Biogeosciences

Supplement of

The fate of upwelled nitrate off Peru shaped by submesoscale filaments and fronts

**Jaard Hauschildt et al.**

*Correspondence to:* Jaard Hauschildt (jhauschildt@geomar.de)

Model evaluation

This supplementary material extends the model evaluation in section 2.8 of the main manuscript. The Taylor diagrams in Figure 2 of the main manuscript show the mean pattern correlation of temperature, nitrate, chlorophyll, primary production and mixed-layer depth between simulation and the respective reference datasets. To provide more information about the spatial patterns of these mean biases, the variables themselves and the differences to their reference values are again presented as two-dimensional maps in the following figures.
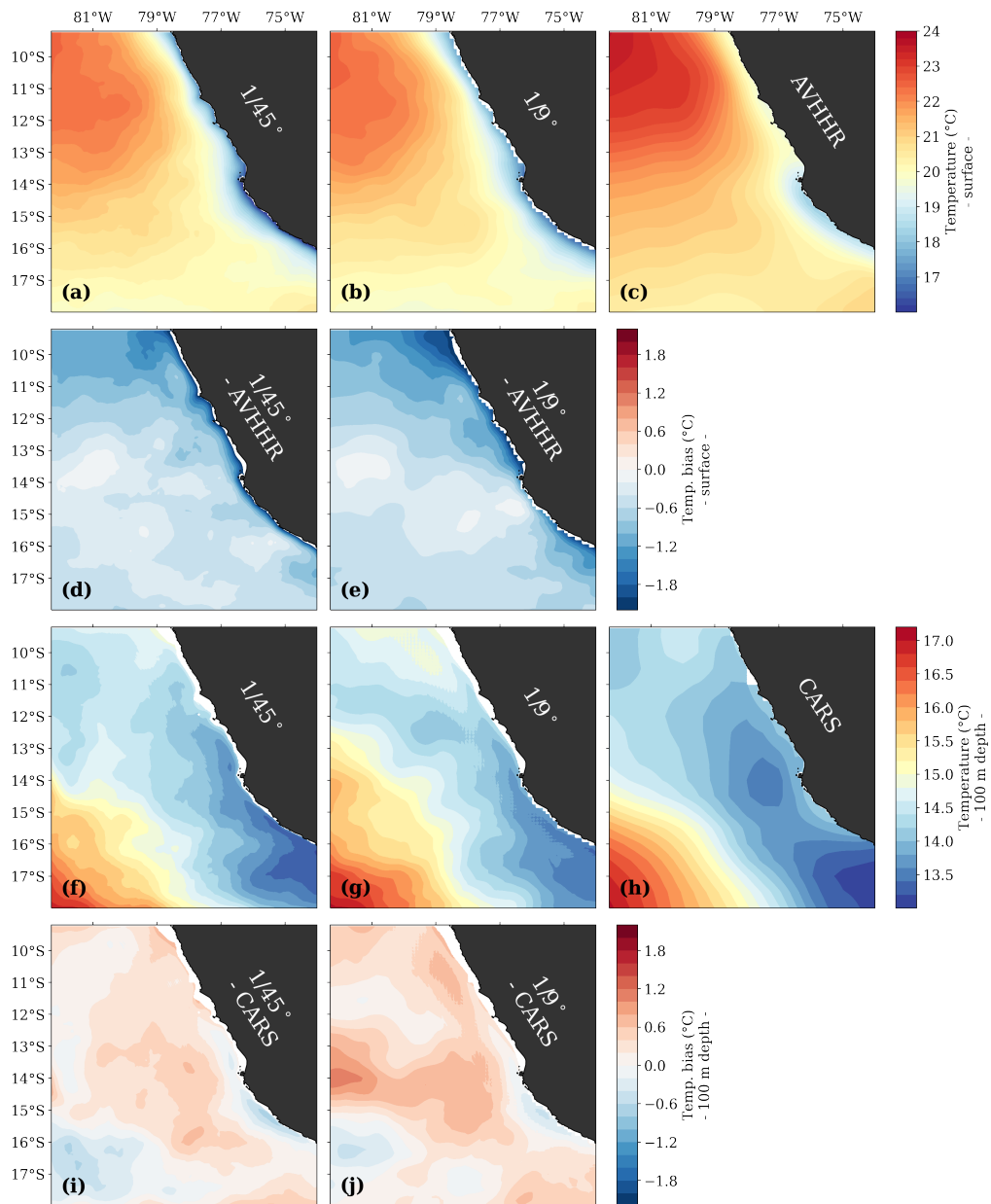
Figure S1. Simulated temperature fields at the surface (a,b) and 100 m depth (f,g) compared with the respective AVHHR (c) and CARS (h) reference values. Panels (d,e) and (i,j) show the differences between the simulated fields and their respective reference values.
