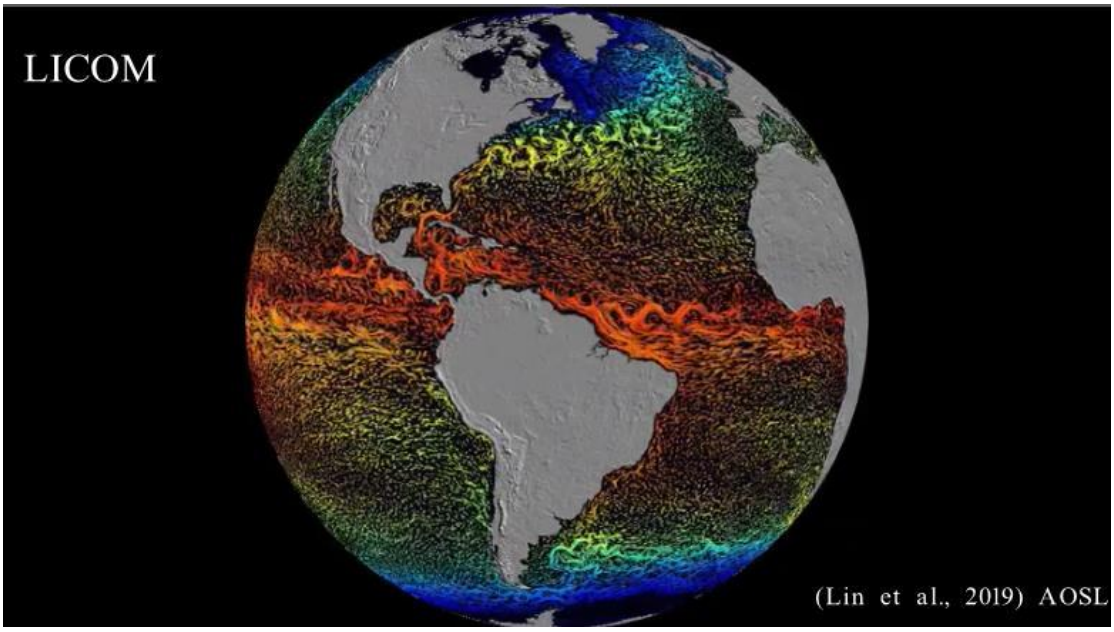
Supplementary Materials

Ocean mesoscale structure–induced air–sea interaction in a high-resolution coupled model

LIN Pengfei [a,b], LIU Hailong[a,b], MA Jing [c] and LI Yiwen[a,b]

[a]State Key Laboratory of Numerical Modeling for Atmospheric Sciences and Geophysical Fluid Dynamics, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing 100029, China; [b]University of Chinese Academy of Sciences, Beijing 100049, China; [c]Key Laboratory of Meteorological Disaster of Ministry of Education, Nanjing University of Information Science and Technology, Nanjing 210044, China



Video 1 sea surface temperature （color）and sea surface current （vectors）in the high-resolution LICOM. (see the video attachment uploaded in the S1M)

