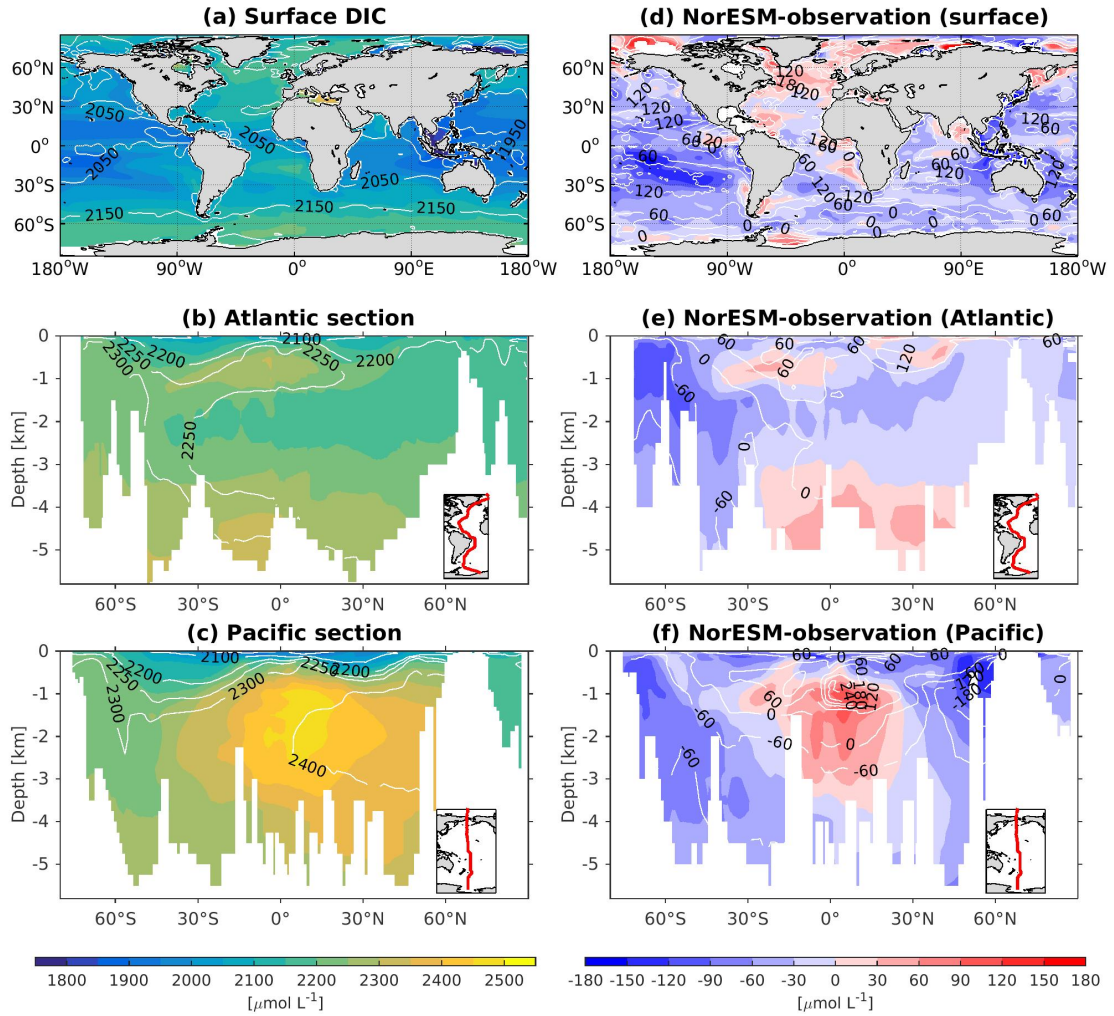
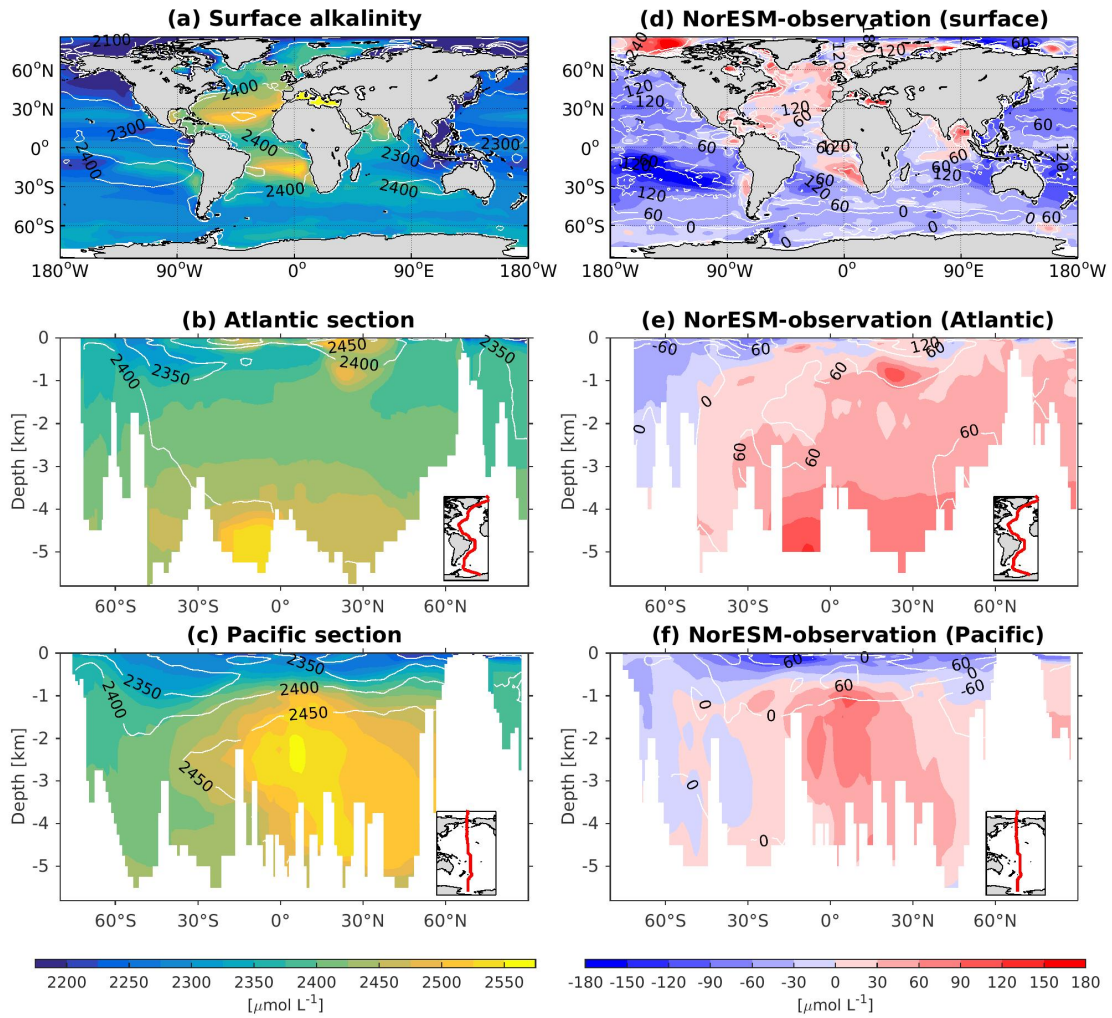
