Geophysical Research Letters

Supporting Information for

Estimation of the Tangential Winds and Asymmetric Structures in Typhoon Inner Core Region Using Himawari-8

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Captions for Movies S1

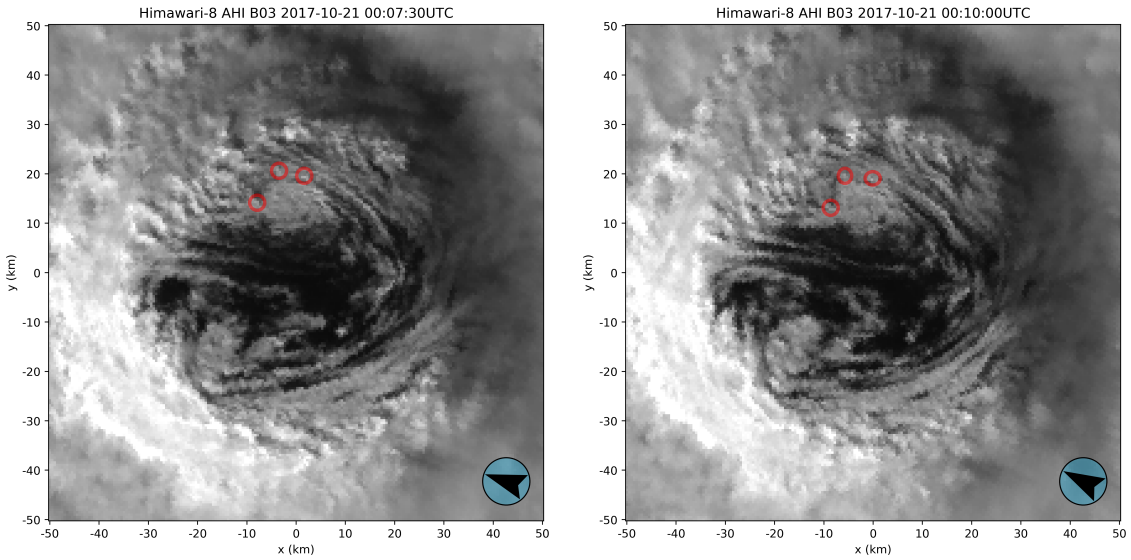

Figure S1. The three features around the mesovortex (MV)-1 used to derive its vorticity (red circles) shown on visible images rotated clockwise to compensate for the eye's rotation at $r =$ 15 km (see section 4.2). Left: $\left(x_1^{t_0}, y_1^{t_0}\right) = (1.57, 19.24)$, $\left(x_2^{t_0}, y_2^{t_0}\right) = (-3.6, 20.29)$, $\left(x_3^{t_0}, y_3^{t_0}\right) = (-8.18, 13.74)$ at $t_0 =$ 00:07:30 UTC, 21, October. Right: $\left(x_1^{t_0+\Delta t}, y_1^{t_0+\Delta t}\right) = (-0.26, 18.85)$, $\left(x_2^{t_0+\Delta t}, y_2^{t_0+\Delta t}\right) = (-5.89, 19.37)$, $\left(x_3^{t_0+\Delta t}, y_3^{t_0+\Delta t}\right) = (-8.77, 12.96)$ at $t_0 + \Delta t =$ 00:10:00 UTC, 21 in local coordinates (units: km). Black arrowhead near the lower right corner indicates the north direction.

