

Shimada, U., M. Hayashi, and A. Mouche, 2024: A comparison between SAR wind speeds and western North Pacific tropical cyclone best track estimates. *J. Meteor. Soc. Japan*, **102**, <http://doi:10.2151/jmsj.2024-031>.

**Plain Language Summary:** Spaceborne synthetic aperture radar (SAR) for measuring high winds is expected to reduce uncertainties in tropical cyclone (TC) intensity and structure estimation, yet the consistency of SAR observed winds with the conventionally estimated 10-min maximum wind speed ( $V_{\max 10}$ ) remains to be assessed. Using appropriate bias correction and wind speed conversion methods, a comparison showed that the mean absolute difference between SAR  $V_{\max 10}$  and best track  $V_{\max 10}$  estimates from the Japan Meteorological Agency (JMA) was  $4.8 \text{ m s}^{-1}$ .

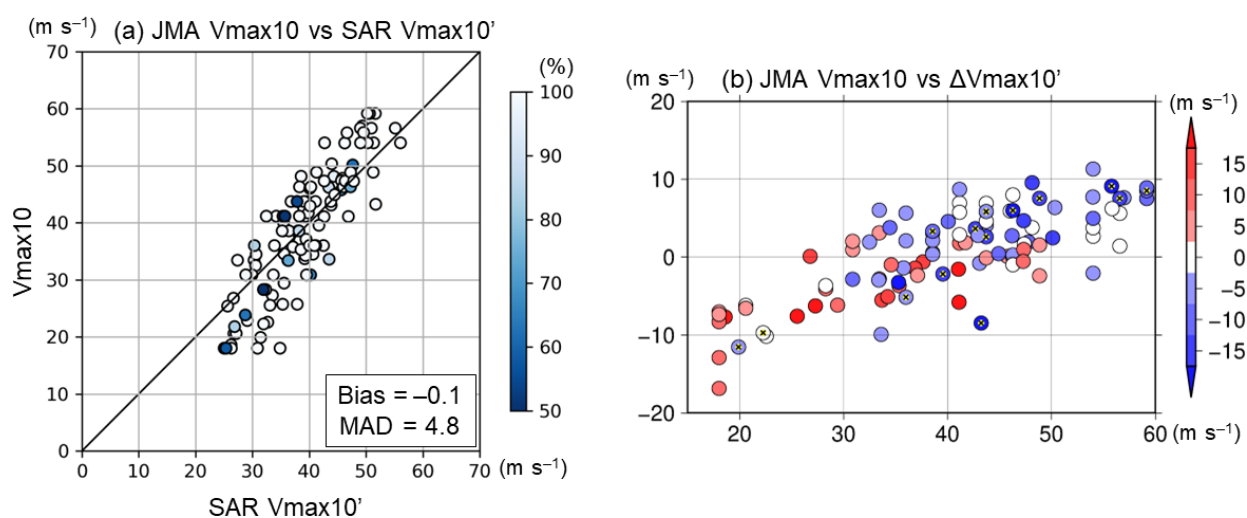


Figure 1. (a) Scatter plots of SAR  $V_{\max 10}$  ( $\text{m s}^{-1}$ ) versus JMA best track  $V_{\max 10}$  ( $\text{m s}^{-1}$ ). The black line indicates the 1-1 line. MAD is the mean absolute difference. Colors indicate the coverage (%) of SAR wind observations at the radius of maximum wind. (b) Scatter plots of JMA  $V_{\max 10}$  ( $\text{m s}^{-1}$ ) versus bias-corrected  $\Delta V_{\max 10}$  (JMA best track  $V_{\max 10}$  – SAR  $V_{\max 10}$ ,  $\text{m s}^{-1}$ ). Colors indicate JMA  $V_{\max 10}$  changes in the next 24 h from the 6-hourly synoptic time closest to the SAR observation time.

- The comparison between the SAR-derived 10-min maximum wind speed ( $V_{\max 10}$ ) and the JMA  $V_{\max 10}$  suggests that the actual  $V_{\max 10}$  of the TCs examined in this study increased earlier and started to decrease earlier than the JMA  $V_{\max 10}$ .
- The JMA best track 30-kt wind radius is generally consistent with SAR wind speeds, whereas the JMA best track 50-kt wind radius is systematically underestimated relative to SAR wind speeds.
- Aside from the SAR wind limitations, possible reasons for the observed discrepancies between SAR wind observations and best track estimates include biases in the Dvorak analysis and conventional surface wind products.