



Supplement of

**Evaluation of a coupled ocean and sea-ice model (MOM6-NEP10k)
over the Bering Sea and its sensitivity to turbulence decay scales**

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Supplementary Figures

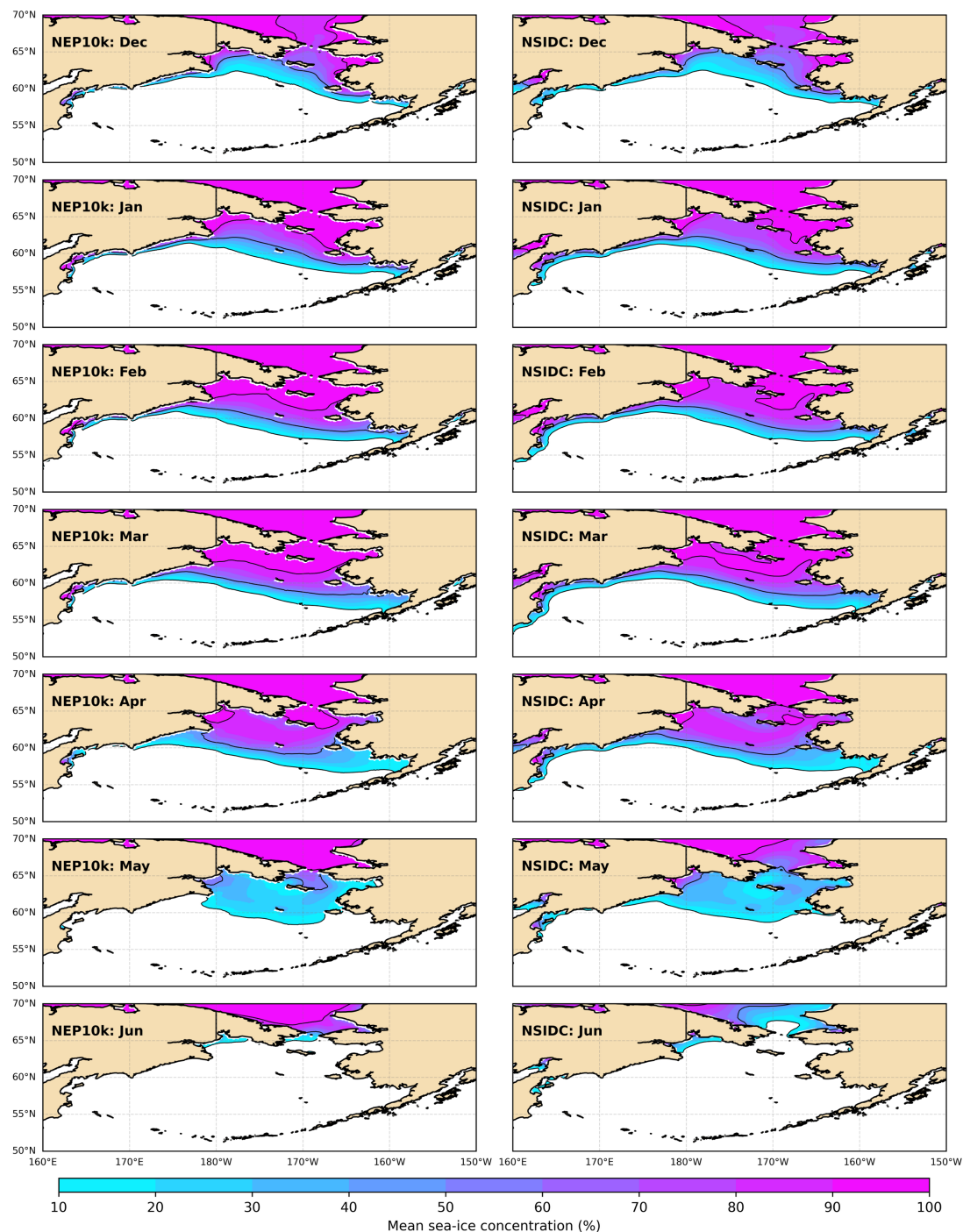


Figure S1: Bering Seasonal Sea Ice Concentration and Spatial Extent. Comparison of spatial patterns in Bering Sea monthly mean (1993-2018) NEP10k sea ice concentration against NSIDC Satellite output.

