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Supporting Information for

**Response and Feedback of Mesoscale Eddies to Tropical Cyclones
over the South China Sea**

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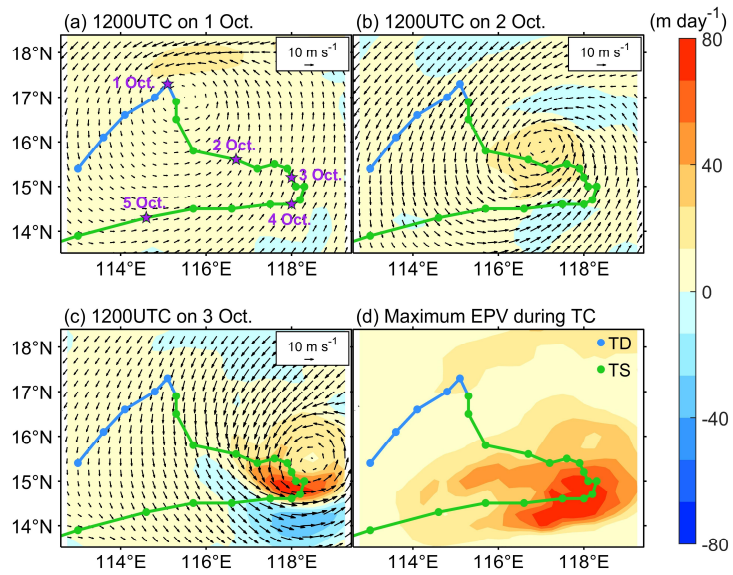


Figure S1. Ekman pumping velocity (EPV) during the passage of TC Gaemi (2012). (a–c) EPV on specific time. (d) Maximum EPV from 30 September to 5 October.

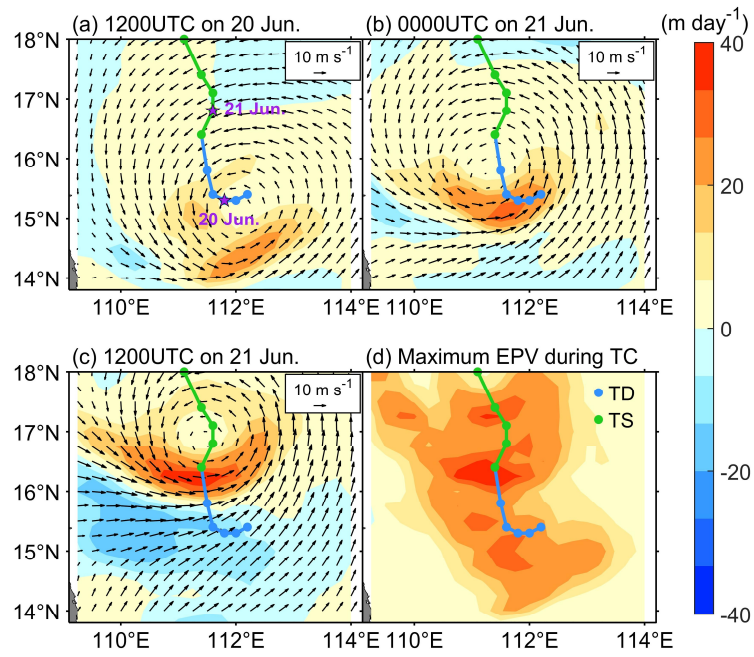


Figure S2. Ekman pumping velocity (EPV) during the passage of TC Kujira (2015). (a–c) EPV on specific time. (d) Maximum EPV during TC.