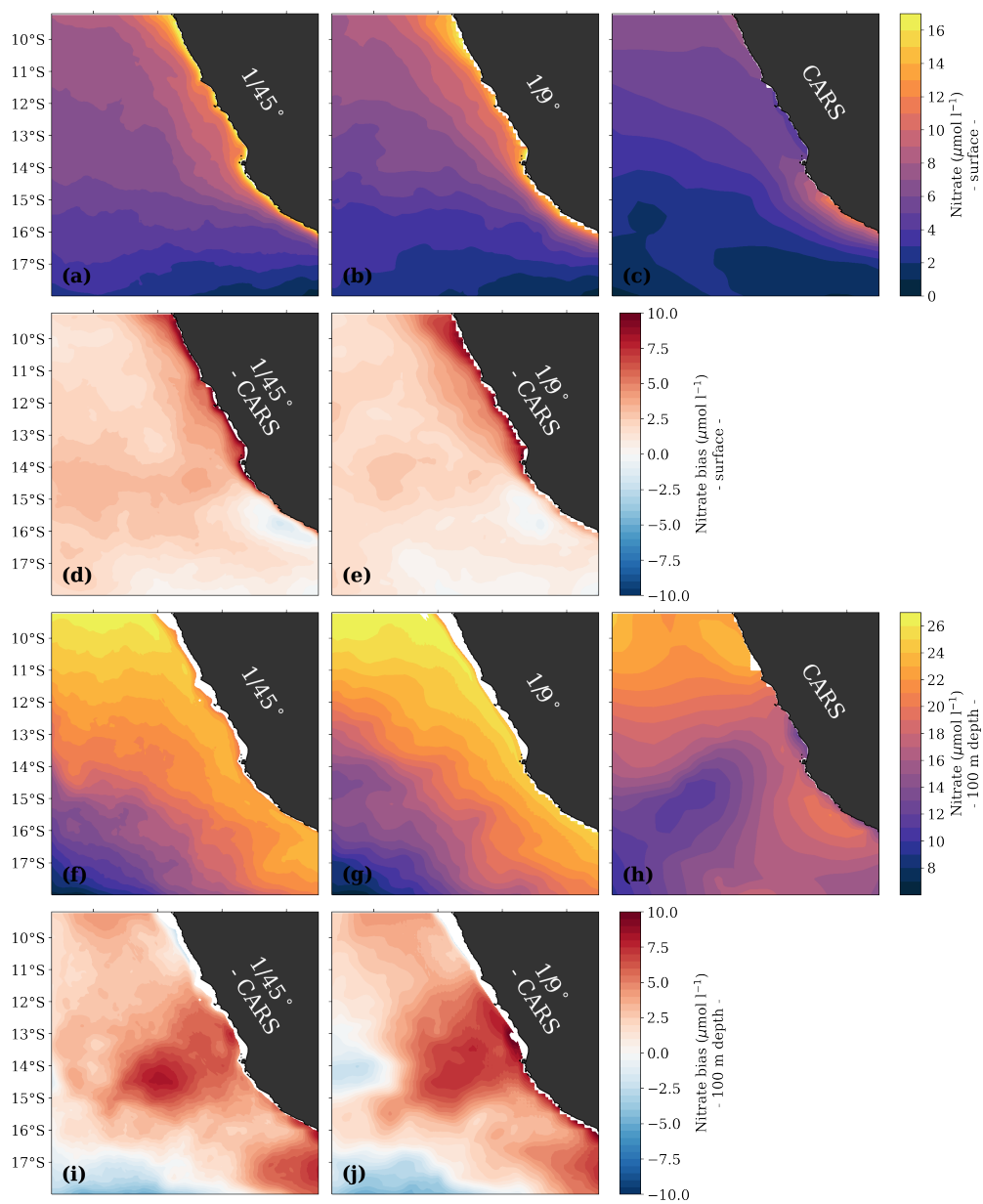
Figure S2. Simulated nitrate fields at the surface (a,b) and 100 m depth (f,g) compared with the respective CARS reference values (c,h). Panels (d,e) and (i,j) show the differences between the simulated fields and their respective reference values.