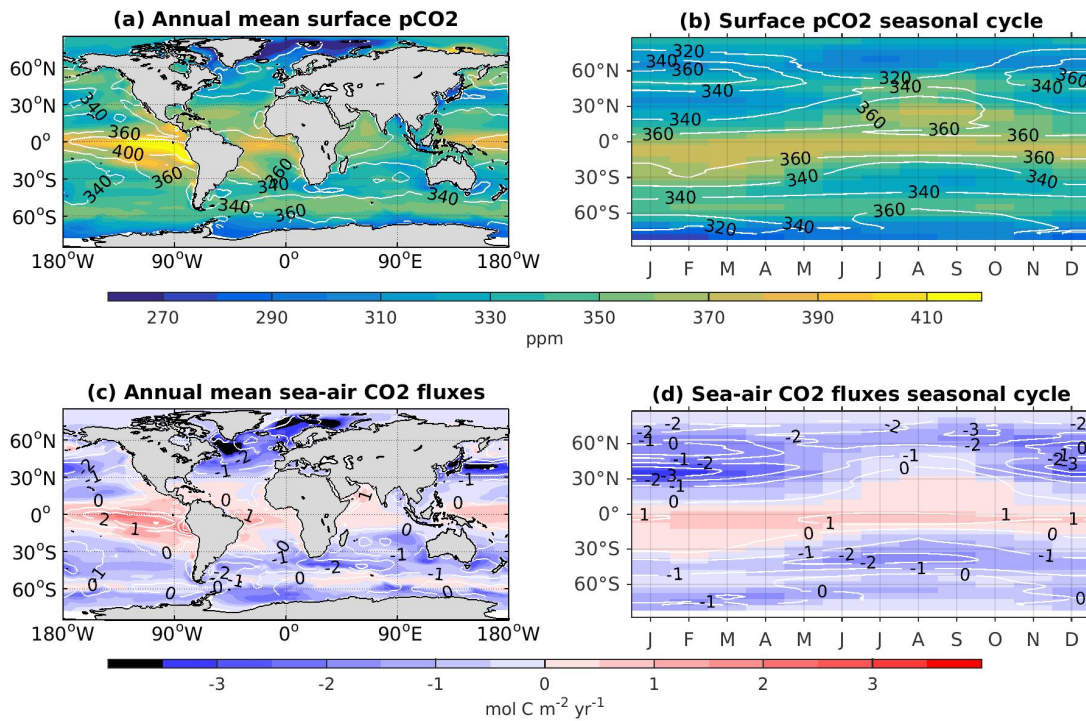
2 Figures

