



Supplement of

Modeling seasonal-to-decadal ocean–cryosphere interactions along the Sabrina Coast, East Antarctica

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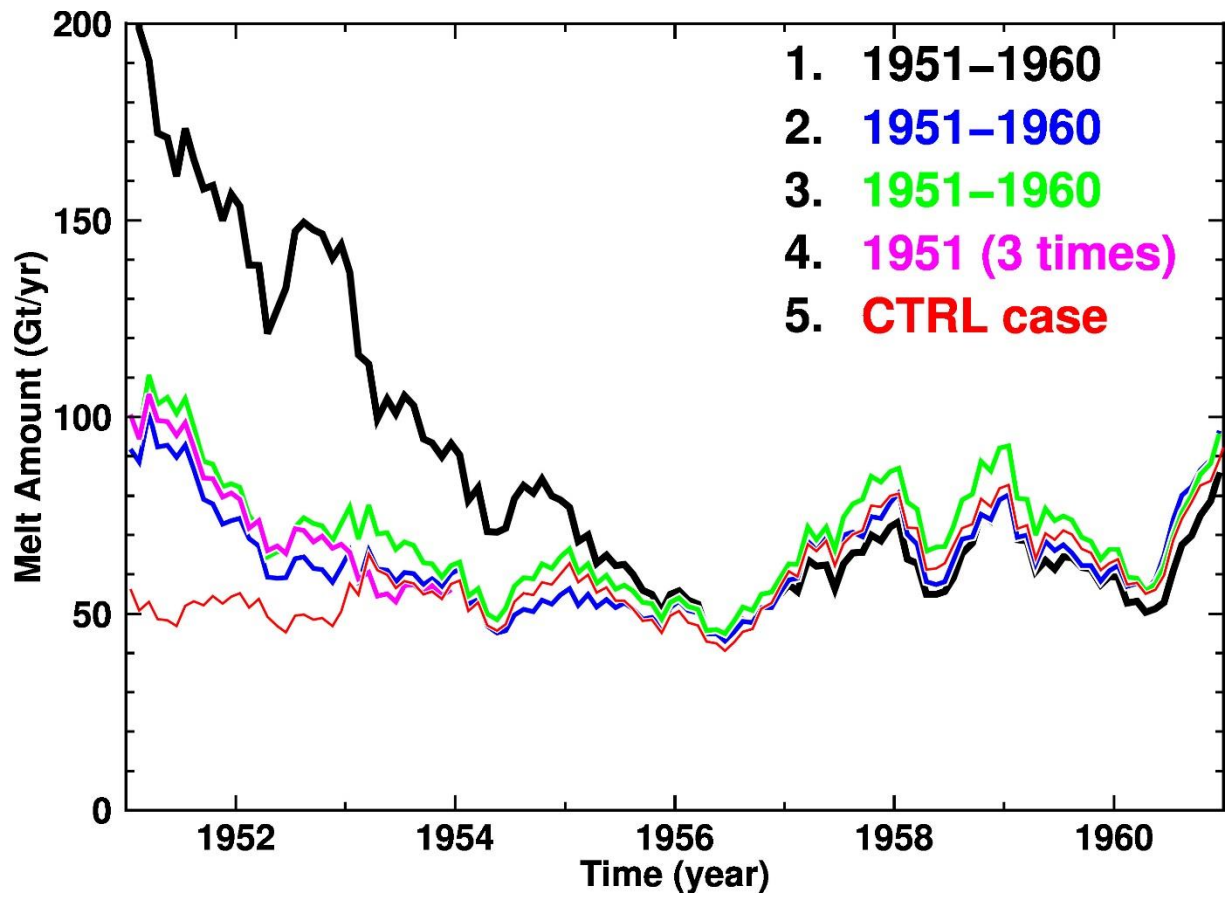


Figure S1: Time series of basal melt amount at ice shelves along the Sabrina Coast in model spin-up stages. After three cycles of 10-year integration with the 1951–1960 forcing (black, blue, and green), a three-year integration repeatedly with 1951 forcing (pink) was conducted to obtain the initial condition for CTRL case (red).

