Supporting Information for "A new framework for evaluating model simulated inland tropical cyclone wind fields"

Jie Chen[1], Kun Gao[1], Lucas Harris[2], Timothy Marchok[2], Linjiong Zhou [1],

Matthew Morin[2]

[1]The Program in Atmospheric and Oceanic Sciences, Princeton University, Princeton, NJ

[2]NOAA Geophysical Fluid Dynamics Laboratory (GFDL), Princeton, NJ

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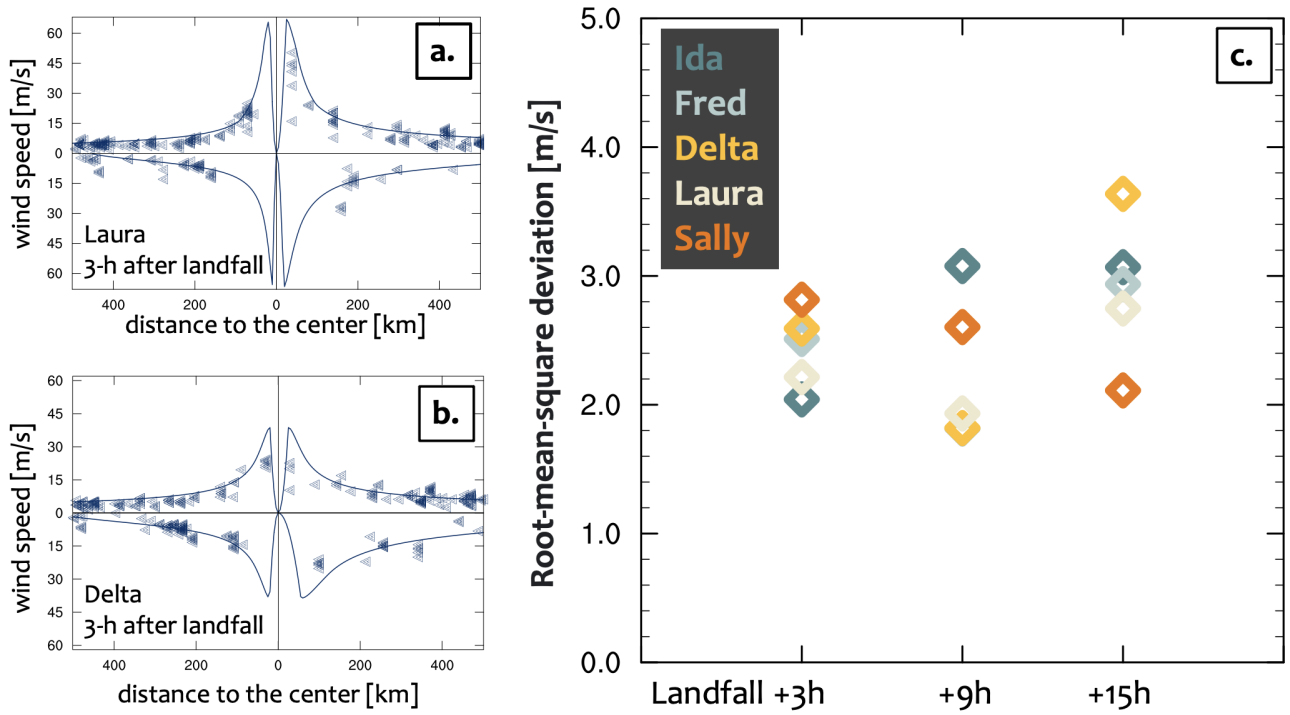

Figure S1. (a)-(b) Similar to Figure 2c, but additional examples showing the ASOS wind speed radial distribution and the corresponding observation-driven, theory-based (Obs-Theo) wind profiles of Hurricanes Laura and Delta 3-h after their observed landfall. (c) The quadrant-averaged root-mean-square deviation of ASOS observations from the Obs-Theo wind profile ($r = 200 - 600\ km$) in each landfall case since the corresponding observed landfall.

