

**Development and assessment of the physical-biogeochemical ocean regional
model in the Northwest Pacific: NPRT v1.0 (ROMS v3.9–TOPAZ v2.0)**

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[Supplementary Figures]

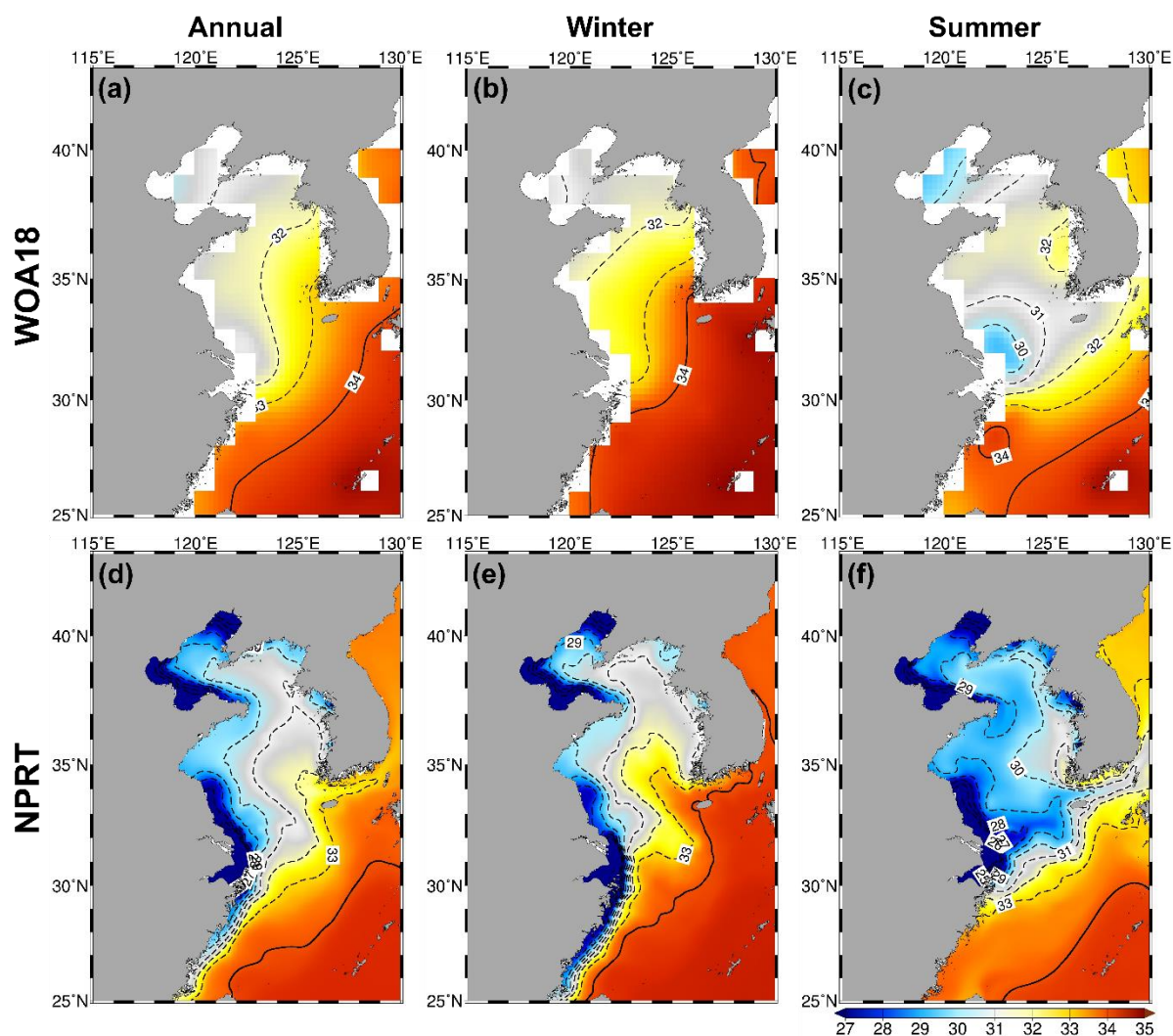


Figure S1. Distributions of the surface salinity in (a, b, c) the WOA18 data and (d, e, f) NPRT for (a, d) the annual mean, (b, e) winter and (c, f) summer in the YECS. The thick solid line indicates 34.0 psu and the contour interval is 0.5 psu.