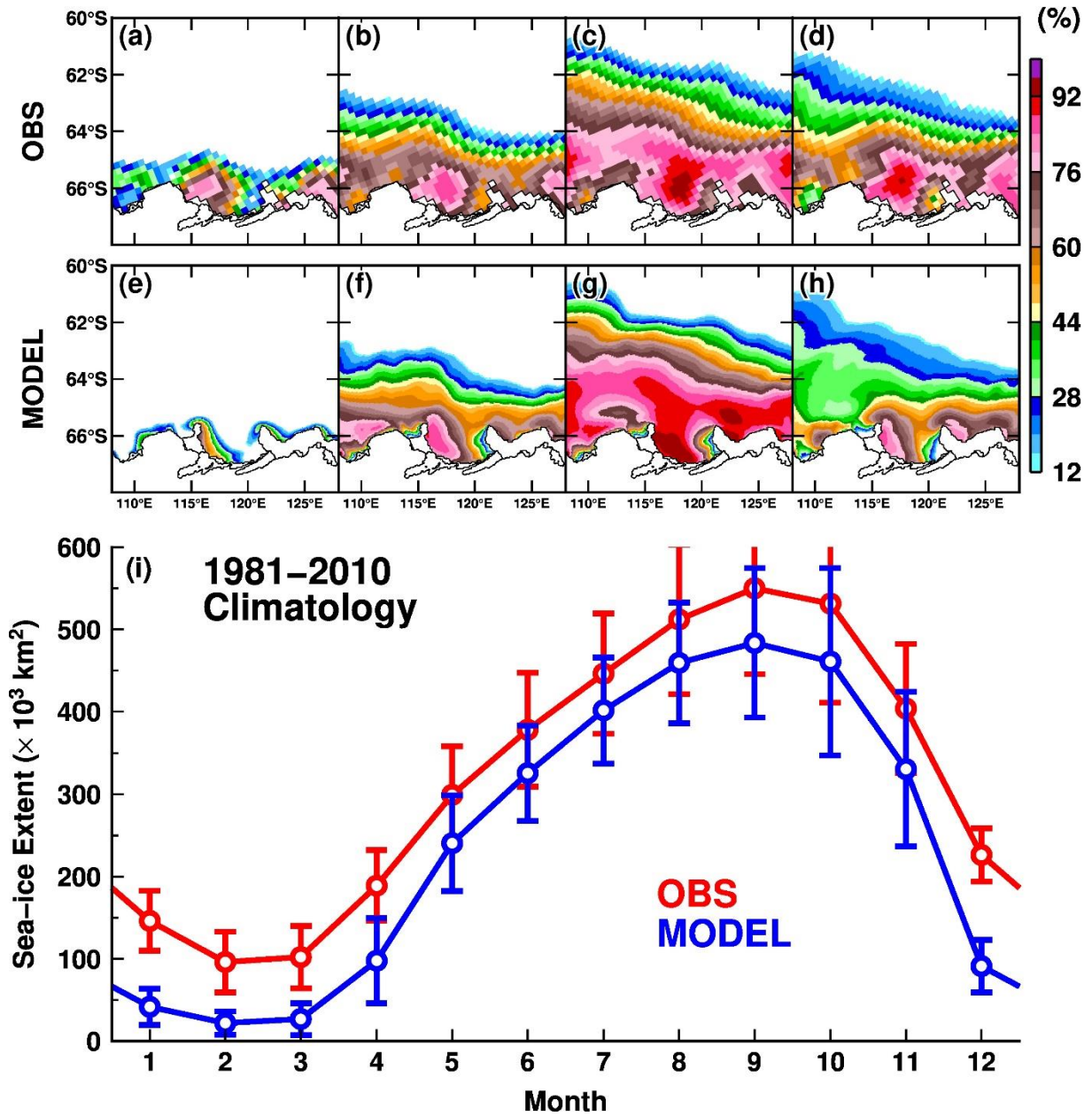


Figure S2: Seasonal cycle of observed and modeled sea-ice climatology averaged over the reference period (1981–2010). (a–h) Maps of sea-ice concentration in a longitudinal range from 108°E to 128°E (a–d: observation and e–h: model) and monthly sea-ice extent (red: observation and blue: model) within the longitudinal band.