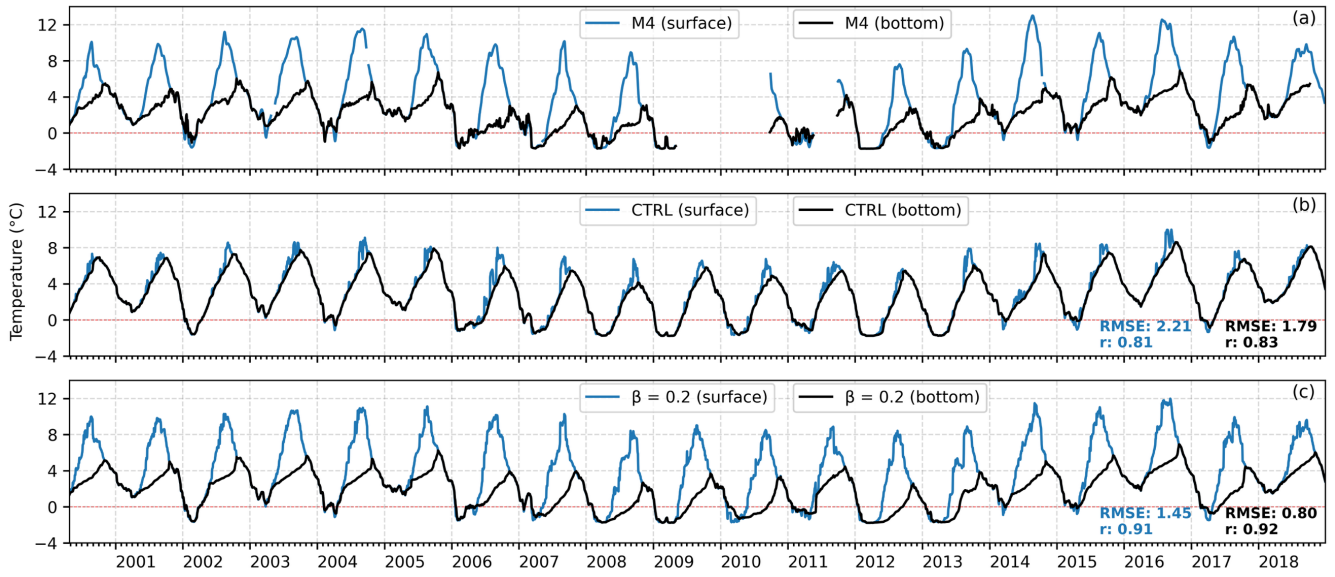


Figure S2: Comparison of surface and bottom temperatures at (a) M4 mooring location, against (b) CTRL (default MOM6-NEP) and (c) $\beta = 0.2$ simulations. This comparison shows the excessive shear-driven vertical mixing in the CTRL simulation.

Seasonal Histogram of Thermocline Depth Differences (Model - Obs)

