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Supplementary Materials

Summer Precipitation Forecast Using an Optimized Artificial Neural Network with a Genetic Algorithm for Yangtze-Huaihe River Basin, China

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Supplementary Figures and Table(s) for the training and validation periods

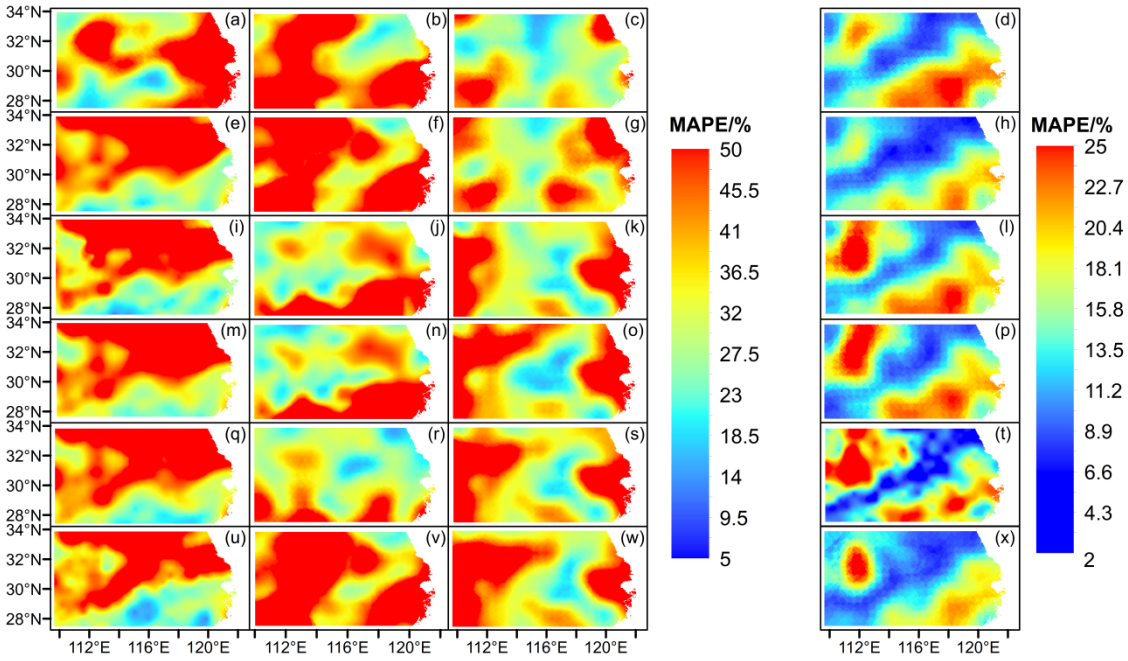

Figure S1. Spatial distributions of MAPE of SVM forecasts, where the six rows are for models using the factors of December, January, February, March, April, and May (from top to bottom; e.g., (a)-(d) are for the MAPE using December factors) with four columns for the forecasted precipitations of June, July, August, and summer (from left to right; e.g., (b), (f), (j), (n), (r) and (v) are for the MAPE of July precipitations), respectively.

