Kawabata, Y., and M. Yamaguchi, 2020: Probability ellipse for tropical cyclone track forecasts with multiple ensembles. *J. Meteor. Soc. Japan*, **98**, 821-833. https://doi.org/10.2151/jmsj.2020-042

Plain Language Summary: The effectiveness of the probability ellipse for tropical cyclone (TC) track forecasts is investigated with multiple ensembles from the Japan Meteorological Agency (JMA), the European Centre for Medium-Range Weather Forecasts (ECMWF), the U.S. National Centers for Environmental Prediction (NCEP), and the Met Office in the United Kingdom (UKMO), for all TCs from 2016 to 2018. The multiple ensembles composed of these four global ensembles are capable of predicting the situation-dependent uncertainties of TC track forecasts appropriately in both the along-track and cross-track directions.

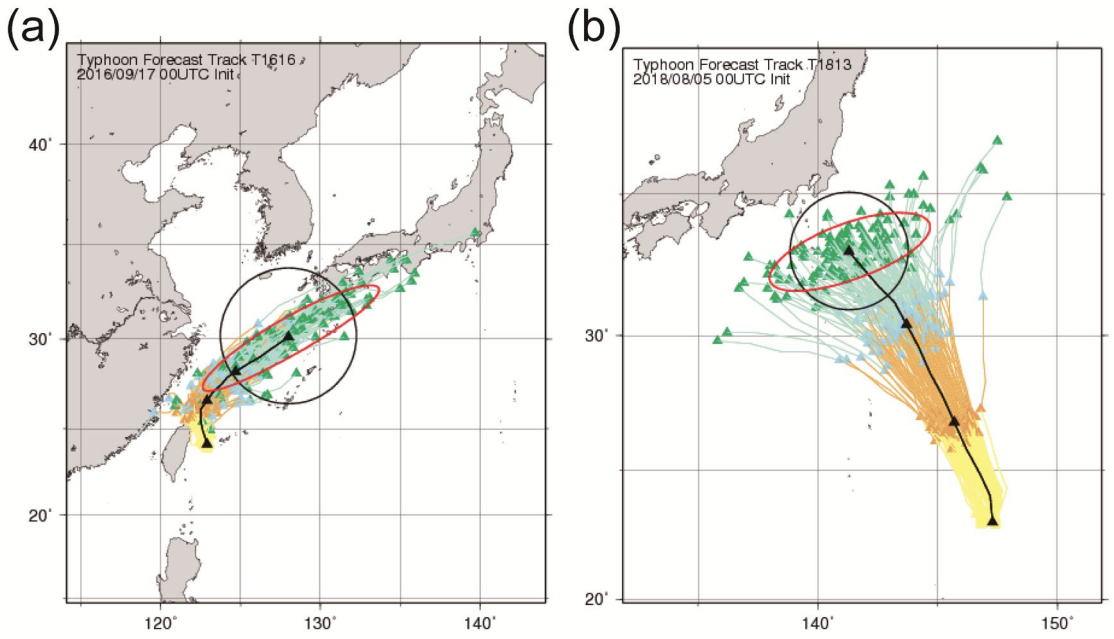

Figure 1. Examples of TC track prediction by the multiple ensemble (colored lines) and the ensemble mean forecasts (black line) at forecast times of 24, 48, and 72 h for (a) Typhoon Malakas, and (b) Typhoon Shanshan. The probability circle (black) and ellipse (red) at the forecast time of 72 h are also shown.

- The introduction of the probability ellipse makes it possible to provide information as to which is more uncertain; the direction or the speed of TC movement.
- Compared to the probability circle adopted operationally at JMA, the probability ellipse can potentially reduce the area by 16, 15, 24 %, on average, at forecast times of 3, 4, and 5 days, respectively.
- Narrowing warning areas of TC track forecasts by the probability ellipse enables us to enhance disaster prevention/mitigation measures.