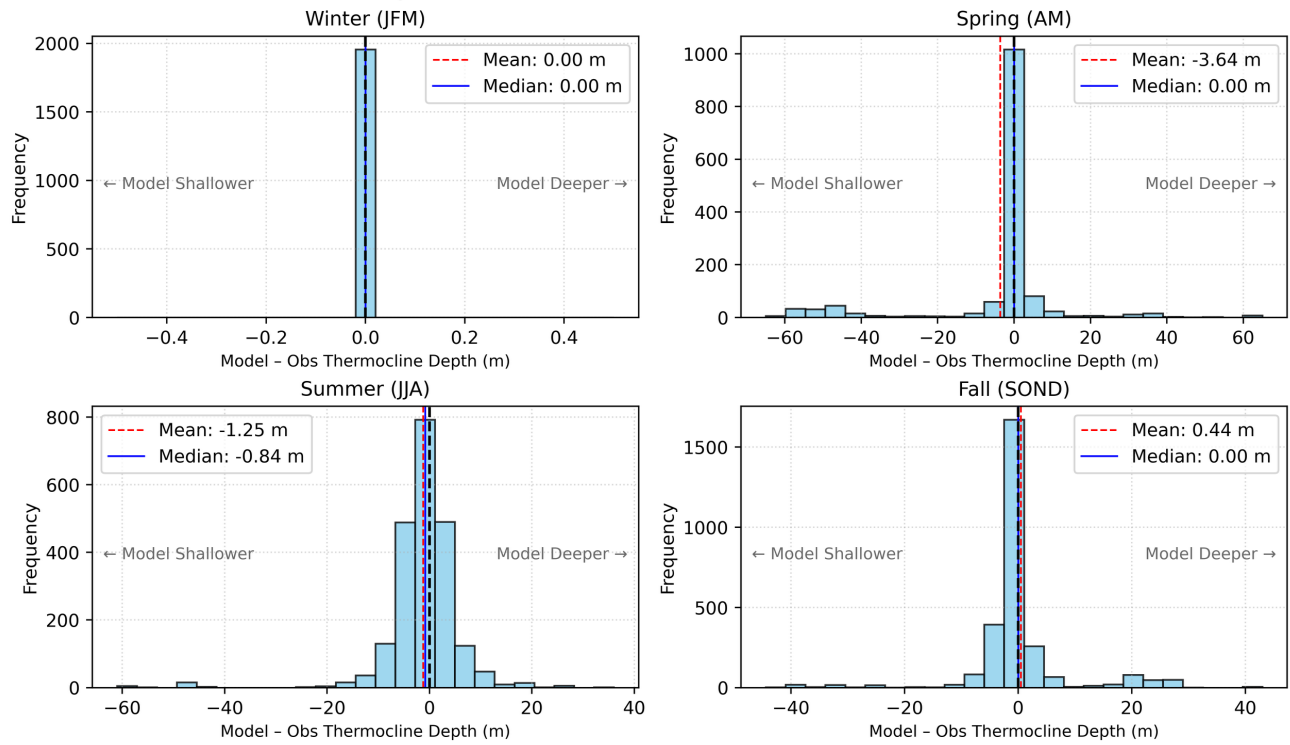
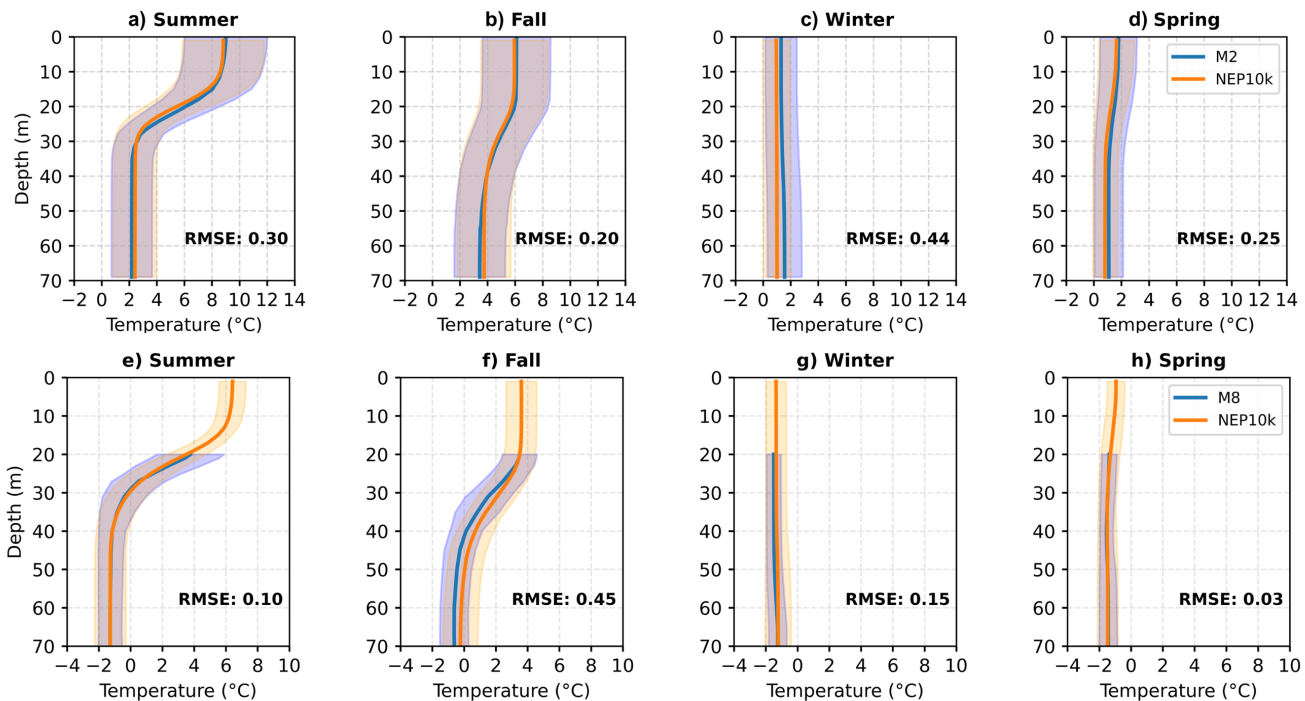


Figure S3: Seasonal histogram of thermocline depth differences (model minus observation) at M2 mooring location.