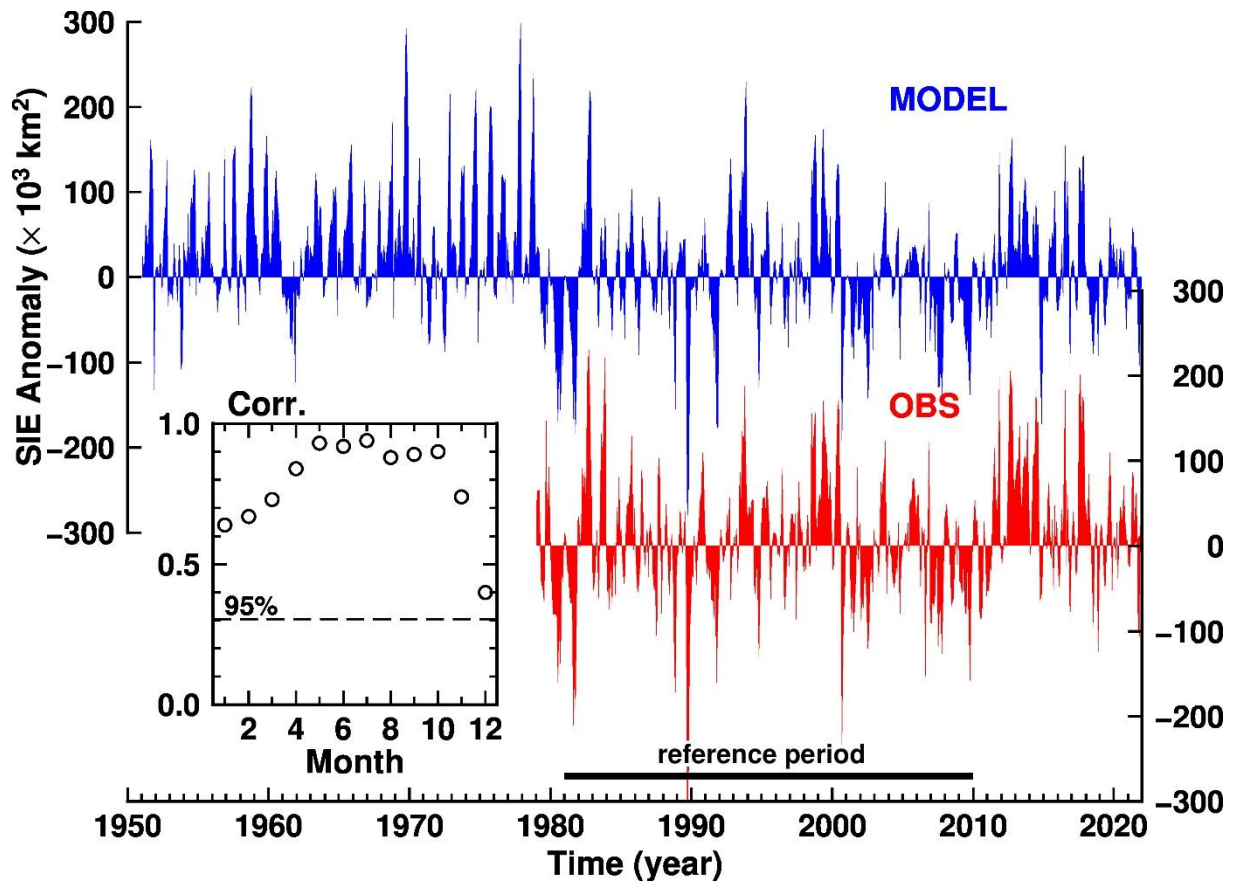


Figure S3: Time series of monthly sea-ice extent anomalies (blue: model for the period 1951–2021 and red: observation for the period 1979–2021). The anomalies are deviations of the regional monthly sea-ice extent from the monthly climatologies (Fig. S2i). Bottom-left small panel shows monthly correlation coefficients of sea-ice extent anomalies for the period 1979–2021 between the observation and model. The dashed line indicates the 95% significant level.

