



Typhoon Wind Gust Product for High Speed Rail System in Taiwan

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Severe wind speed and wind gust result in damages and economic losses to buildings and public transport systems. This study applied an ensemble Numerical Weather Prediction (NWP) system to provide the wind gust forecast for specific stations of the High Speed Rail (HSR) system in Taiwan. The ensemble NWP system is named Taiwan Cooperative Precipitation Ensemble Forecast Experiment (TAPEX) began in 2010 and was the first attempt to design a high-resolution numerical ensemble system in Taiwan.

Preliminary verification showed that the surface wind forecast from the ensemble system can well represent the variance of wind speed at each station of the HSR system. For providing wind gust forecast, a strategy been developed from our previous study (Tsai and Yang 2017, under review) was followed. In our previous study, a gust factor was derived using model forecasted and observed wind speed data for each station and multiplied by the forecasted surface wind to provide wind gust forecast. Two approaches, linear regression and micro-genetic algorithm (MGA), were conducted to estimate the gust factor with real-time forecasted and observed data combining a 5-run successively accumulated training data approach.

In this study, a wind gust product produced via a static gust factor derived from linear regression using observational data shows the potential application in operation and builds up the forecast baseline. Not only a static gust factor to provide the wind gust forecast, but the updated gust factor from linear regression and MGA approach will be identified. Two cases, typhoon SOUDELOR (2015) and DUJUAN (2015), were selected and 21 stations along the HSR system were verified. More verification results will be demonstrated in the presentation.