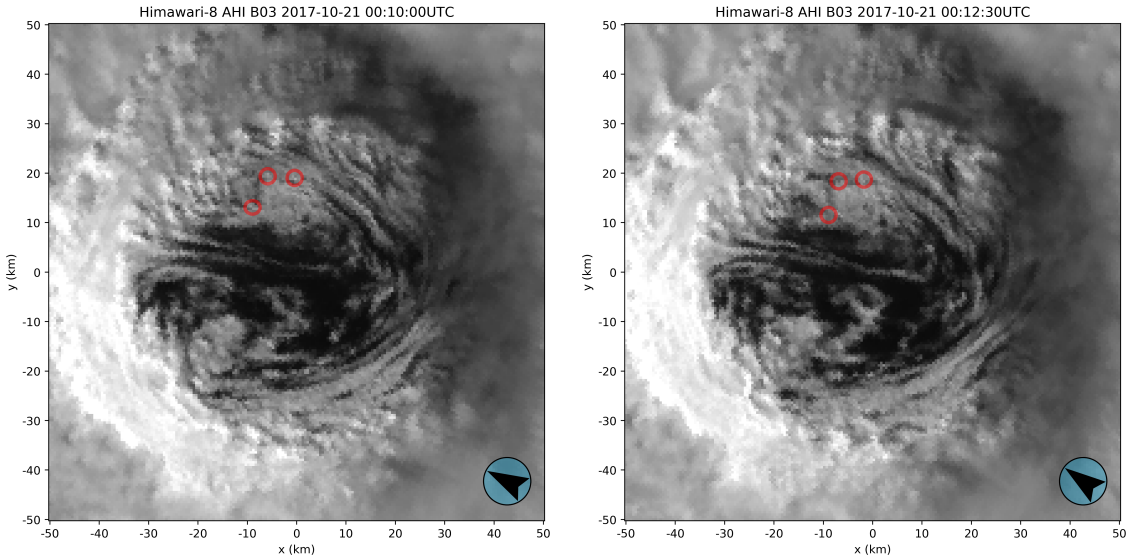

Figure S2. As in **Fig. S1** but at different times. Left: $\left(x_1^{t_0}, y_1^{t_0}\right) = (-0.26, -18.85)$, $\left(x_2^{t_0}, y_2^{t_0}\right) = (-5.89, 19.37)$, $\left(x_3^{t_0}, y_3^{t_0}\right) = (-8.77, 12.96)$ at $t_0 =$ 00:10:00 UTC, 21, October. Right: $\left(x_1^{t_0+\Delta t}, y_1^{t_0+\Delta t}\right) = (-1.96, 18.46)$, $\left(x_2^{t_0+\Delta t}, y_2^{t_0+\Delta t}\right) = (-7.07, 18.19)$, $\left(x_3^{t_0+\Delta t}, y_3^{t_0+\Delta t}\right) = (-9.29, 11.39)$ at $t_0 + \Delta t =$ 00:12:30 UTC, 21.