15 **Figure S4: Seasonal variations of temperature with depth at (a-d) M2 and (e-h) M8 with their respective standard deviations (shading). All correlation values are significant ($p < 0.001$).**

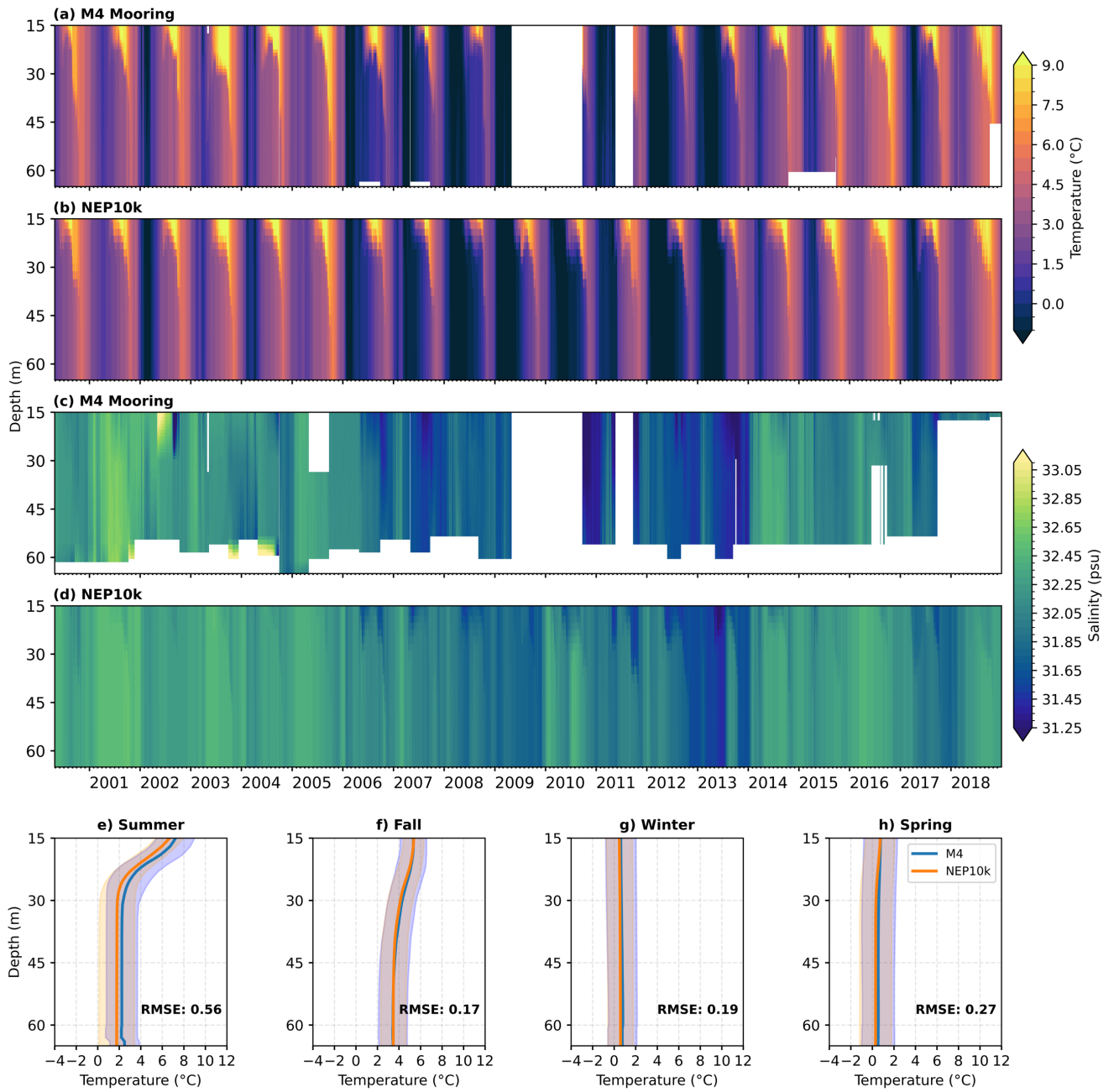


Figure S5: Depth versus time contours of temperature for (a) observations and (b) model, and salinity for (c) observations and (d) model, and seasonal variations of temperature with depth (e-h) at M4 mooring with their respective standard deviations (shading).