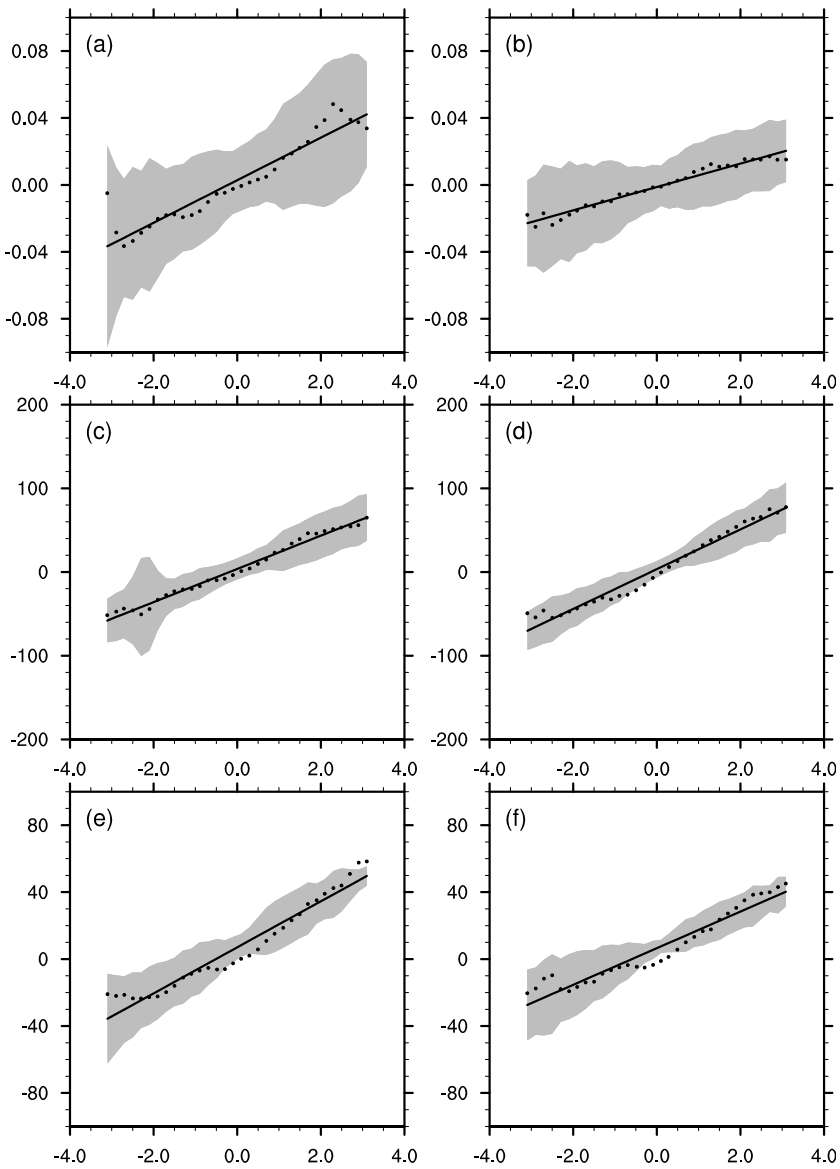


Figure S1. Binned scatterplots of high-pass filtered SST（units: ℃） and wind stress magnitudes (units: N m^{-2}, a, b), SST and latent heat flux (units: Wm^{-2}, c, d), SST and sensible heat flux (units : Wm^{-2}, e, f) in the winter (DJF, December-January-February) according to observational (a, c, e) and high-resolution coupled simulation (b, d, f) results for over the Kuroshio and its extension. High-pass filtered wind stress magnitudes and associated standard deviations (STDs) are calculated for each 0.2 ℃ SST interval. Coupling coefficients are estimated as linear regression slopes (black lines) of wind stress magnitude, latent heat

flux, and sensible heat flux values bin averaged on SSTs (black dots); the gray shaded areas show ±1 STD of wind stress magnitude, latent heat flux, and sensible heat flux perturbation for each SST bin.

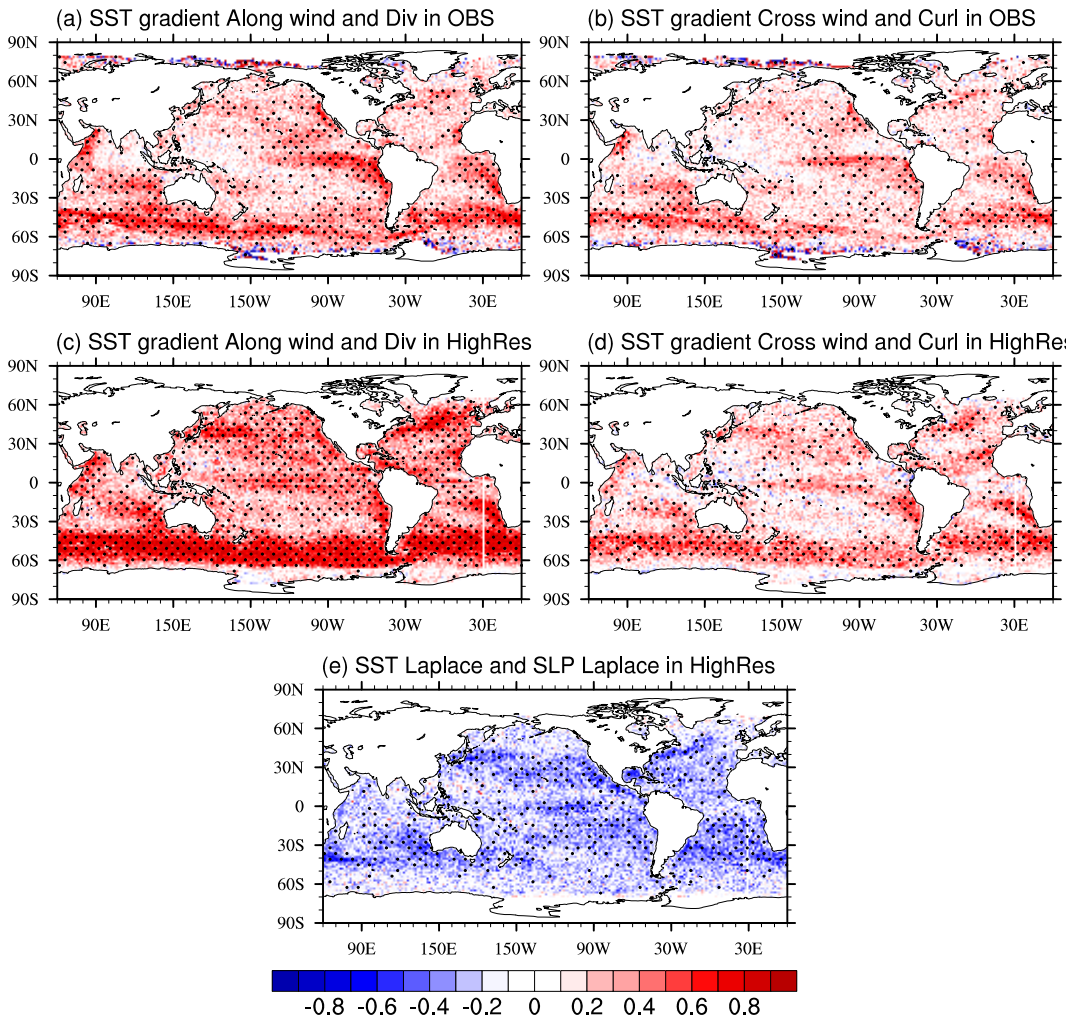


Figure S2. Correlation coefficients between high-pass filtered SST gradients along wind stress and wind stress divergence (a, b); between high-pass filtered SST gradients across wind stress and wind stress curl (c, d); between the Laplacian of SST and the Laplacian of SLP (e). Panels (a, b) are for the observations and (c, d, e) are for the high-resolution coupled model results. The area with dots passes student-*t* tests at the 95% confidence level.