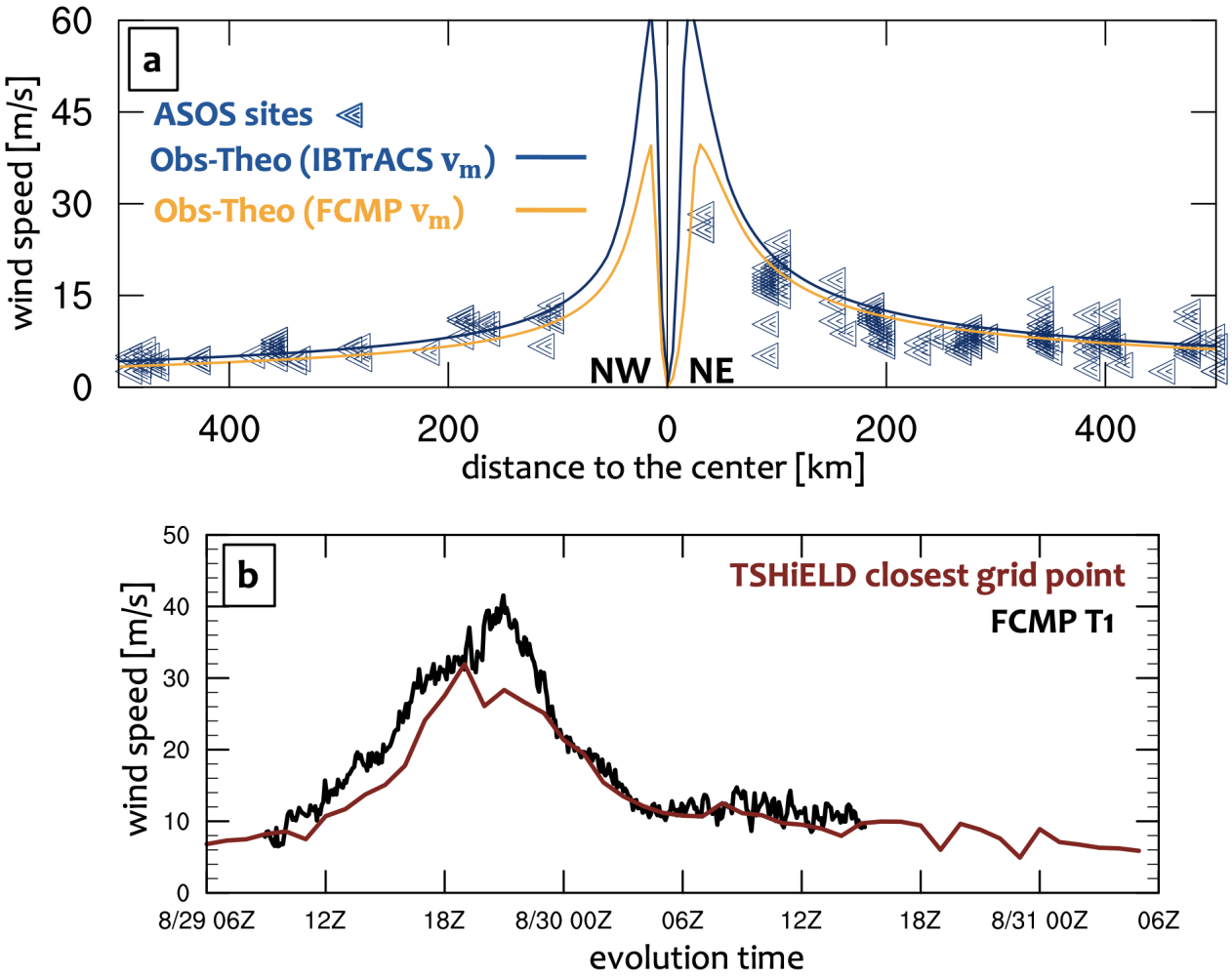

Figure S2. (a) Similar to Figure 2c, but the observation-driven, theory-based (Obs-Theo) wind profile in the northern quadrants of Hurricane Ida (1800 UTC 29 August 2021) using the maximum wind speed v_m obtained from IBTrACS (blue line) and FCMP T1 (yellow line), respectively. The representative radius r_{10} for the both of the Obs-Theo wind fields is obtained from the cubic spline of the wind speed radial distribution. (b) The time series of 1-min averaged v_m recorded by the FCMP T1 and the corresponding closest T-SHiELD grid point, respectively.

