

Predictability of Typhoon TRAMI (2018) track

*SORA NAKAOJI¹, MIO MATSUEDA²

1. Graduate School of Science and Technology, University of Tsukuba, 2. Center for Computational Sciences, University of Tsukuba

Typhoon TRAMI (2018) which occurred near the Mariana Islands on 21st September 2018, made a landfall near Tanabe City, Wakayama Prefecture on 30th September 2018 and caused not only windstorm, heavy rain, high wave, storm surge but also extensive damages including salt damage, residential damage, and four fatalities throughout Japan. This study assessed the ensemble forecast skill of the TRAMI tracks using European Centre for Medium-Range Weather Forecasts (ECMWF), Japan Meteorological Agency (JMA), National Centers for Environmental Prediction (NCEP), and United Kingdom Meteorological Office (UKMO), focusing on the influence of atmospheric fields on tropical cyclone tracks. Most of ensemble members in all the centres initialized at 00UTC 22nd and 23rd September, predicted the tracks for TRAMI westward relative to the best track. The ECMWF ensemble forecasts initialised at 00UTC 22nd and 23rd September, showed a larger variability of the predicted track than did the other centres. In particular, these forecasts, valid at 00UTC 27th September showed the largest variability of the predicted track. The track predicted by 78% (92%) of the ECMWF ensemble members initialised at 00UTC 22nd (23rd) September, was shifted rightward or forward, compared with the best track. Comparisons among the rightward- and forward-shifted members with position errors of > 200km and well-predicted (good) members with position errors of < 150km were made. The leftward-shifted members predicted an upper-level trough north of TRAMI to the east relative to the observed position. The forward-shifted members predicted a southward extension of the upper-level trough to be weaker than observed. The forecast initialised at 00UTC 24th September showed a large improvement in predicting the cyclone position and the southward extension of the trough. The percentages of the good members initialised at 00UTC 22nd, 23rd and 24th September were 18%, 22%, and 71%, respectively. The study revealed that the predicted track of tropical cyclone largely depends on the predicted position of upper-level troughs, consistent with the previous study showing that the uncertainties in trough forecast can affect the uncertainties in tropical cyclone track forecast.

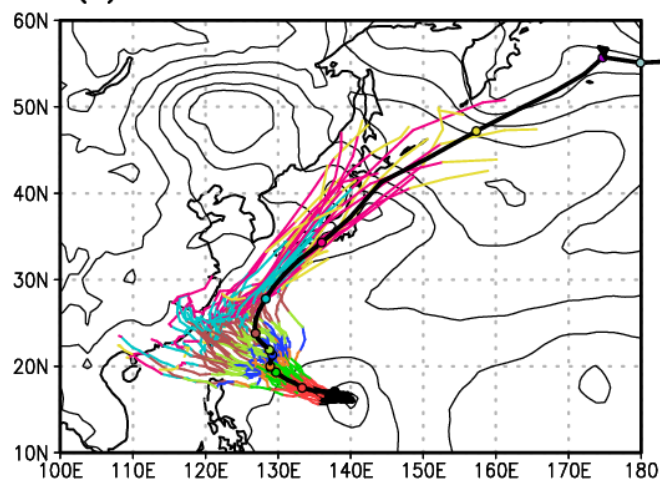
Keywords: Typhoon TRAMI(2018), typhoon track, predictability

Ensemble forecasts for TRAMI track

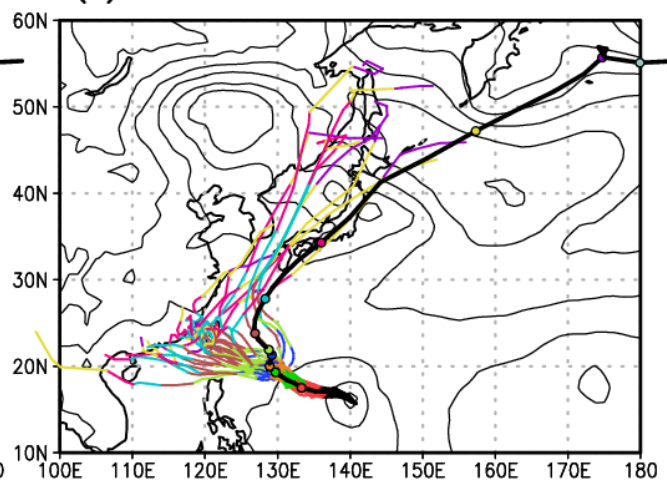
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 +168-192hr +192-216hr +216-240hr +240-264hr +264-288hr +288-360hr best track

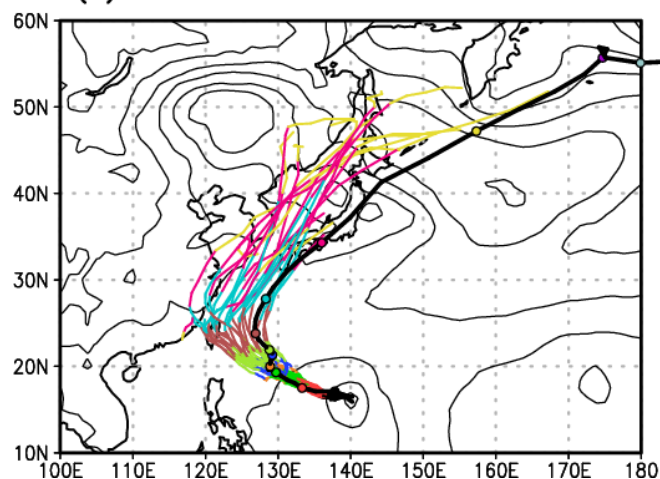
(a)ECMWF



(b)JMA



(c)NCEP



(d)UKMO

