Supplemental Material

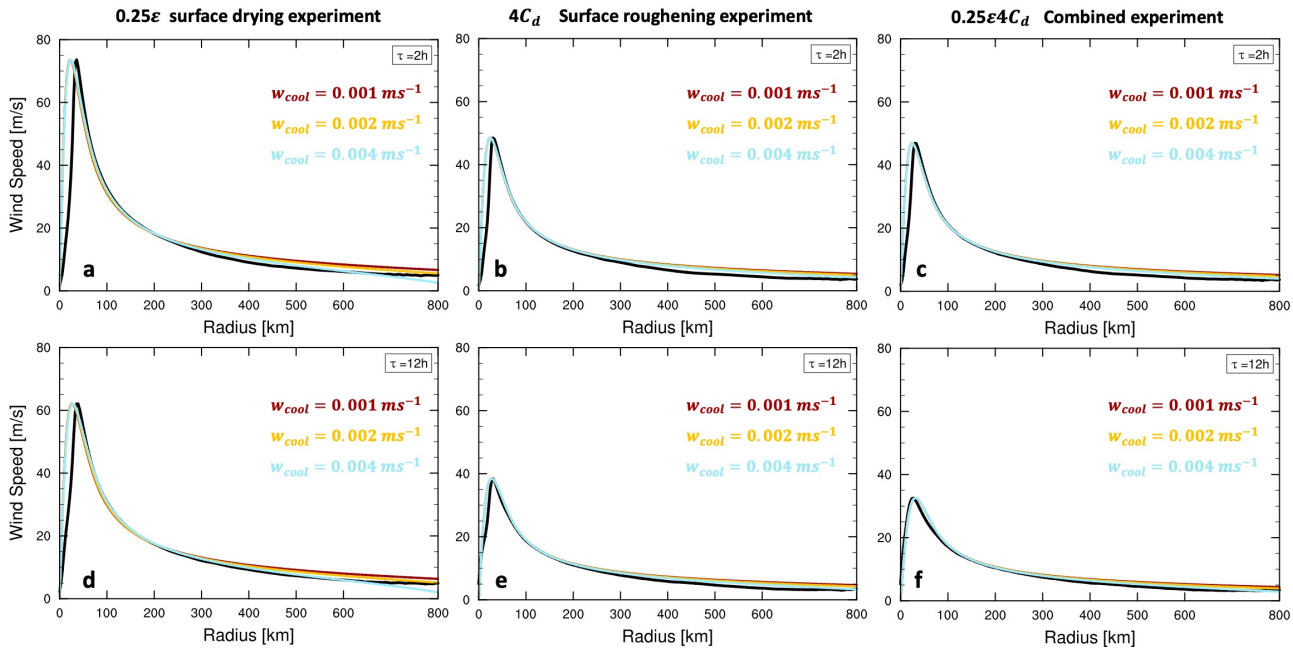

Figure 1. Simulated Wind field of (a)(d) 0.25ε surface drying experiment, (b)(e) $4C_d$ surface roughening experiment, and (c)(f) $0.25\varepsilon 4C_d$ combined forcing experiment at $\tau = 2, 12\ h$ are shown by black lines. The C15 prediction given the corresponding v_m and r_{34kt} at each timestep while varying W_{cool} are shown by colored lines. The W_{cool} is set as 0.001, 0.002, and 0.004 ms^{-1}, covering the values of W_{cool} approximated by its definition (Chavas et al., 2015) for these sets of idealized landfall experiments.

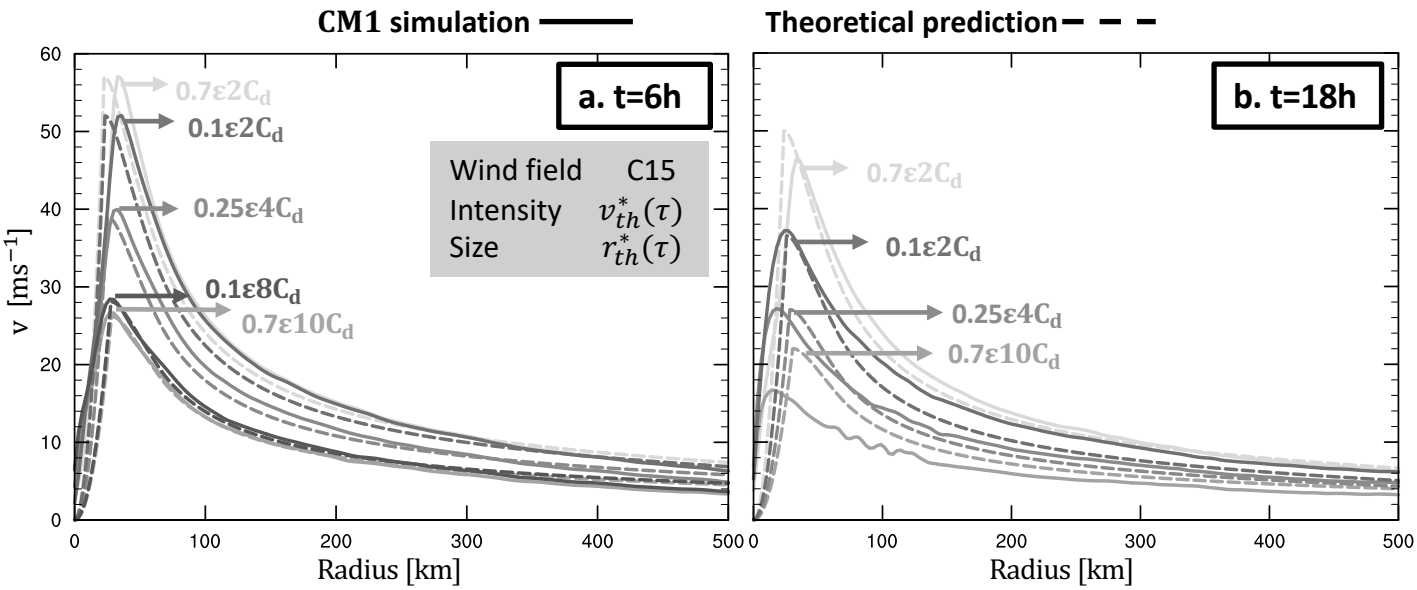

Figure 2. Simulated Wind field of representative landfall experiments (solid) and the corresponding full-theoretical prediction (dash) at (a) $\tau = 6\ h$ and (b) $\tau = 18\ h$. Full-theoretical wind field prediction applies the theoretically predicted intensity response $v^*_{th}(\tau)$ introduced in CC21 (Eq. 14-15 therein) and its corresponding size estimation $r^*_{th}(\tau)$ (Eq. 10) in the C15 model. Experiments with stronger surface modifications decay too fast to produce the input v_m and r_{34kt} for C15 model at $\tau = 18\ h$, thus $0.1\varepsilon 8C_d$ experiment is not shown in (b).