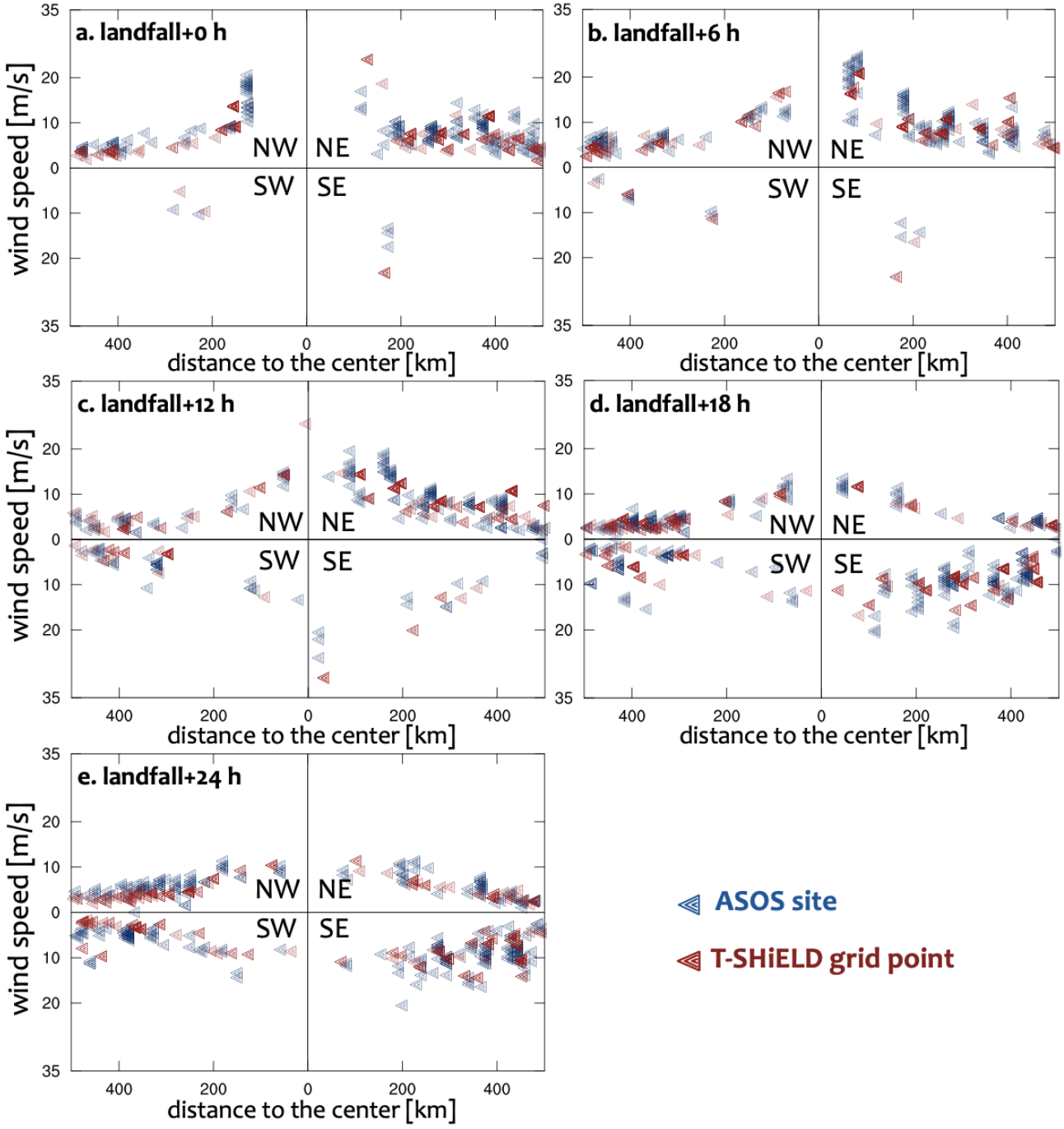

Figure S3. Same as Figure 2b, but for the Hurricane Ida (2021) wind speed radial distribution in each quadrant generated from ASOS sites and their corresponding T-SHiELD grid points at (a) 1500UTC, (b) 2100UTC 29 Aug 2021, and (c) 0300UTC, (d) 0900UTC, (e) 1500UTC 30 Aug 2021, which are $0, 6, 12, 18$ and 24 h since the landfall, respectively. The T-SHiELD forecast time is 12 hours plus the observed time.

