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## Supplemental Material

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Parameterization of Vertical Turbulent Transport in the Inner Core of Tropical Cyclones and Its Impact on Storm Intensification. Part I: Sensitivity to Turbulent Mixing Length

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Supplementary file for

**Parameterization of Vertical Turbulent Transport in the Inner Core of Tropical Cyclones and Its Impact on Storm Intensification. Part I: Sensitivity to Turbulent Mixing Length**

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This supplementary file (SF) provides additional information to support the main conclusions made in article manuscript.

1. Figure S1

During the simulations, the vertical TKE profiles are calculated online at each model grid point based on the dynamic and thermodynamic fields simulated by the HWRF. The TKE profiles shown in Fig. 7 are the ones averaged over all grid points within the area of  $r > 0.7$  RMW from the last 24-hour simulations. Figure S1 shows the individual profiles of TKE,  $N^2$ , and  $S^2$  in the area of  $r > 0.7$  RMW during the 24-hour simulations from EXP-SLOPE-1 along with the statistical mean and standard deviation.

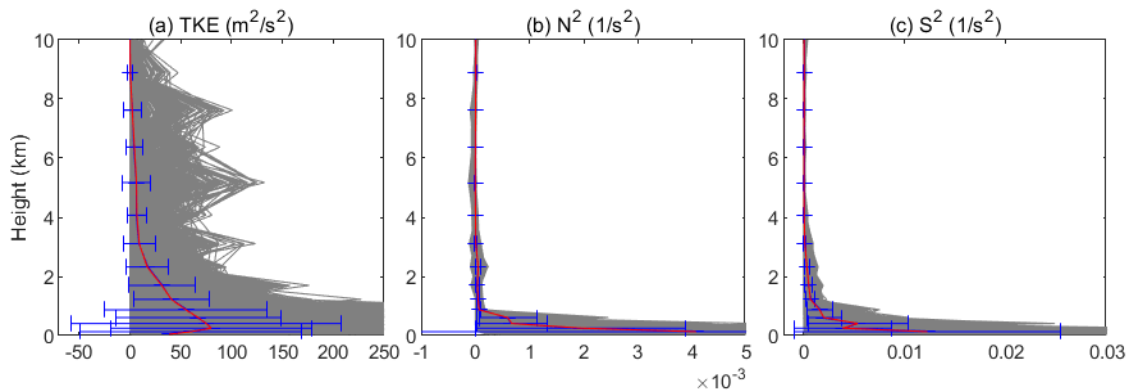


Figure S1: Vertical profiles of (a) TKE, (b)  $N^2$ , and (c)  $S^2$  in the eyewall defined as the area of  $r > 0.7$  radius of maximum of wind (RMW) from EXP-SLOPE-1 during the last 24-hour simulations. Gray lines: individual profiles of TKE,  $N^2$ , and  $S^2$  at each grid point. Red lines with blue horizontal bars are the averaged profile of TKE,  $N^2$ , and  $S^2$  along with their respective standard deviations.

## 2. Figure S2

The time evolution of  $-\overline{u_r \xi}$  and  $D_{sgs_\lambda}$  depicted by Fig. S2 allows us to see how the tendencies relate to the development of the core of tangential wind. In EXP-SLOPE-1,  $-\overline{u_r \xi}$  is greater than  $D_{sgs_\lambda}$  right after the spin-up (first 24 hours) and maintains its dominance throughout the simulation. In contrast,  $-\overline{u_r \xi}$  is nearly balanced and overwhelmed by the negative  $D_{sgs_\lambda}$  in BASELINE and EXP-SLOPE-2, respectively.

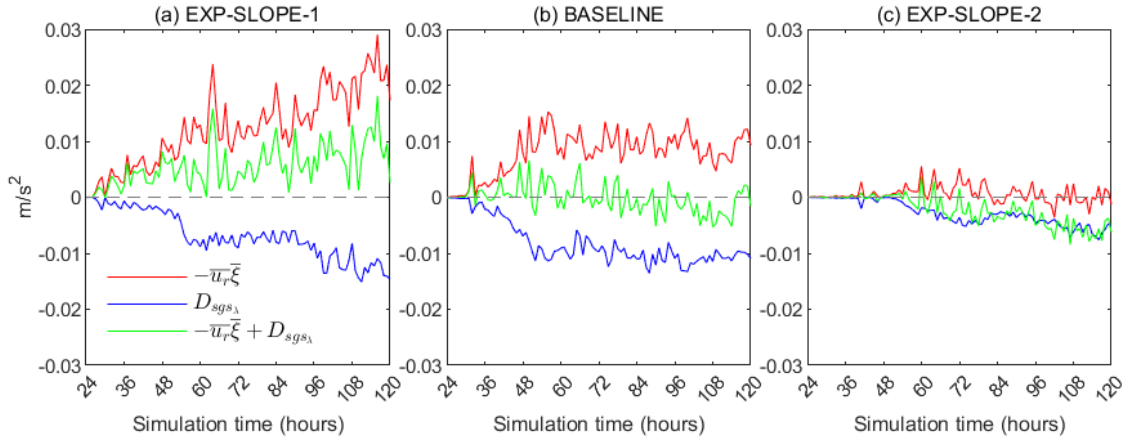


Figure S2: Time evolution of inward transport of absolute vorticity  $-\overline{u_r \xi}$  and tangential turbulent eddy forcing  $D_{sgs_\lambda}$  averaged over the area with tangential wind greater than  $0.9v_{\max}$  from 24 to 120 hours simulated by EXP-SLOPE-1, BASELINE, and EXP-SLOPE-2.