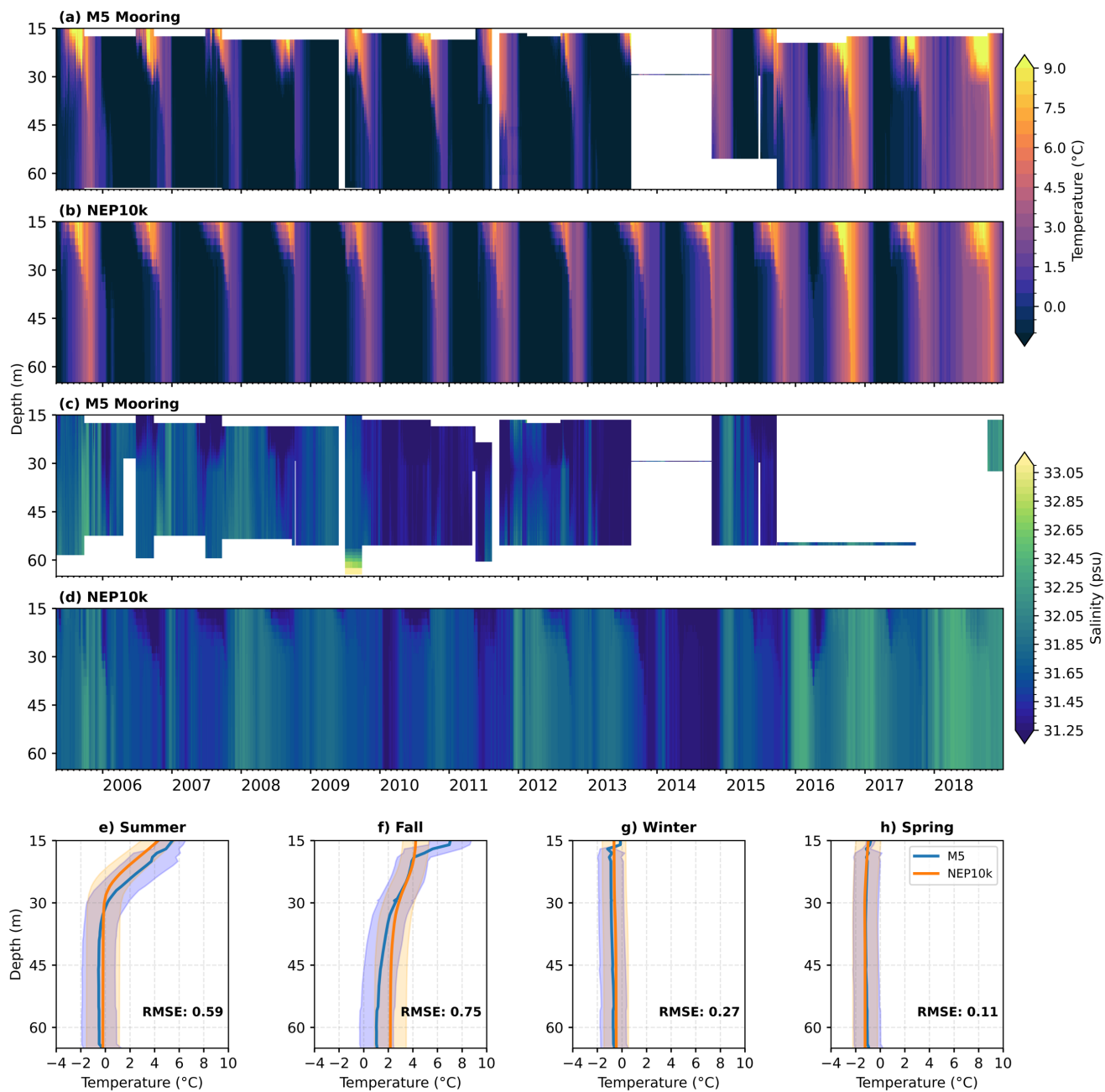


Figure S6: As in Figure S5, except for M5.