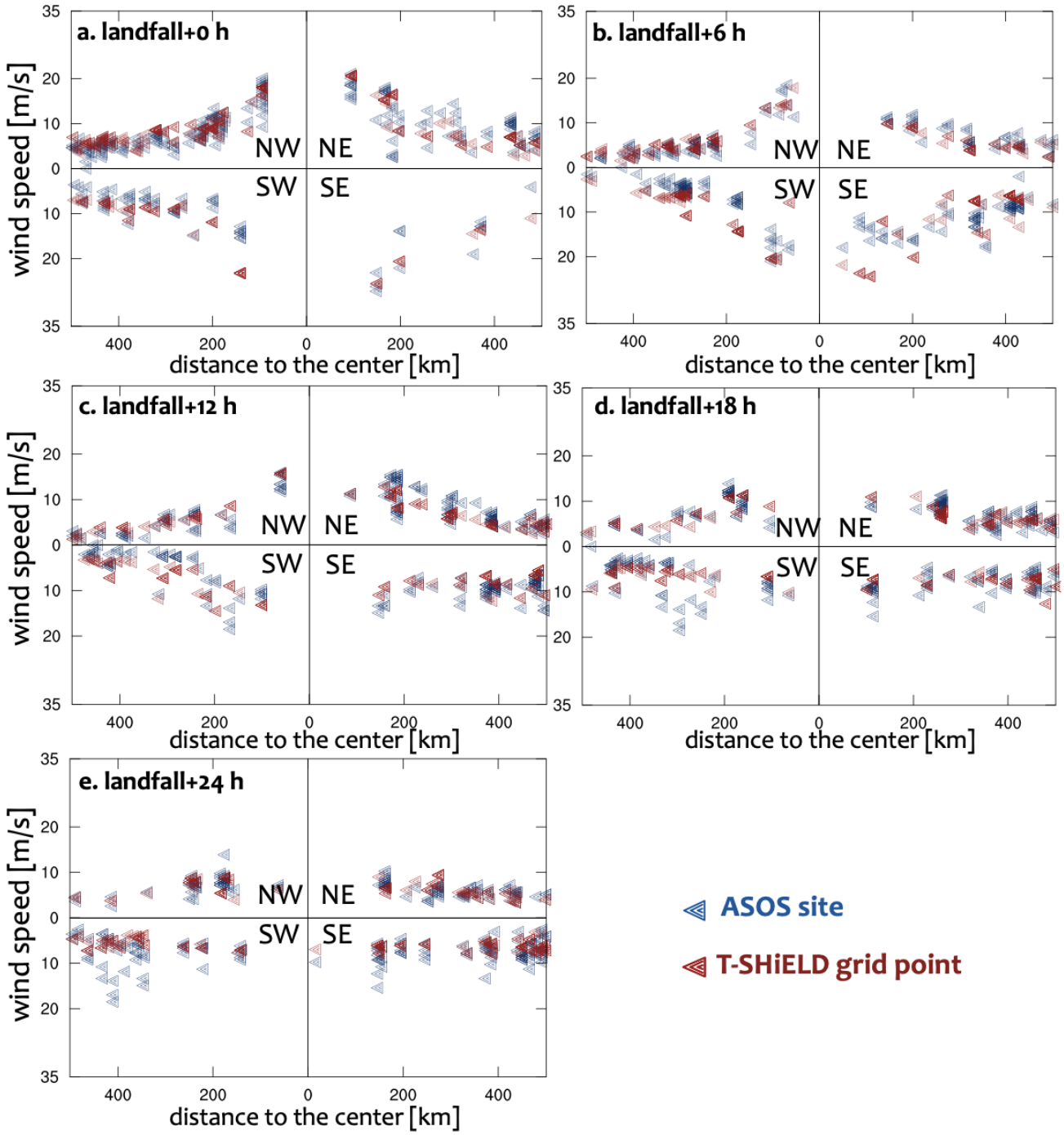

Figure S4. Same as S3, but for the Hurricane Delta (2020) at (a) 2100UTC 9 Oct 2020, (b) 0300UTC (c) 0900UTC, (d) 1200UTC, (e) 1800UTC 10 Oct 2020, which are 0, 6, 12, 18 and 24 h since the landfall, respectively. The T-SHiELD forecast time is 12 hours plus the observed time.