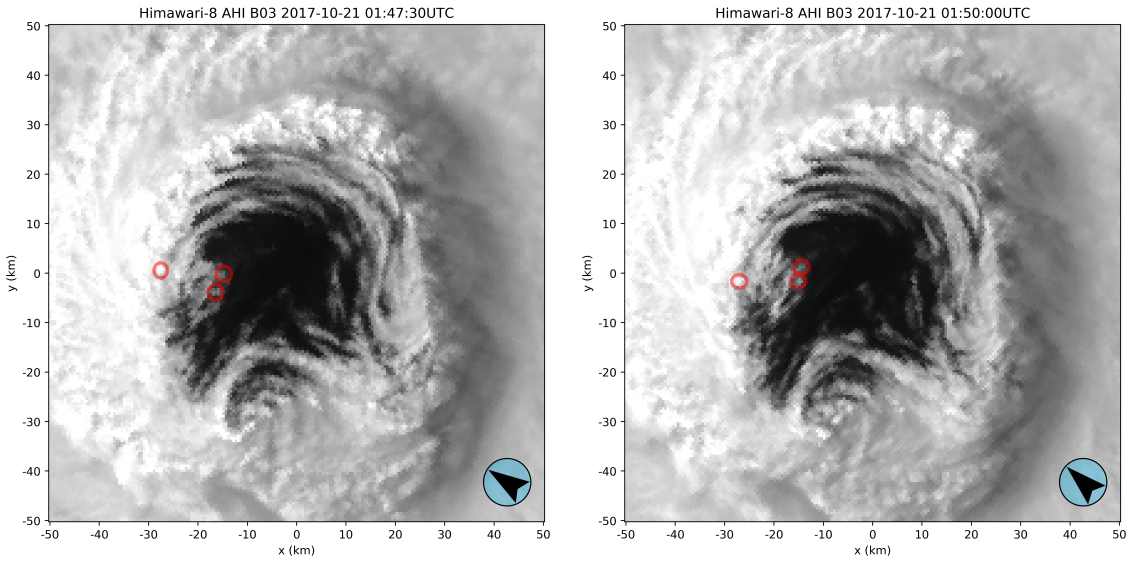

Figure S3. As in **Fig. S1** but for MV-4 at different time. Left: $\left(x_1^{t_0}, y_1^{t_0}\right) = (-27.36, 0.52)$, $\left(x_2^{t_0}, y_2^{t_0}\right) = (-16.16, -3.93)$, $\left(x_3^{t_0}, y_3^{t_0}\right) = (-14.66, -0.13)$ at t_0 = 01:47:30 UTC, 21, October. Right: $\left(x_1^{t_0+\Delta t}, y_1^{t_0+\Delta t}\right) = (-27.03, -1.70)$, $\left(x_2^{t_0+\Delta t}, y_2^{t_0+\Delta t}\right) = (-14.92, -1.70)$, $\left(x_3^{t_0+\Delta t}, y_3^{t_0+\Delta t}\right) = (-14.33, 1.18)$ at $t_0 + \Delta t$ = 01:50:00 UTC, 21.

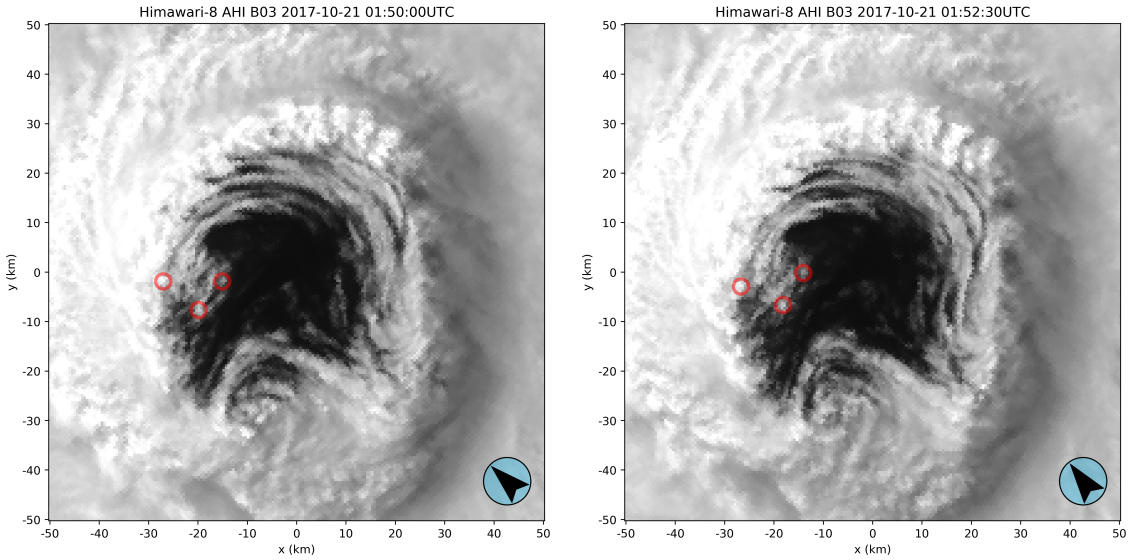

Figure S4. As in **Fig. S1** but for MV-4 at different time. Left: $\left(x_1^{t_0}, y_1^{t_0}\right) = (-27.03, -1.70)$, $\left(x_2^{t_0}, y_2^{t_0}\right) = (-14.92, -1.70)$, $\left(x_3^{t_0}, y_3^{t_0}\right) = (-19.63, -7.72)$ at t_0 = 01:50:00 UTC, 21, October. Right: $\left(x_1^{t_0+\Delta t}, y_1^{t_0+\Delta t}\right) = (-26.77, -2.62)$, $\left(x_2^{t_0+\Delta t}, y_2^{t_0+\Delta t}\right) = (-14.01, 0.07)$, $\left(x_3^{t_0+\Delta t}, y_3^{t_0+\Delta t}\right) = (-18.13, -6.54)$ at $t_0 + \Delta t$ = 01:52:30 UTC, 21.