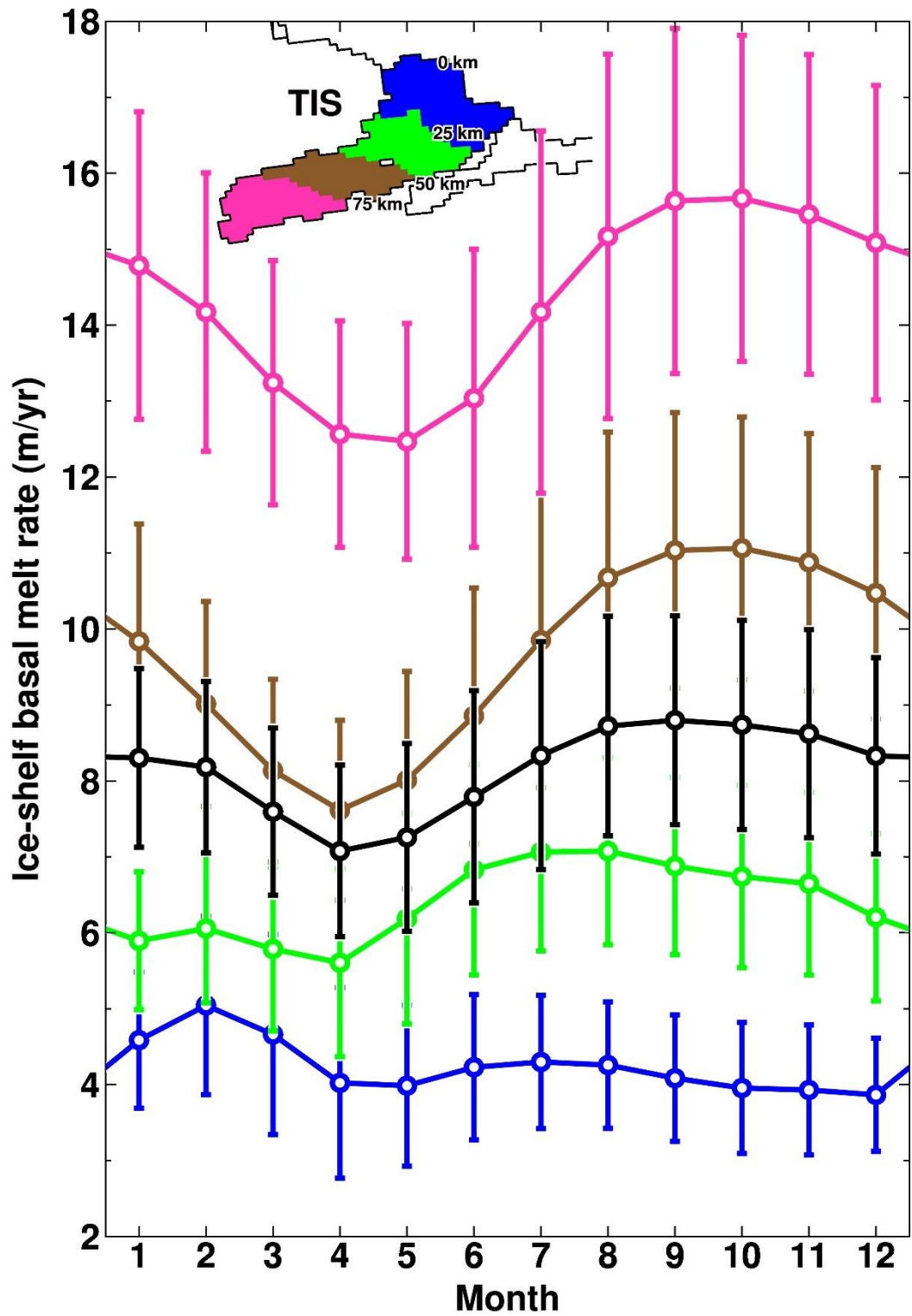


Figure S4: Seasonal variation in ice-shelf basal melt rate at the TIS. Blue, green, brown, and pink indicate the area-averaged melt rate in the four regions shown in the inset. Black shows the mean melt rate averaged over the TIS; circles and error bars show the mean and standard deviation of the melt rate for the reference period (1981–2010).

