Short-term Prediction of Wind Speed based on

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ABSTRACT

As a kind of wind-sensitive structure, the single-layer (SL) cable net faces the threat of wind which cannot be ignored. An effective way to reduce the harm is to predict the wind speed in advance to allow time for emergency measures. A field measurement was carried out at the China Maritime Museum during typhoon Muifa. Based on the field wind data, a series of algorithm experiments were carried out, and a kind of short-term wind speed prediction model based on frequency decomposition and artificial neural network (ANN) is proposed in this paper. Six mixed models are formed by combining two decomposition algorithms (EMD, VMD and WT) with two ANN models (BPNN and LSTM). The comparison of the six mixed models shows that the choice of decomposition algorithm has a significant influence on the prediction accuracy. The algorithm based on VMD provides the best prediction performance. The best model is selected from the six mixed models by comparing their predictive performance based on the real wind data. The results indicate that the prediction error of different mixed models increases with the increase of step size. The VMD- BPNN is superior to the other models in the wind prediction.

Figure 1 Track map of Typhoon Muifa

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