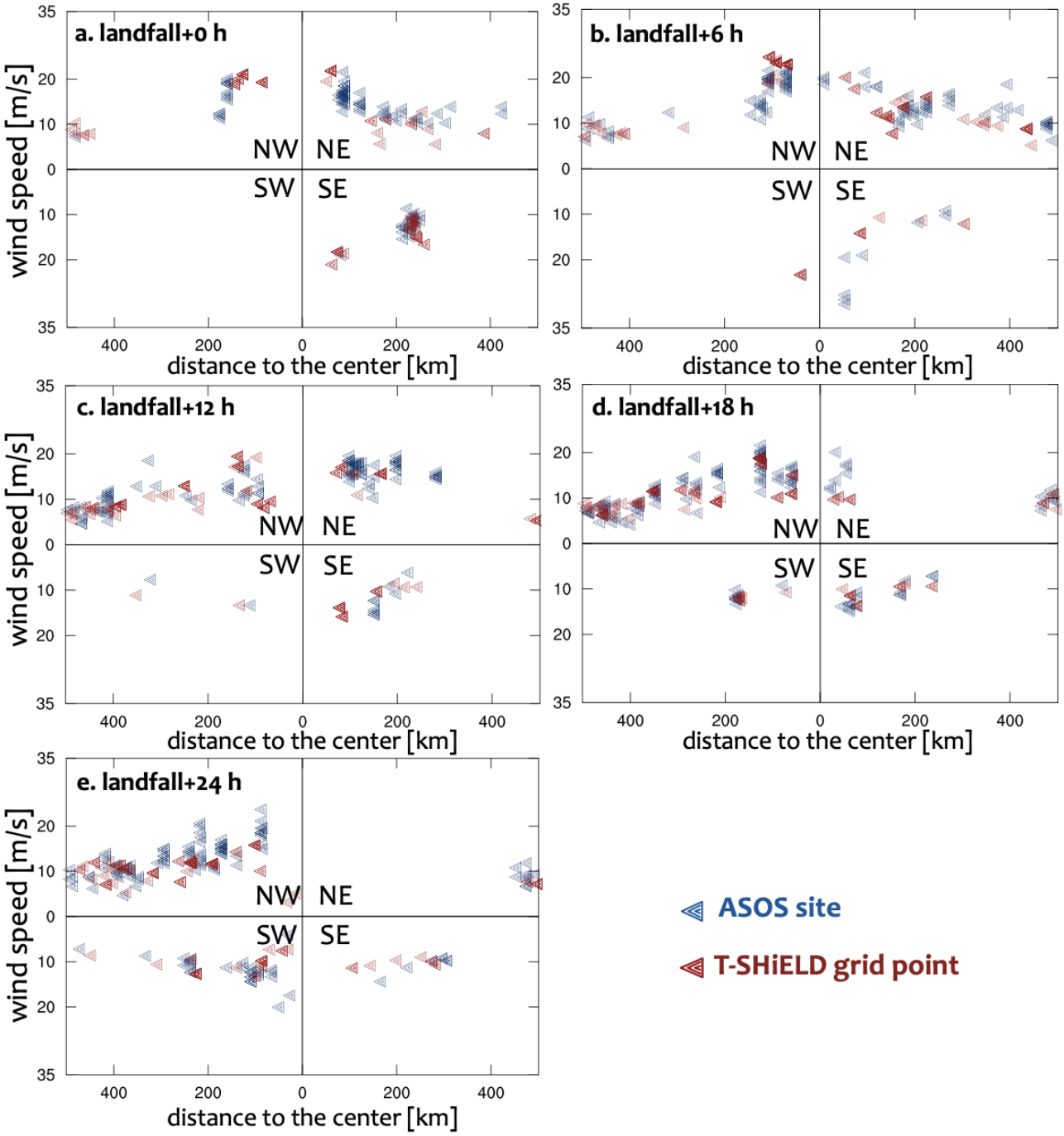

Figure S5. Same as S1, but for the Hurricane Ian (2022) at (a) 0600UTC, (b) 1200UTC and (c) 1800UTC 27 Sept. 2022, and (d) 0000UTC, (e) 0600UTC 28 Sept. 2022 , which are 0, 6, 12, 18 and 24 h since the landfall, respectively. The T-SHiELD forecast time is 12 hours plus the observed time.