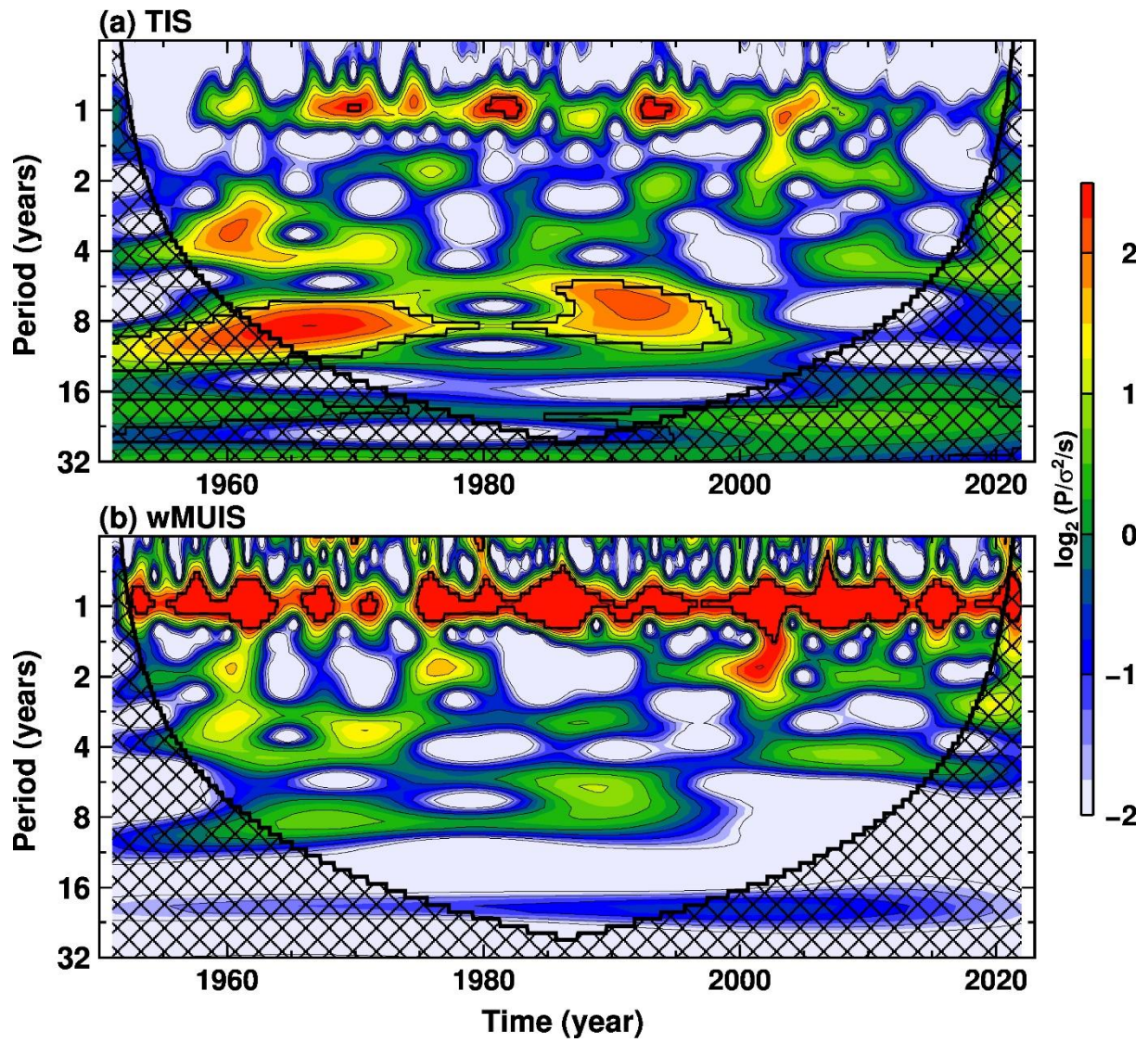


Figure S5: Wavelet power spectra for the ice-shelf basal melt rate in the TIS and wMUIS. The power spectrum is normalized by the variance (σ^2) and the scale (s). The vertical axis is the period (in year), and the horizontal axis is time (year). The regions enclosed by thick contours indicate time-period zones greater than the 95% confidence level. Cross-hatched regions indicate the cone of influence, where edge effects are not negligible.

