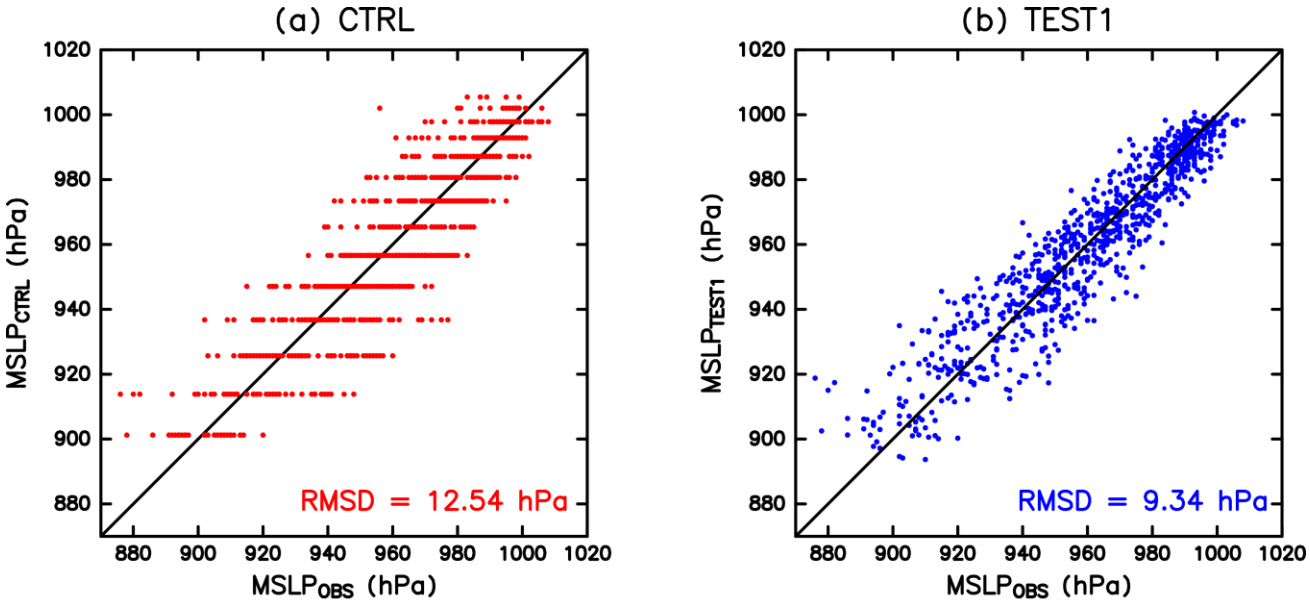
Aizawa, M., K. Ito, and U. Shimada, 2024: Revisiting Koba's relationship to improve minimum sea-level pressure estimates of western North Pacific tropical cyclones. *J. Meteor. Soc. Japan*, **102**, http://doi.org/10.2151/jmsj.2024-018.

Plain Language Summary: The Regional Specialized Meteorological Center - Tokyo applies the satellite-based Dvorak technique using the relationship developed by Koba et al. (1990) for one of the important sources of tropical cyclone (TC) intensity analysis. We revisited Koba's relationship and reconstructed a new regression equation that used current intensity (CI) numbers analyzed through modern methods and additional explanatory parameters with careful treatment of the aircraft data. The revised model reduced the root mean squared difference (RMSD) of the minimum sea-level pressure (MSLP) between the aircraft data and the concurrent estimates by more than 20% to 9.3 hPa.



$$\mathrm{MSLP_{CTRL}} = -1.53\mathrm{CI}^2 - 3.03\mathrm{CI} + 1010.01$$

$$\mathrm{MSLP_{TEST1}} = -2.17\mathrm{CI}^2 + 5.43\mathrm{CI} + 1.73\delta\mathrm{CI}_{24} - 0.367\Phi - 0.0227R - 5.78 + P_{\mathrm{env}}$$

Figure 1. Comparison of aircraft-based observations and regression models for the Koba's equation (CTRL) and revised regression equation (TEST1). The RMSDs are shown in the right-bottom of each panel. $\delta\mathrm{CI}_{24}$ is the change of CI number in the last 24 hours, Φ is the latitude of TC center, R is the TC size.

- The RMSD of the individual MSLP records with respect to the regression line was estimated to be as much as 12.5–13.0 hPa in the current framework.
- The RMSD was substantially reduced in the new model that used CI numbers analyzed through modern methods and additional explanatory parameters with careful treatment of the aircraft data.
- The signs of the coefficients in the proposed model suggest that the actual MSLP change lags the change in the corresponding CI number. The large TC at high latitudes with lower environmental pressure has a low MSLP for a given CI number.