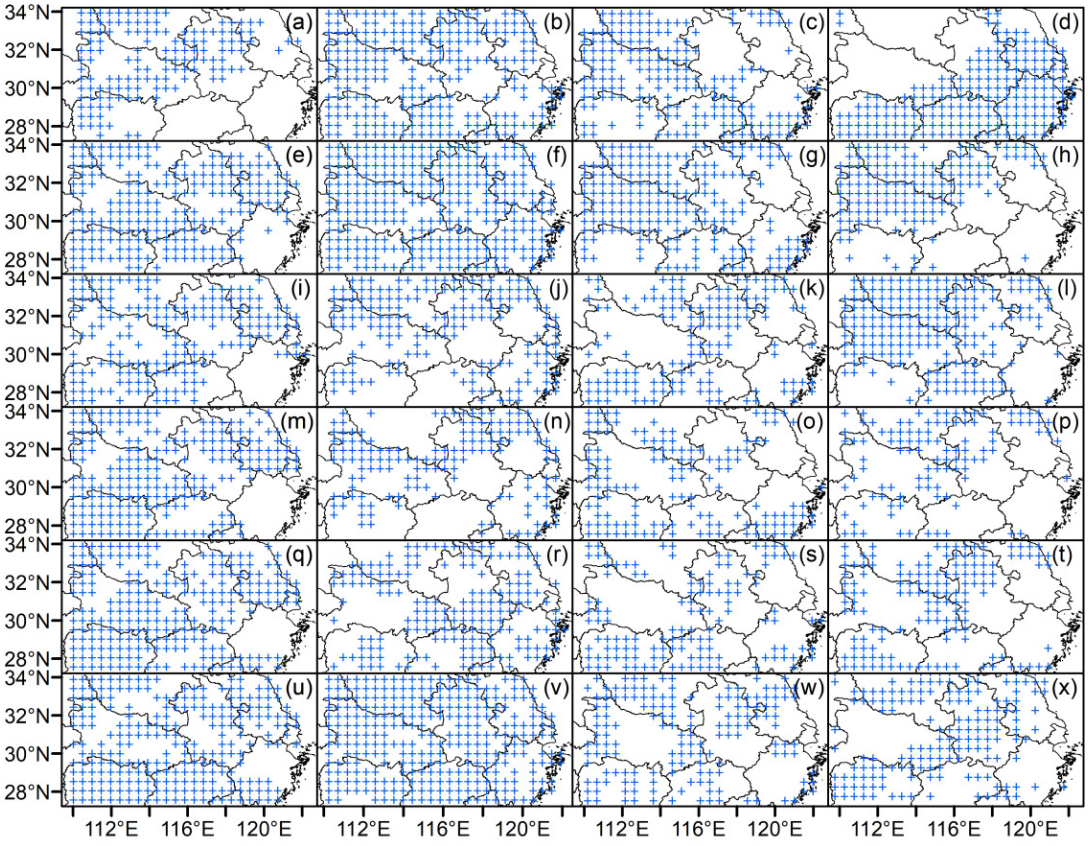

Figure S2. Spatial distribution of identical signs of SVM forecast precipitation anomalies, where six rows and four columns are the same as those in Fig. 7 for various months of factors and months/season of precipitation forecast, respectively (e.g., (a)-(d) are for the identical signs using December factors, and (b), (f), (j), (n), (r) and (v) are for those of July precipitation anomalies), and the grids with identical signs of forecast and observed anomalies are marked with crosses (i.e., "+"), through which the AR is calculated.