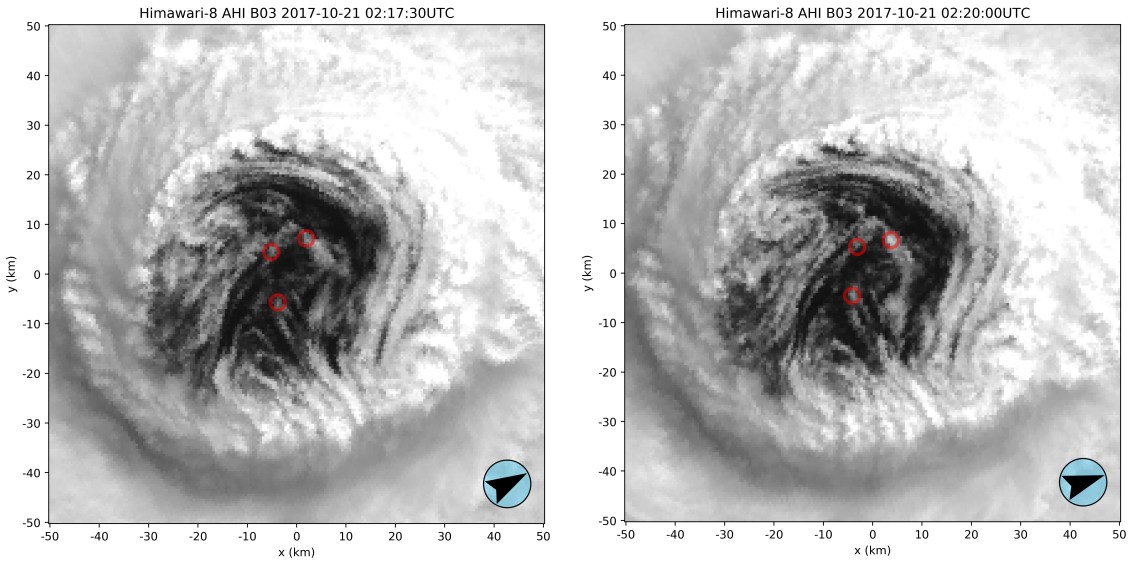

Figure S5. As in **Fig. S1** but for MV-6 at different time. Left: $\left(x_1^{t_0}, y_1^{t_0}\right) = (-3.73, -6.09)$, $\left(x_2^{t_0}, y_2^{t_0}\right) = (2.09, 6.87)$, $\left(x_3^{t_0}, y_3^{t_0}\right) = (-4.97, 4.32)$ at t_0 = 02:17:30 UTC, 21, October. Right: $\left(x_1^{t_0+\Delta t}, y_1^{t_0+\Delta t}\right) = (-4.06, -4.45)$, $\left(x_2^{t_0+\Delta t}, y_2^{t_0+\Delta t}\right) = (3.47, 6.68)$, $\left(x_3^{t_0+\Delta t}, y_3^{t_0+\Delta t}\right) = (-3.27, 5.37)$ at $t_0 + \Delta t$ = 02:20:00 UTC, 21.

