



An Objective Approach for Rainstorm Based on Double Factor Feature Extraction and Generalized Regression Neural Network

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Rainstorm often causes inland flooding and mudslides that threaten lives and properties. In this study, rainstorm is used as a forecasting object, and an interpretation prediction model for rainstorm based on the European Centre for Medium-Range Weather Forecasting (ECMWF) numerical prediction model is constructed through the generalized regression neural network (GRNN) method. Model inputs are forecasted through principal component analysis, and dual-feature extraction is performed on the primary predictors for obtaining new irrelevant variables and optimizing network structures. The experimental forecast results of the 24 h aging test using an independent sample of large-scale rainstorm in Guangxi, China from 2012 to 2016, the actual forecast results of selected rainstorm cases with great influence on Guangxi, and different influencing systems show that the new prediction scheme is sophisticated. Thus, the scheme has a certain universal applicability. The results of the comparative analysis between the new program and ECMWF show that the forecasting ability of the new method is more accurate than that of the direct numerical forecasting model. The 5 years threat score (TS) of the new forecast model has a 58.4% increase relative to the ECMWF. The forecasting skills are positive and good and can thus improve the rainstorm forecasting ability of ECMWF and provide a better guidance for forecasters.