XVIII World Water Congress
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Technical Research on Operational Application of the OTS Correction Method for Numerical Model Precipitation Forecast

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Objectives

Wu Qishu's team designed the optimal threat score (OTS) correction method with the goal of achieving the optimal threat score of the precipitation forecast correction result.

Methods

Taking the correction experiment of ECMWF model station forecast of 12 h cumulative precipitation as an example, taking Fujian, Jiangxi, Zhejiang and Shanghai as the research area, three technologies cited or initiated by Fujian when realizing the optimal threat score (OTS) correction method are introduced in detail, and compared with similar technologies.

Results

Applying 3-year quasi-symmetric sliding window sampling method to collect training samples to calculate the OTS correction threshold, grouping modeling based on the maximum 2 m temperature forecast to obtain the elimination threshold under different temperature conditions,using the inverse distance weighted interpolation method to interpolate the model precipitation forecast, and then using the OTS correction method to correct the precipitation forecast.

The application of each technology improves the effectiveness, and the comprehensive application of these technologies can significantly improve the final correction effect.

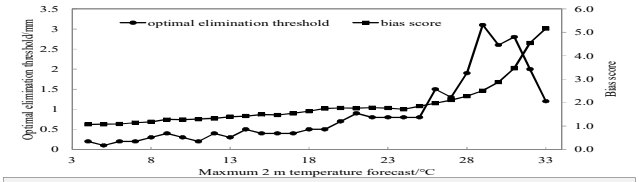

Fig. 1 Variation of the bias score of EC_IDW for ≥0.1 mm and OTS elimination threshold at 24 h with the maximum 2 m temperature forecast from 2018 to 2019

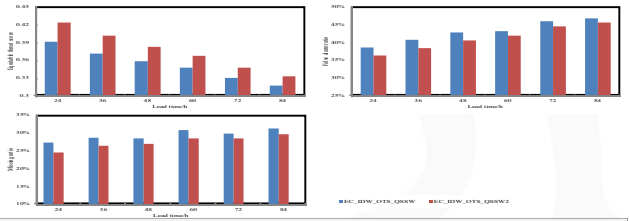

Fig. 2 Equitable threat score, false alarm ratio and missing ratio of EC_IDW_OTS_QSSW and EC_IDW_OTS_QSSW2 for light rain from 2018 to 2019

Conclusions

1) The 3-year quasi-symmetric sliding window sampling method is used to collect training samples to calculate the OTS correction threshold, and the effect is better than that of the sampling method of collecting the samples from the same season in the previous 3 years. 2) The magnitude of the OTS correction threshold F1 (i.e. elimination threshold) is closely related to the magnitude of 2 m temperature. As the temperature rises, the elimination threshold first increases and then decreases. Compared with the modeling scheme without grouping, the grouping modeling based on the maximum 2 m temperature forecast can obtain the elimination threshold under different temperature conditions, which can simultaneously reduce the false alarm ratio and missing ratio of light rain, and improve the equitable threat score of light rain by 5.0%~8.2%. 3) The effect of the first scheme, which is to use the inverse distance weighted interpolation method to interpolate the model precipitation forecast, and then use the OTS correction method to correct the precipitation forecast, is better than that of the second scheme, which is to use the nearest neighbor interpolation method to interpolate the model precipitation forecast, and then use the OTS correction method to correct the precipitation forecast.

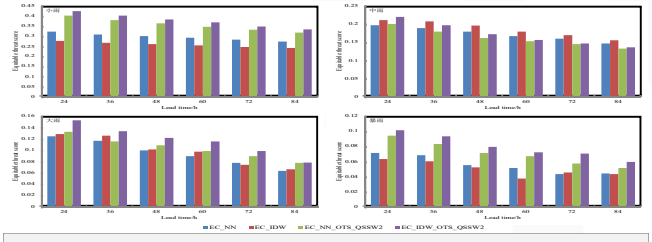

Fig. 3 Equitable threat score of EC_NN, EC_IDW, EC_NN_OTS_QSSW2 and EC_IDW_OTS_QSSW2 for light, moderate, heavy and hard rain from 2018 to 2019

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