

Li, J., F. Ren, C. Ding, J. Zuo, M. Wang, Y. Chen, and T. Feng, 2022: Improvement of the ensemble methods in the Dynamical–Statistical–Analog Ensemble Forecast model for landfalling typhoon precipitation. *J. Meteor. Soc. Japan*, **100**, 555-573.

<https://doi.org/10.2151/jmsj.2022-029>

**Plain Language Summary:** The Dynamical–Statistical–Analog Ensemble Forecast model for landfalling typhoon precipitation (the DSAEF\_LTP model) identifies tropical cyclones (TCs) similar to the target TC and then assembles the precipitation of them to get the precipitation forecast for the target TC. Two original ensemble methods in the DSAEF\_LTP model, namely, mean and maximum, tend to under- and over- forecast TC precipitation, respectively. To improve the forecast performance of the DSAEF\_LTP model, the following five new ensemble methods are incorporated: optimal percentile, fuse, probability-matching mean (PM), equal difference-weighted mean (ED-WM), and TC track Similarity Area Index-weighted mean (TSAI-WM). Experiments show that the overall performance of the optimal percentile (the 90th percentile) ensemble method is superior.

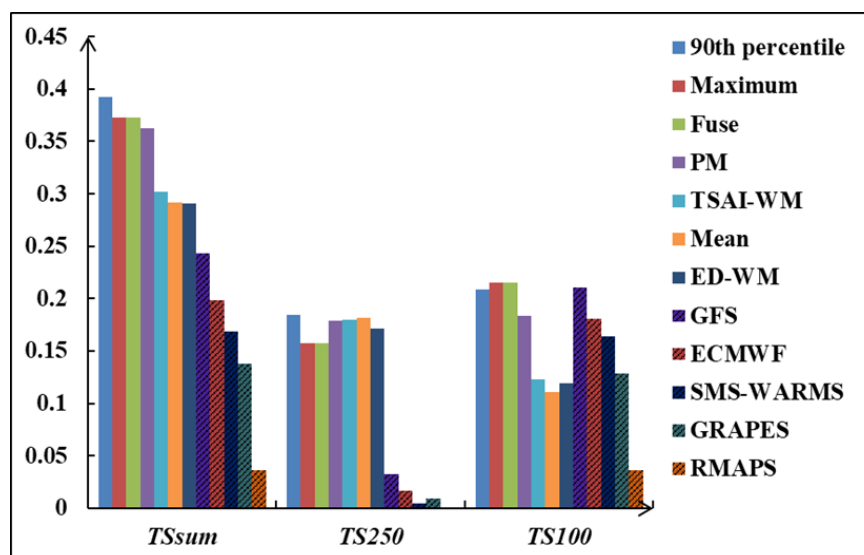


Figure 1. Threat scores (TS) for TC precipitation forecasts with different ensemble methods of the DSAEF\_LTP model and five Numerical Weather Prediction (NWP) models (i.e., ECMWF, GRAPES, GFS, SMA-WARMS and RMAPS). The higher the TS is, the better is the forecast performance. TS100 and TS250 are TS at thresholds above 100 and 250 mm, respectively.  $TS_{sum} = TS_{100} + TS_{250}$ .

- The 90th percentile ensemble method performs best in TC precipitation forecasts of the DSAEF\_LTP model.
- Compared with the five NWP models, the DSAEF\_LTP model with the new ensemble methods performs better.
- The forecast performance of the DSAEF\_LTP model can be further improved by applying different ensemble methods to TCs with different track types.