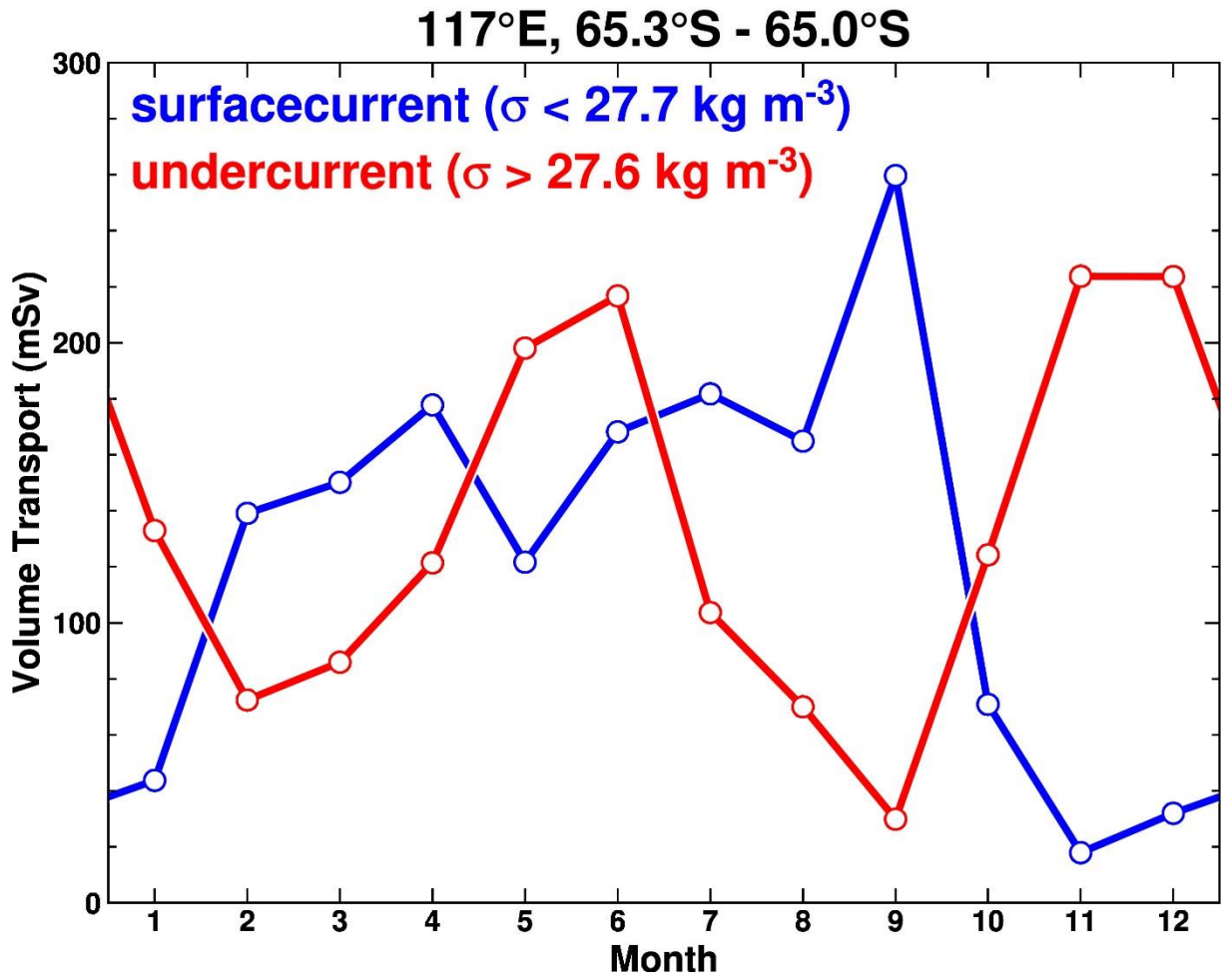


Figure S6: Seasonal variation in volume transports of the westward-flowing surface current (blue) and the eastward-flowing undercurrent (red). The monthly climatology averaged over the reference period 1981–2010 is used for the plot.