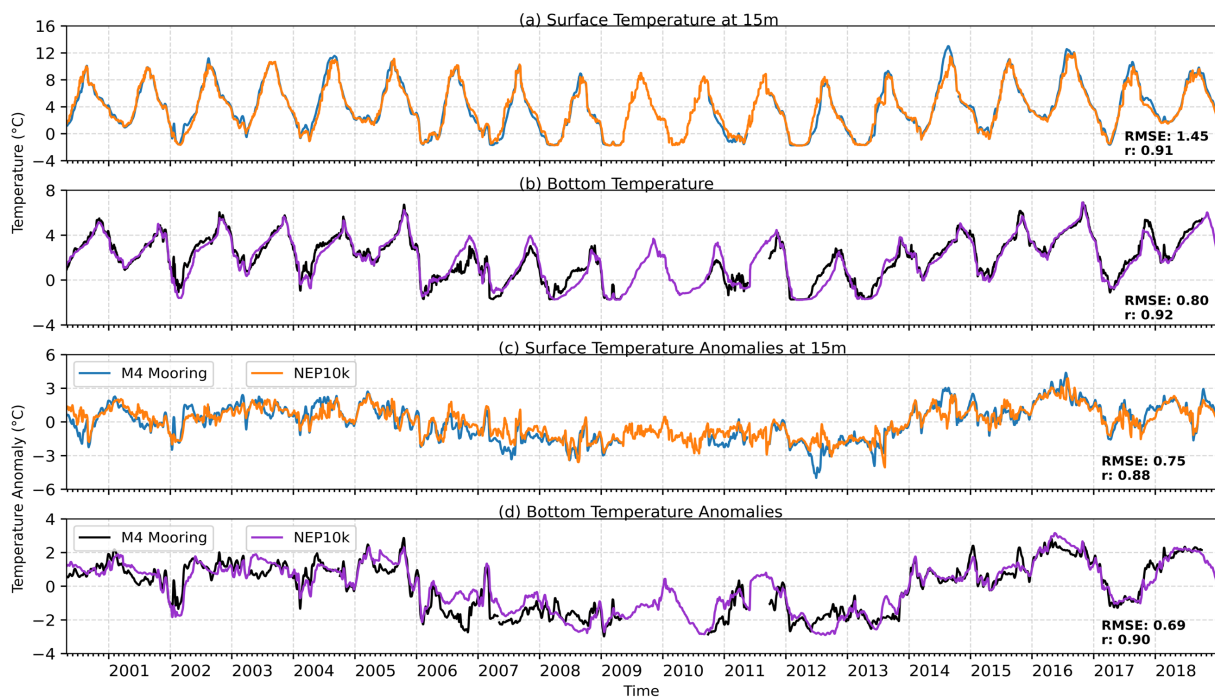


Figure S7: Same as in Fig. 14 except for M4.