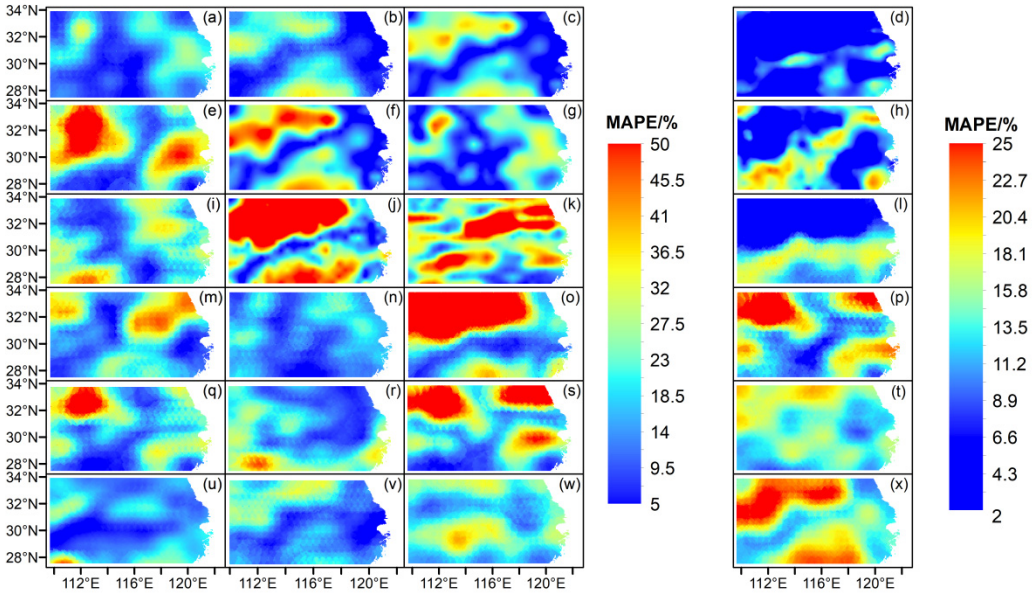

Figure S3. As Fig. S1, but for GABP MAPE in the training period.

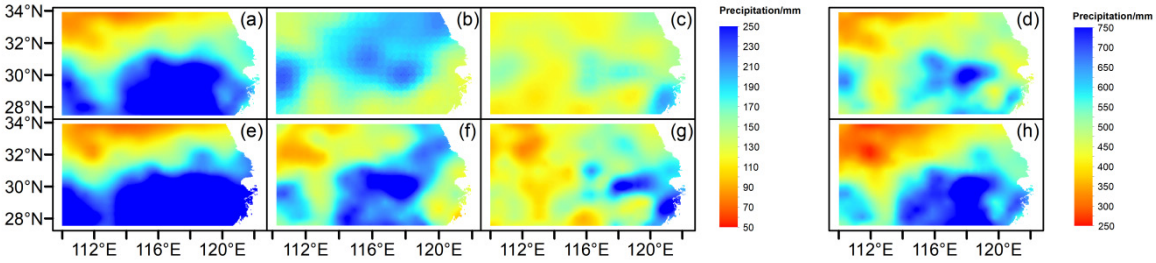

Figure S4. As Fig. S3, but for observed mean precipitations in the training (upper) and validation (lower) periods (units: mm).

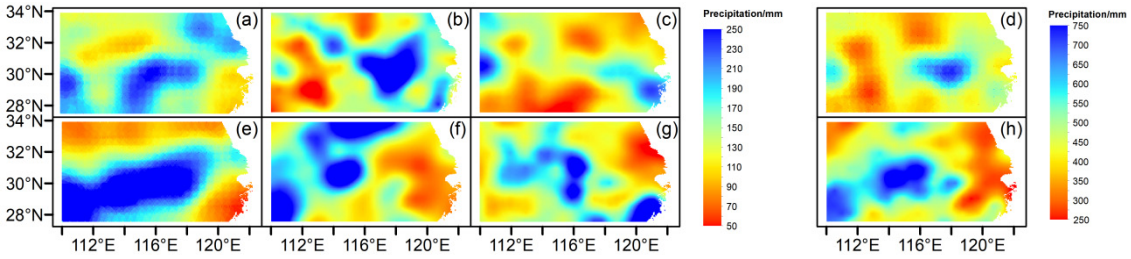

Figure S5. As Fig. S4, but for BPNN precipitations using March factors in the training (upper) and validation periods.

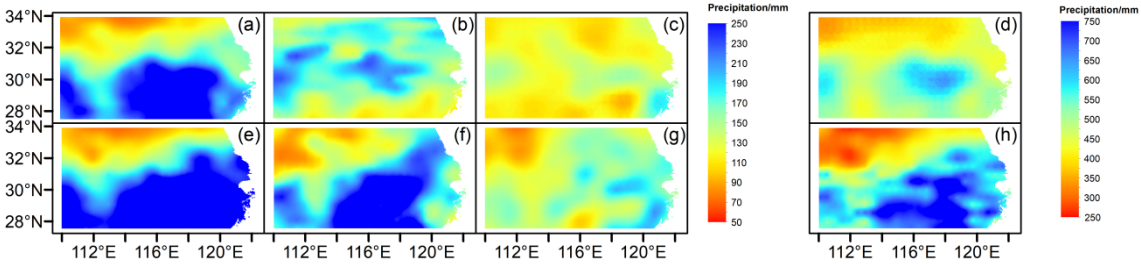

Figure S6. As Fig. S5, but for GABP precipitations.