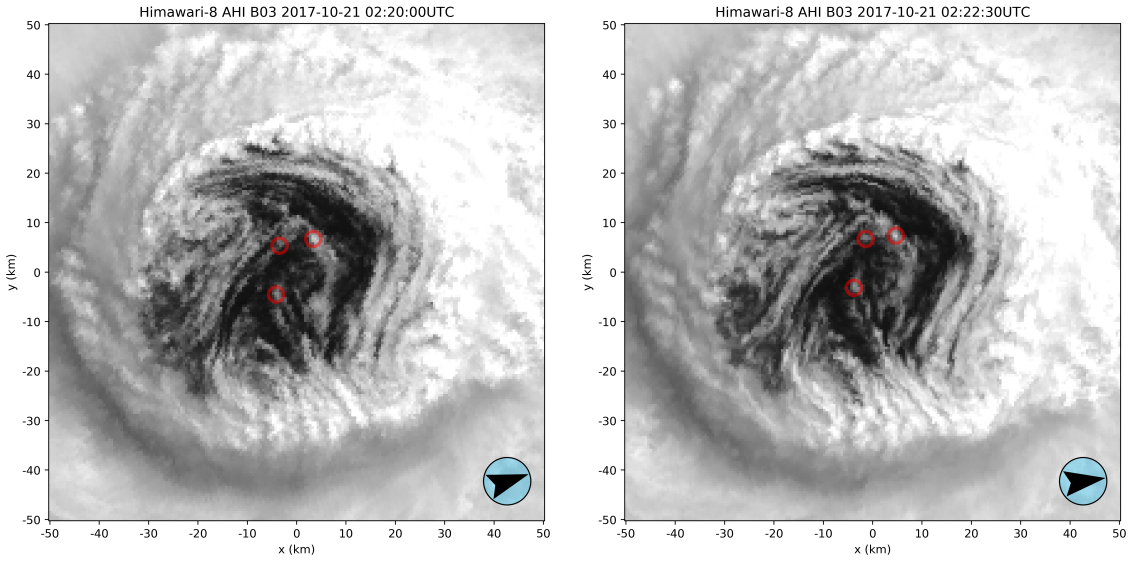

Figure S6. As in **Fig. S1** but for MV-6 at different time. Left: $\left(x_1^{t_0}, y_1^{t_0}\right) = (-4.06, -4.45)$, $\left(x_2^{t_0}, y_2^{t_0}\right) = (3.47, 6.68)$, $\left(x_3^{t_0}, y_3^{t_0}\right) = (-3.27, 5.37)$ at t_0 = 02:20:00 UTC, 21, October. Right: $\left(x_1^{t_0+\Delta t}, y_1^{t_0+\Delta t}\right) = (-3.80, -3.01)$, $\left(x_2^{t_0+\Delta t}, y_2^{t_0+\Delta t}\right) = (4.65, 7.40)$, $\left(x_3^{t_0+\Delta t}, y_3^{t_0+\Delta t}\right) = (-1.57, 6.87)$ at $t_0 + \Delta t$ = 02:22:30 UTC, 21.

