

Figure titles for Supplementary figures:

Figure S1: Total surface eddy kinetic energy (EKE) time series from December 2019 to December 2021, computed over the entire SCARIBOS model domain. The black line represents the hourly EKE time series, while the red line shows the 12-hour moving average.

Figure S2: Comparison of monthly surface currents across the entire domain between SCARIBOS model output and GLORYS12V1 model output for the year 2022. SCARIBOS surface currents are interpolated to a $1/12^\circ$ grid to match the spatial resolution of the GLORYS12V1 model. The colour scheme represents surface speed, with arrows indicating both direction (arrow shape) and magnitude (arrow size). All plots share the same colour bar and arrow scale.

Figure S3: Comparison of monthly sea surface temperature (SST) across the entire domain between SCARIBOS model output and E.U. Copernicus Marine Service Information multi-observation dataset (referred to as MultiObs) by Guinehut et al. (2012) for the year 2022. SCARIBOS SST fields are interpolated to a $1/8^\circ$ grid to match the spatial resolution of the MultiObs dataset. All plots share the same colour bar.

Figure S4: Comparison of monthly sea surface temperature (SST) across the entire domain between SCARIBOS model output and GLORYS12V1 model output for the year 2022. SCARIBOS SST fields are interpolated to a $1/12^\circ$ grid to match the spatial resolution of the GLORYS12V1 model. All plots share the same colour bar.

Figure S5: Comparison of monthly sea surface salinity (SSS) across the entire domain between SCARIBOS model output and E.U. Copernicus Marine Service Information multi-observation dataset (referred to as MultiObs) by Droghei et al. (2016) for the year 2022. SCARIBOS SSS fields are interpolated to a $1/8^\circ$ grid to match the spatial resolution of the MultiObs dataset. All plots share the same colour bar.

Figure S6: Comparison of monthly sea surface salinity (SSS) across the entire domain between SCARIBOS model output and GLORYS12V1 model output for the year 2022. SCARIBOS SSS fields are interpolated to a $1/12^\circ$ grid to match the spatial resolution of the GLORYS12V1 model. All plots share the same colour bar.