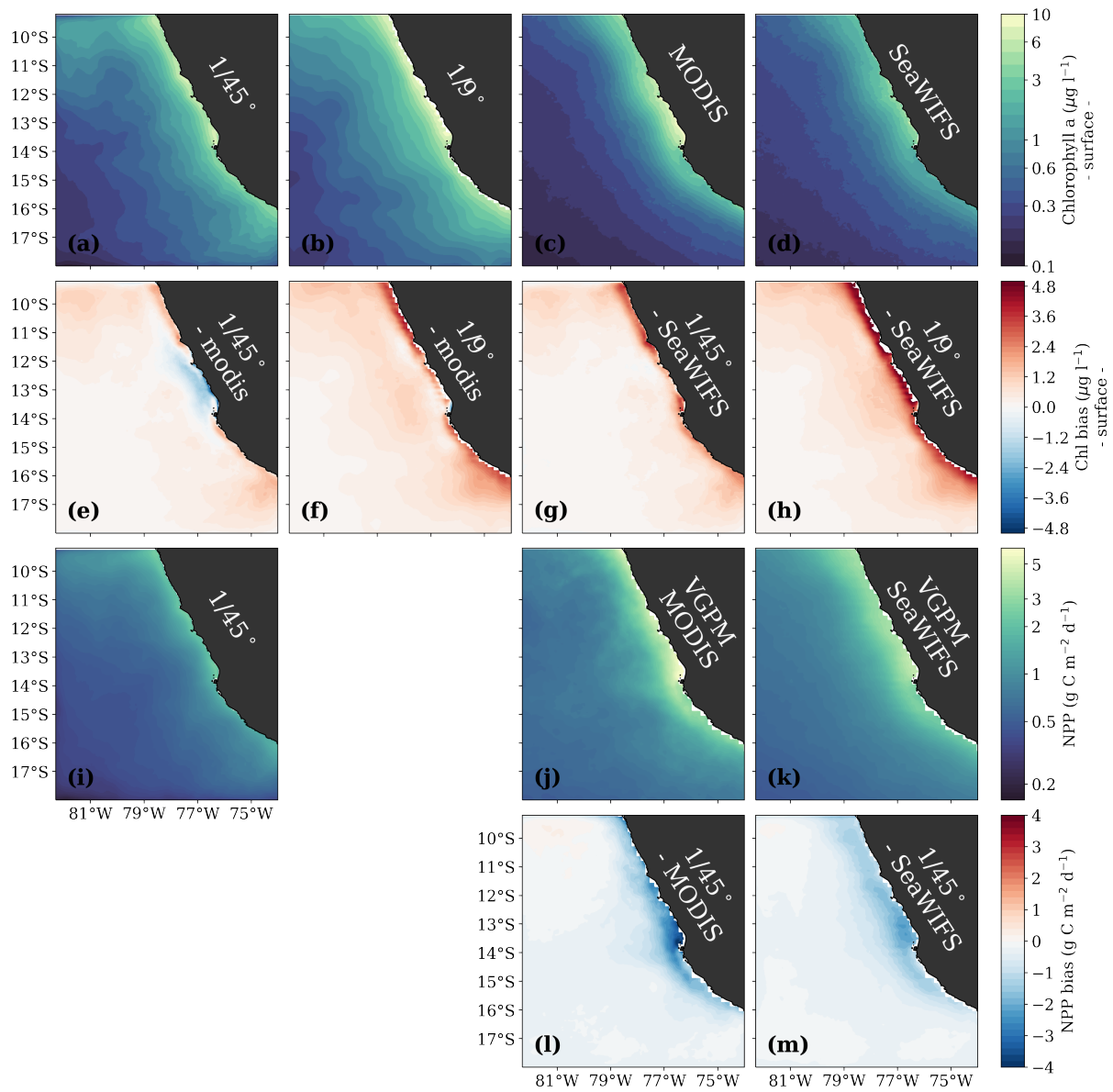
Figure S3. Simulated chlorophyll (a,b) and NPP (i) fields (f,g) compared with the respective MODIS (c,j) and SeaWIFS (d,k) reference values. Panels (e-h) and (l,m) show the differences between the simulated fields and their respective reference values.