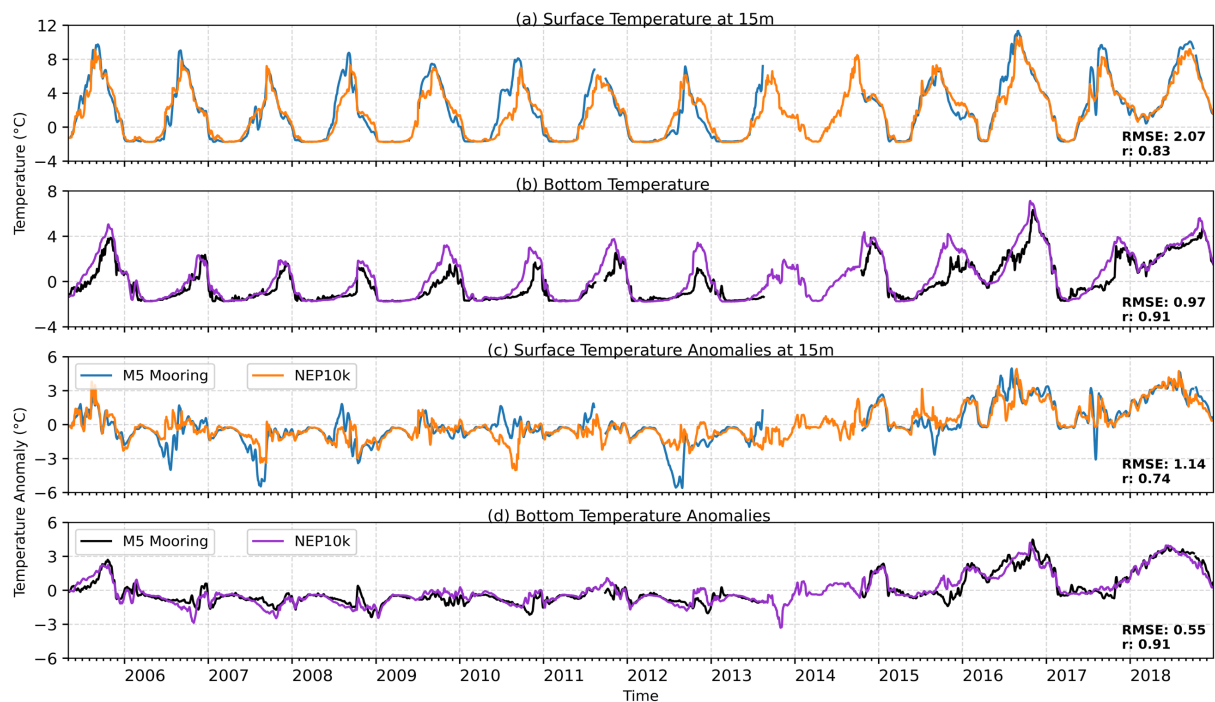


Figure S8: Same as in Fig. 14 except for M5.

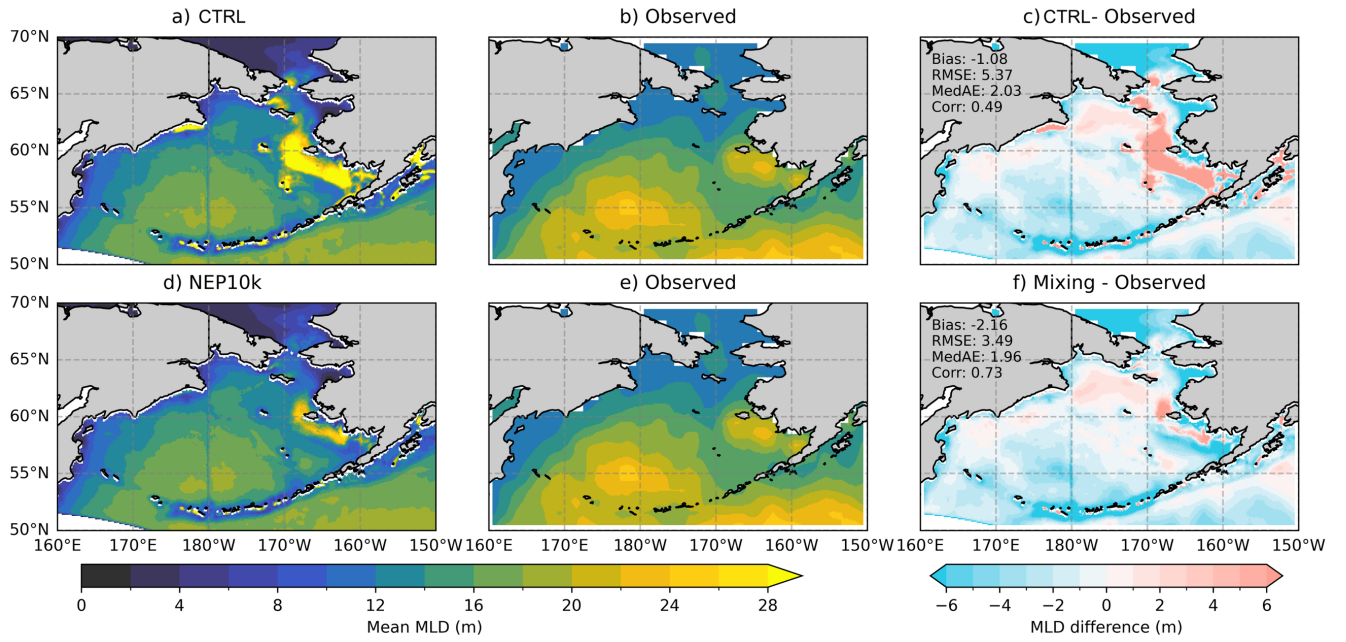


Figure S9: June-July-August mean mixed layer depth from (a) the CTRL simulation, (b) observations, (c) CTRL minus observations, (d) MOM6-NEP10KP1.1, (e) observations, and (f) MOM6-NEP10KP1.1 minus observations.