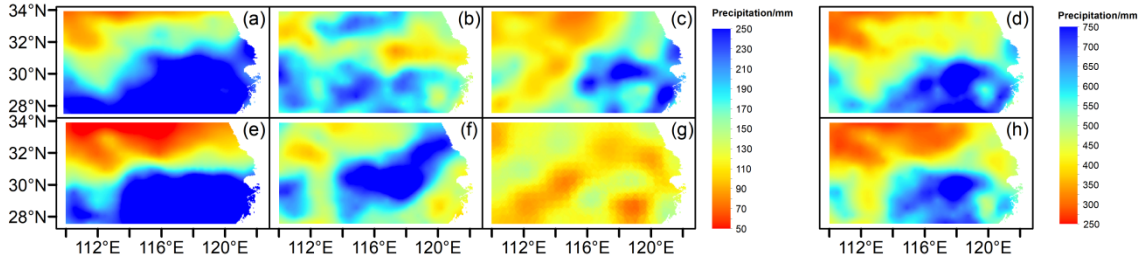

Figure S7. As Fig. S5, but for SVM precipitations.

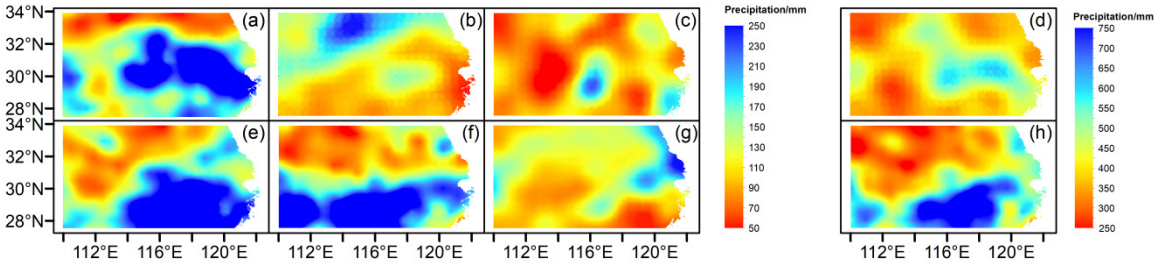

Figure S8. As Fig. S5, but for MLR precipitations.

Table S1. The GABP basin-averaged MAPE values in the training period.

Measure	**$M_{12\text{-}6}$ ($M_{3\text{-}6}$)**	**$M_{12\text{-}7}$ ($M_{3\text{-}7}$)**	**$M_{12\text{-}8}$ ($M_{3\text{-}8}$)**	**$M_{1\text{-}6}$ ($M_{4\text{-}6}$)**	**$M_{1\text{-}7}$ ($M_{4\text{-}7}$)**	**$M_{1\text{-}8}$ ($M_{4\text{-}8}$)**	**$M_{2\text{-}6}$ ($M_{5\text{-}6}$)**	**$M_{2\text{-}7}$ ($M_{5\text{-}7}$)**	**$M_{2\text{-}8}$ ($M_{5\text{-}8}$)**	**$M_{12\text{-}s}$ ($M_{3\text{-}s}$)**	**$M_{1\text{-}s}$ ($M_{4\text{-}s}$)**	**$M_{2\text{-}s}$ ($M_{5\text{-}s}$)**
MAPE/%	14.0 (20.8)	15.5 (13.3)	16.5 (39.6)	27.5 (21.7)	21.5 (18.7)	15.9 (28.3)	20.6 (14.4)	44.1 (15.6)	32.2 (21.9)	5.2 (20.7)	15.3 (11.8)	13.9 (21.6)