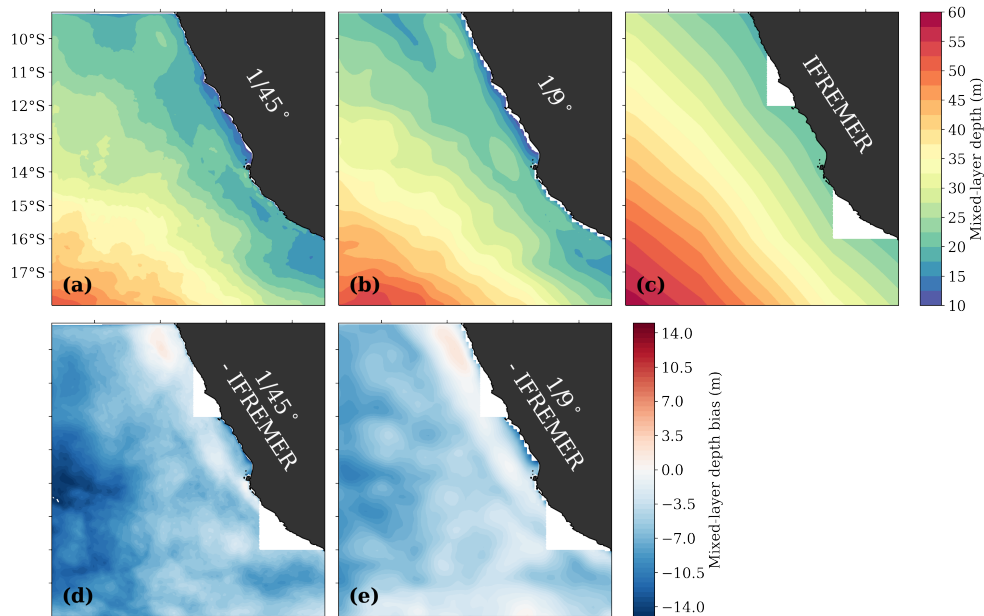
Figure S4. Simulated mixed-layer depth fields (a,b) compared with the IFREMER reference values (c). Panels (d-e) show the differences between the simulated fields and the reference values.