Supplemental Figure S1. Atlantic section plot of PO (phosphate-oxygen) tracer from observations and different NorESM model versions. Black contour lines depict value of 520 μmol O_2 L^{-1}, which approximately illustrate the boundary separating the northern source water and the southern source water in the interior.

Supplemental Figure S2. Climatology temperature values at the (a) surface and across the vertical sections of (b) Atlantic and (c) Pacific from NorESM2-LM (color-shadings) and observations (contour lines). Difference between NorESM2 (NorESM1) and observations are shown in color-shadings (contour-lines) in panels (d)-(f).

Supplemental Figure S3. Same as Fig. S2 but for salinity.

Supplemental Figure S4. Climatology seasonal mixed layer depth as (left-column) simulated in NorESM2-LM and (right-column) estimated from from observations.

Supplemental Figure S5. Same as Fig. S2 but for CFC-11 tracer.

Supplemental Figure S6. Same as Fig. S2 but for phosphate concentrations.

Supplemental Figure S7. Same as Fig. S2 but for nitrate concentrations.

Supplemental Figure S8. Same as Fig. S2 but for silicate concentrations.

Supplemental Figure S9. Maps of limiting nutrients for biological productivity as simulated in (a) NorESM1-ME and (b) NorESM2-LM.

Supplemental Figure S10. Same as Fig. S2 but for dissolved oxygen concentrations.

Supplemental Figure S11. Climatology apparent oxygen utilization (AOU) values across the vertical sections of (a) Atlantic and (b) Pacific from NorESM2-LM (color-shadings) and observations (contour lines). Difference between NorESM2-LM (NorESM1-ME) and observations are shown in color-shadings (contour-lines) in panels (c)-(d).

Supplemental Figure S12. Annual mean (a) vertically-integrated contemporary primary production and (b) transfer efficient ($T_{eff-1km}$) as simulated in NorESM2-LM (color-shadings) and from observations (contour-lines). Respective difference between NorESM2 (NorESM1) and observations are shown in color-shadings (contour-lines) in panels (c)-(d).

Supplemental Figure S13. Seasonally-averaged surface concentration of DMS as simulated in NorESM2-OC (color-shadings) and from observations (contour-lines).

Supplemental Figure S14. Same as Fig. S2 but for dissolved inorganic carbon concentrations.

Supplemental Figure S15. Same as Fig. S2 but for total alkalinity concentrations.

Supplemental Figure S16. Surface climatology maps of (a) partial pressure of CO_2 and (c) sea-air CO_2 fluxes together with Hovmöller plots of zonally-averaged seasonal cycle of (b) surface pCO_2 and (d) sea-air CO_2 fluxes as simulated in NorESM2-LM (color-shadings) and from observations (contour-lines).