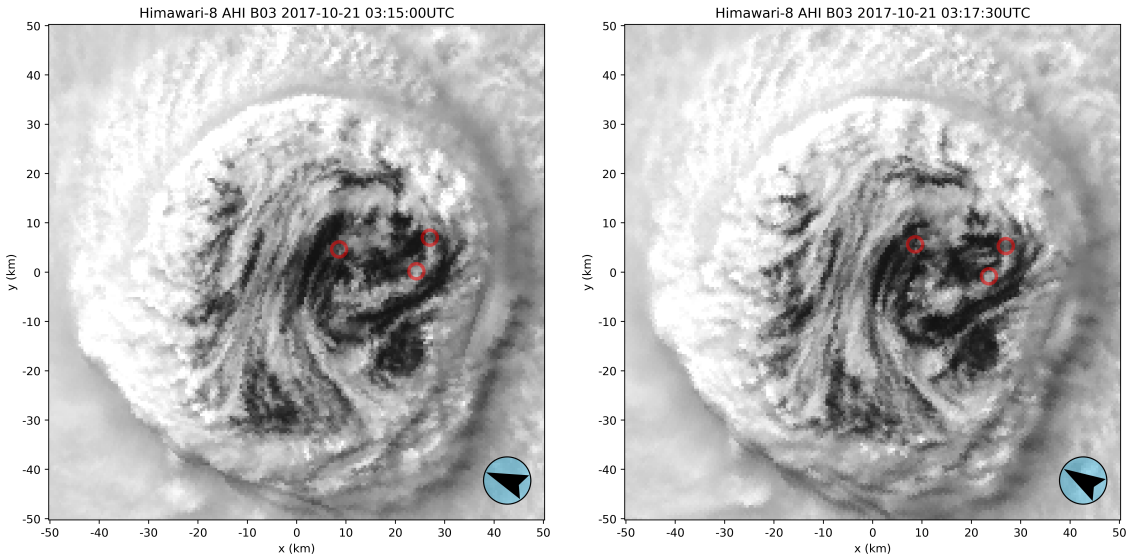

Figure S7. As in **Fig. S1** but for MV-6 at different time. Left: $\left(x_1^{t_0}, y_1^{t_0}\right) = (8.44, 4.58)$, $\left(x_2^{t_0}, y_2^{t_0}\right) = (24.21, 0.39)$, $\left(x_3^{t_0}, y_3^{t_0}\right) = (26.83, 7.07)$ at t_0 = 03:15:00 UTC, 21, October. Right: $\left(x_1^{t_0+\Delta t}, y_1^{t_0+\Delta t}\right) = (8.57, 5.63)$, $\left(x_2^{t_0+\Delta t}, y_2^{t_0+\Delta t}\right) = (23.56, -0.85)$, $\left(x_3^{t_0+\Delta t}, y_3^{t_0+\Delta t}\right) = (27.16, 5.30)$ at $t_0 + \Delta t$ = 03:17:30 UTC, 21.

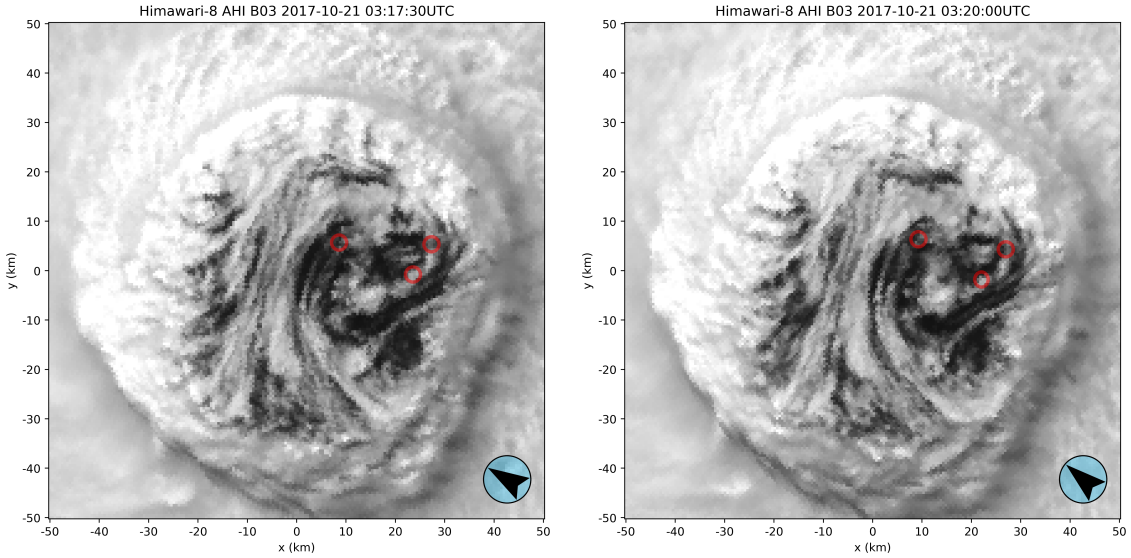

Figure S8. As in **Fig. S1** but for MV-6 at different time. Left: $\left(x_1^{t_0}, y_1^{t_0}\right) = (8.57, 5.63)$, $\left(x_2^{t_0}, y_2^{t_0}\right) = (23.56, -0.85)$, $\left(x_3^{t_0}, y_3^{t_0}\right) = (27.16, 5.30)$ at t_0 = 03:17:30 UTC, 21, October. Right: $\left(x_1^{t_0+\Delta t}, y_1^{t_0+\Delta t}\right) = (9.42, 6.48)$, $\left(x_2^{t_0+\Delta t}, y_2^{t_0+\Delta t}\right) = (22.19, -1.90)$, $\left(x_3^{t_0+\Delta t}, y_3^{t_0+\Delta t}\right) = (27.16, 4.19)$ at $t_0 + \Delta t$ = 03:20:00 UTC, 21.

Movie S1. 2.5-minute Himawari-8 VIS images of the Typhoon Lan (2017) at $r \leq 50$ km rotated clockwise from 22:45 UTC, 20, October to 06:45 UTC, 21, October. The images are rotated clockwise to compensate for the rotation speed of $\sim 1.15 \times 10^{-3}$ rad/s at $r = 15$ km (**Fig. 4**).