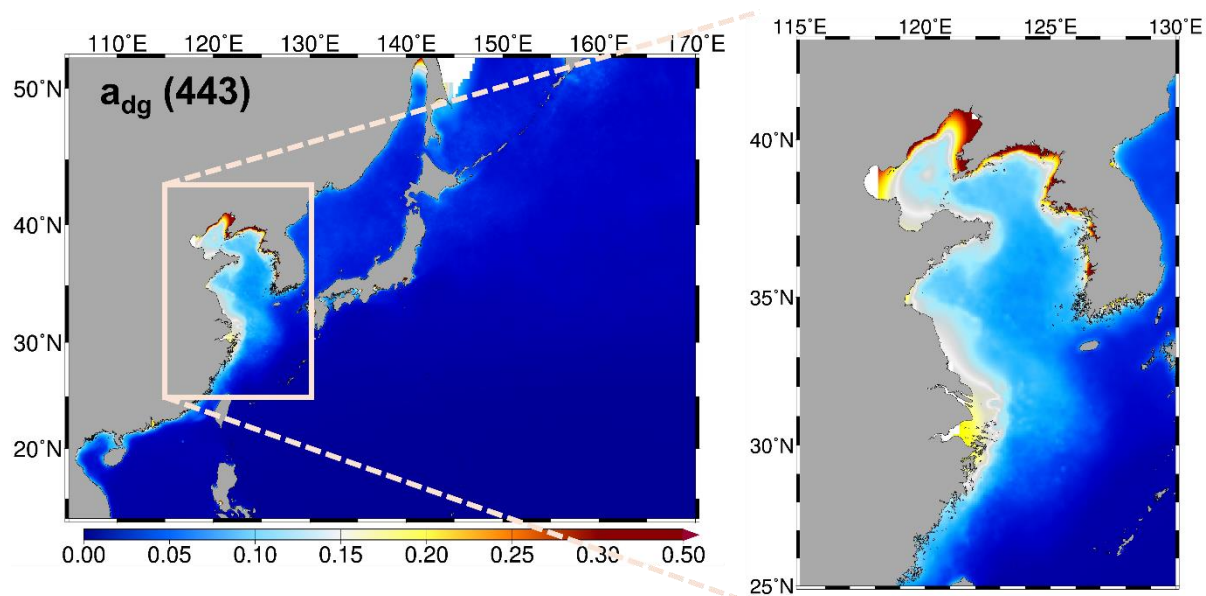


Figure S2. Distributions of the climatological mean absorption coefficient of light for colored detrital matter $a_{dg}(443)$ (unit: m^{-1}) from 2005 to 2014 derived from the MODIS data.

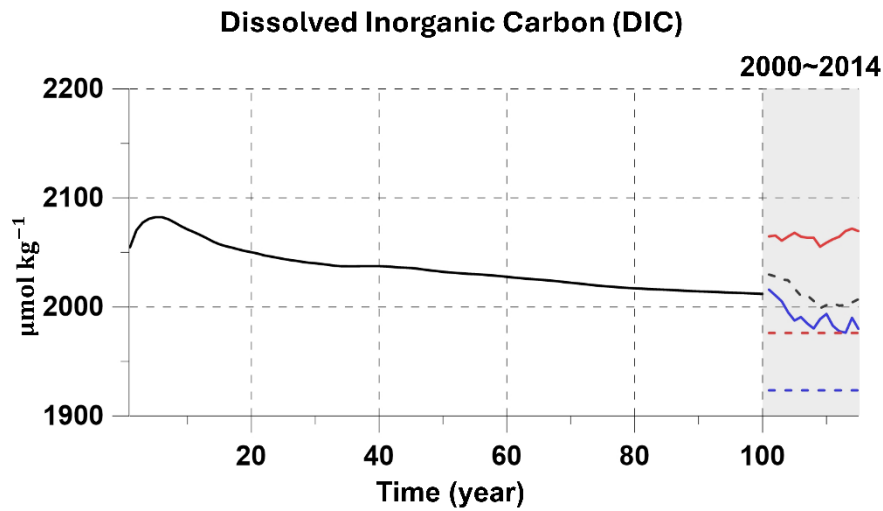


Figure S3. Time series of the annual mean surface DIC concentration ($\mu\text{mol kg}^{-1}$) in the NWP (the subtropical and subarctic regions) during spin-up time using MOM5–TOPAZ. The spin-up process for the first 100 years (black solid line) was conducted under a $p\text{CO}_2$ (369.6 ppm) and atmospheric forcings (ERA5) conditions of the year 2000. The MOM5–TOPAZ model was then run for the period 2000–2014 (black dashed line; light gray shaded region), using the final time step of the 100-year spin-up as the initial condition. Through these spin-up process, the initial and boundary conditions for the biogeochemical variables required to conduct NPRT were obtained. The red and blue solid lines (dashed lines) represent the zonal– and meridional–averaged surface DIC concentrations applied to NPRT (from GLODAPv2) at the eastern and southern boundary conditions, respectively.