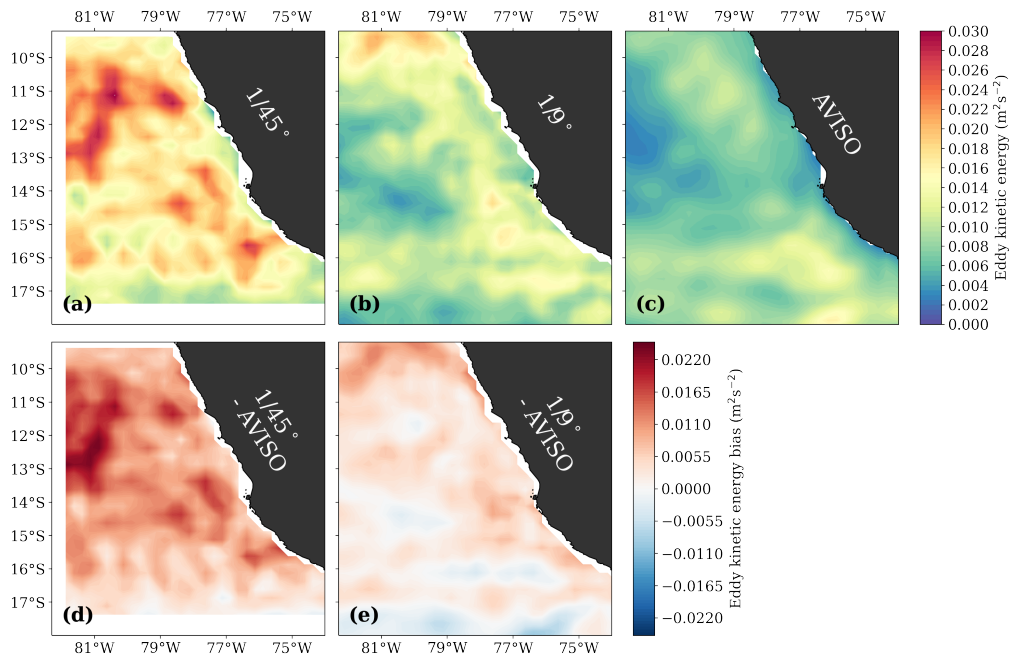
Figure S5. Simulated surface geostrophic eddy kinetic energy fields (a,b) compared with reference values calculated from AVISO sea surface height data (c). Panels (d-e) show the differences between the simulated fields and the reference values. All sea surface height fields were interpolated onto the same horizontal grid (1/4°) and and averaged to 6-day resolution before computing the surface geostrophic velocities.
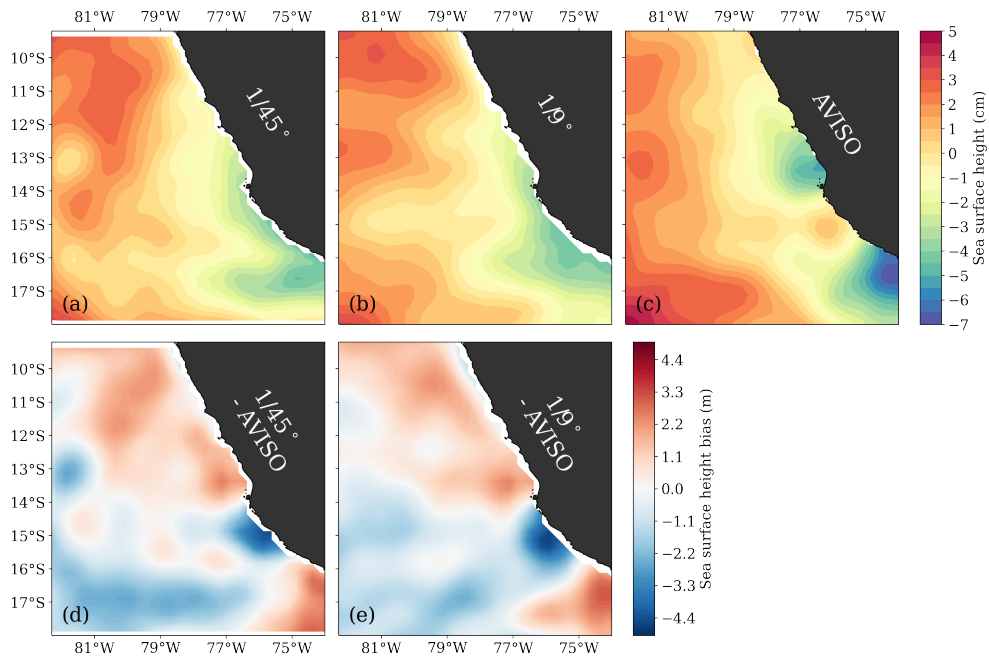
Figure S6. Simulated mean sea-surface height (a,b) compared with reference values calculated from AVISO sea level data (c). Panels (d-e) show the differences between the simulated fields and the reference values. All sea surface height fields were interpolated onto the same horizontal grid (1/4°) and a time-averaged, spatially averaged reference value was substracted for each field.