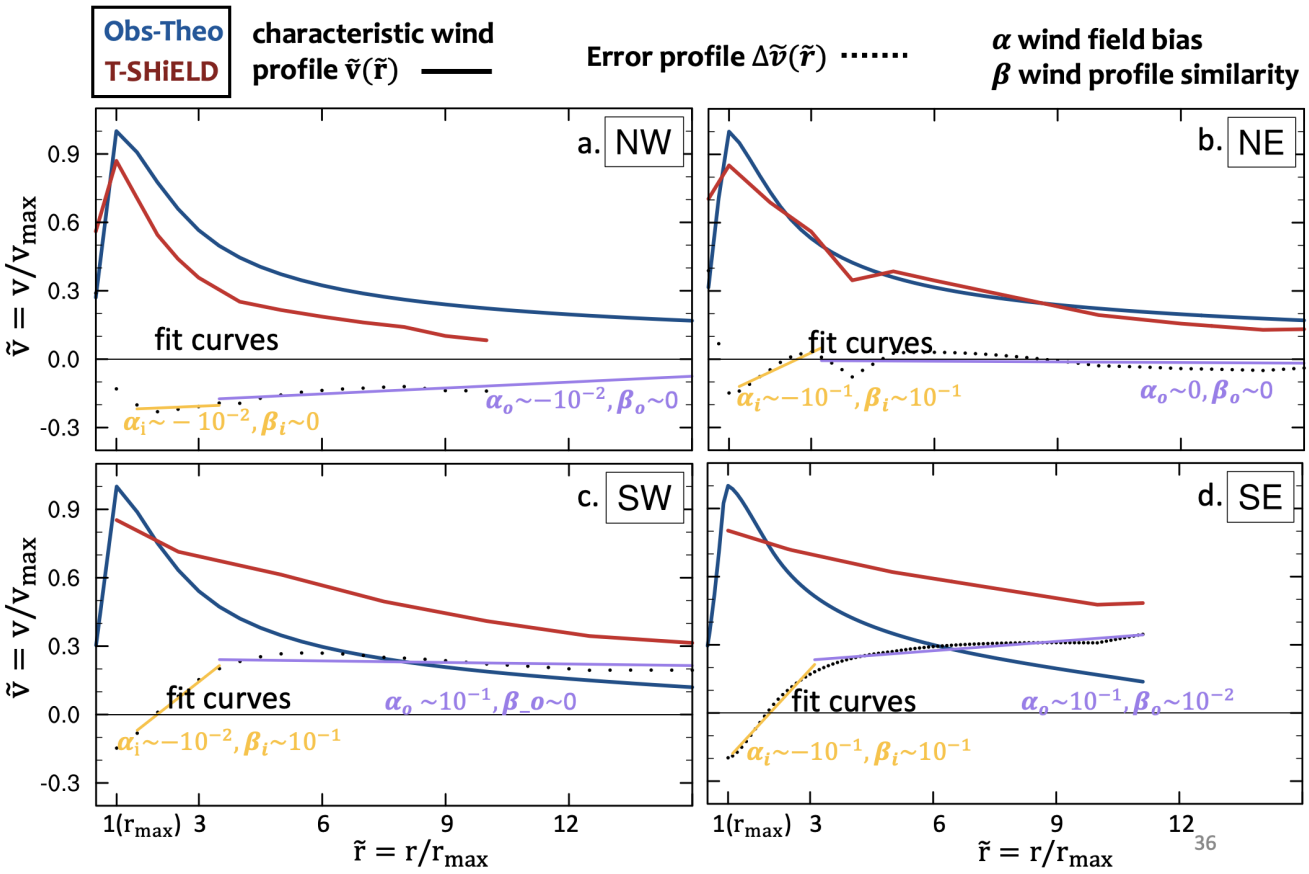

Figure S6. Same as Figure 3, but for the Hurricane Fred (2021) at 1800 UTC 16 Aug, 2021. In this example (c)-(d), the positive α in the outer region indicates a stronger wind field forecast, while the wind profile shape may or may not resemble the Obs-Theo or not, depending on the value of β.