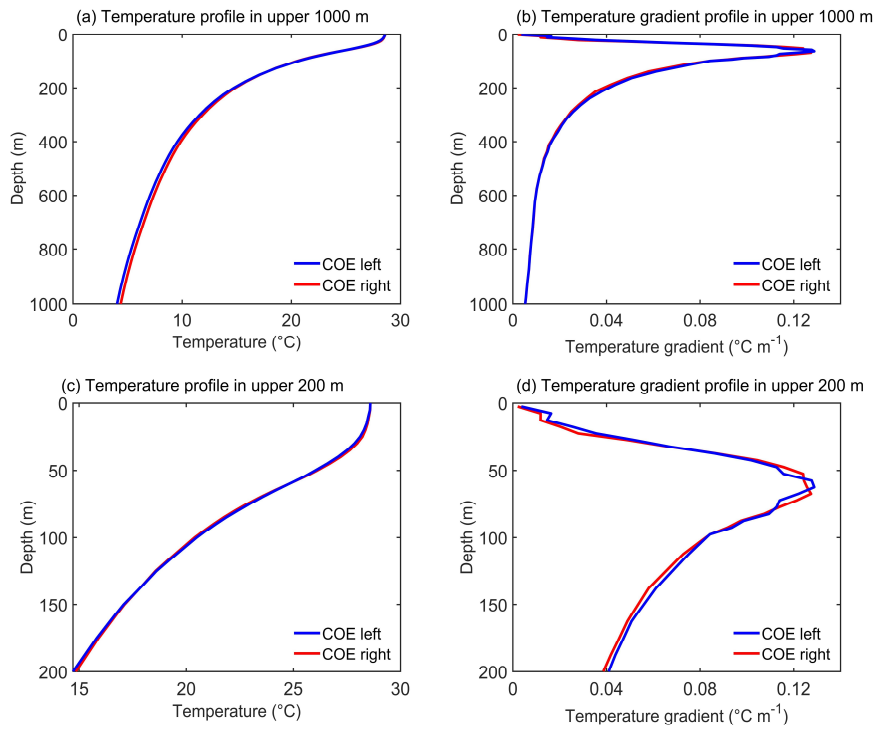


Figure S3. (a) Initial background temperature profile before incorporating isotherm displacements associated with the eddy in numerical experiments. The temperature profile is composited based on the average temperature profile within 300 km of the TC center in the presence of left COEs (blue) and right COEs (red). (b) Temperature gradient profile. (c and d) Same as (a and b) but in the upper 200 m. The profiles are extracted from the monthly temperature data of *World Ocean Atlas 2018* (<https://www.ncei.noaa.gov/access/world-ocean-atlas-2018/>).

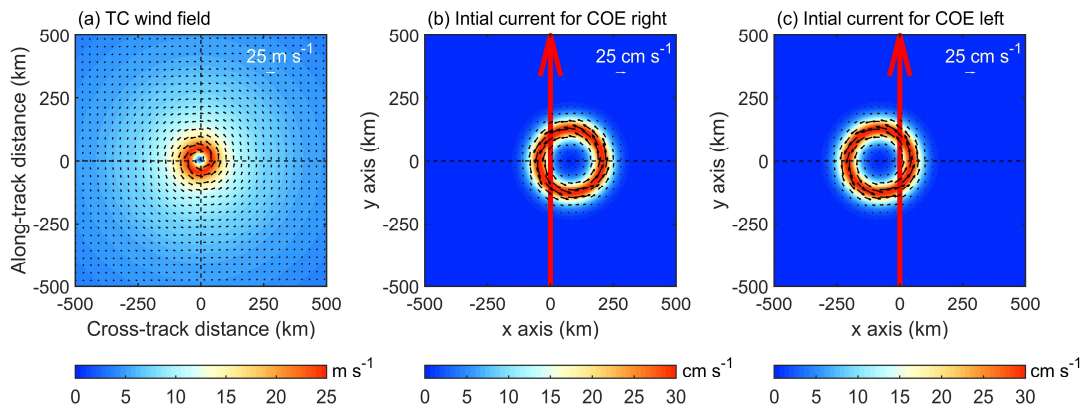


Figure S4. (a) Wind field applied in numerical experiments. (b) Initial sea surface geostrophic current when the COE is located 80 km to the right of the TC center. The red arrow indicates the moving direction of the tropical cyclone (TC). (c) Same as (b) except that the COE is located 80 km to the left of the TC center.

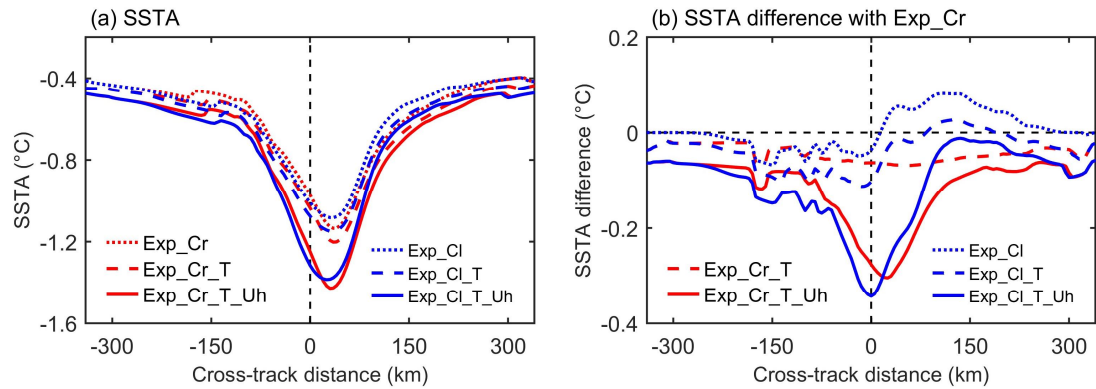


Figure S5. Same as Figure 14 but for two additional experiments (experiments Exp_Cr_T and Exp_Cr_T_Uh). The experiment Exp_Cr_T setting is the same as experiment Exp_Cr but the background ocean temperature before incorporating eddy-related isotherm displacements is the composited climatological temperature profile for TCs encountering left COEs (i.e., the blue line in Figure S3a). The experiment Exp_Cr_T_Uh setting is the same as experiment Exp_Cr_T but for the TC U_h of 3.5 m s⁻¹.