

Fig. S1. Monthly spatial patterns of Mann-Kendall (M-K) trend classes.

Fig. S2. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in January.

Fig. S3. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in February.

Fig. S4. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in March.

Fig. S5. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in April.

Fig. S6. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in May.

Fig. S7. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in June.

Fig. S8. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in July.

Fig. S9. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in August.

Fig. S10. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in September.

Fig. S11. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in October.

Fig. S12. Trend-related non-stationarity and predictive gain from non-stationary

marginal fitting in November.

Fig. S13. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in December.

Fig. S14. Monthly mean KGE across AI regions for (a) M3_two and (b) M4_two.

Fig. S15. Faceted KGE-ITS relationships and LOESS fits for M1_two and M2_two.

Fig. S16. Faceted KGE-ITS relationships and LOESS fits for M3_two and M4_two.

Fig. S17. Faceted KGE-ITS relationships and LOESS fits for M5_two and M6_two.

Fig. S18. Full comparison of predictor-importance rankings across SHAP, RF, XGB, and CCM.

Fig. S1. Monthly spatial patterns of Mann-Kendall (M-K) trend classes.

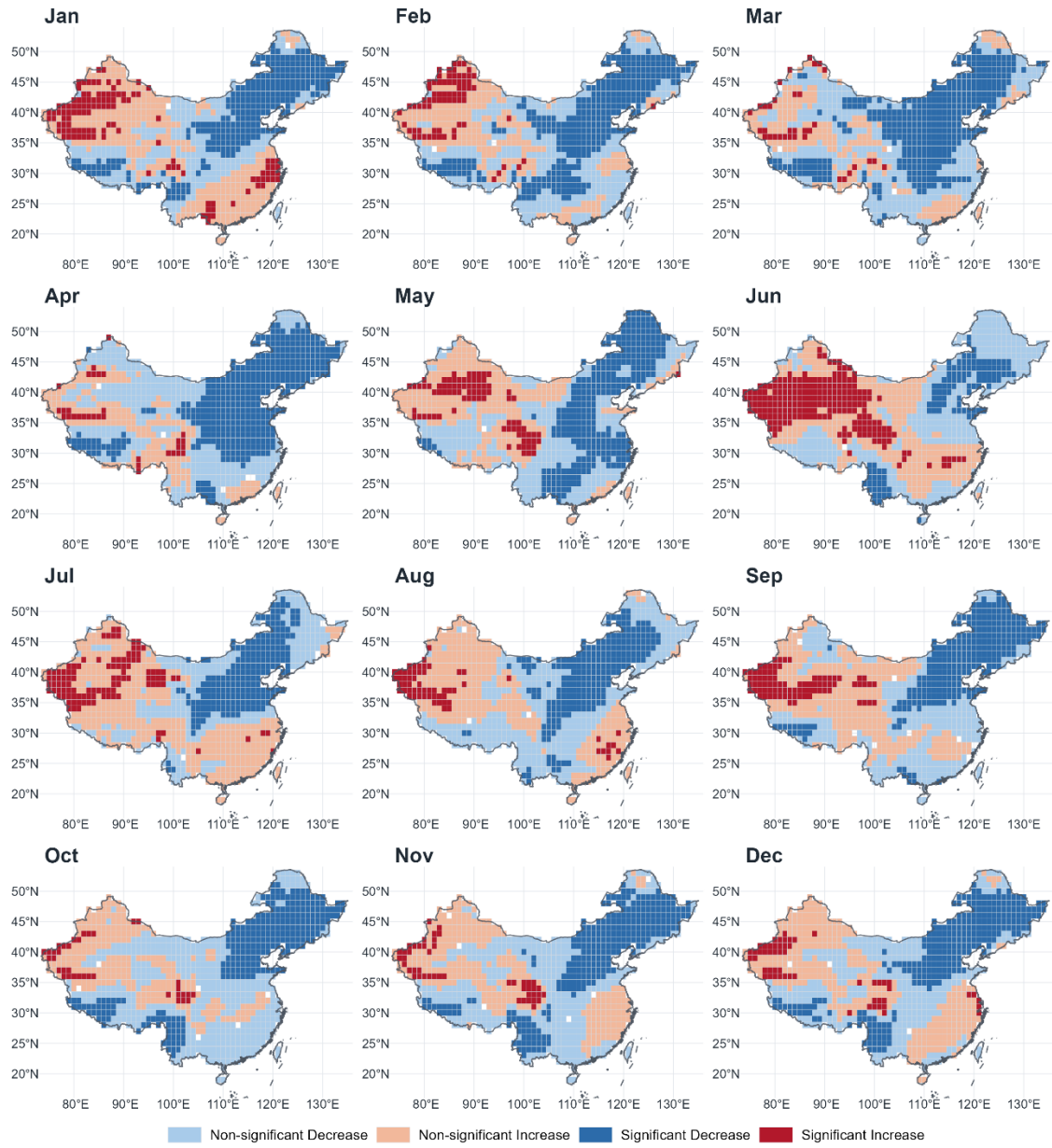


Fig. S2. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in January.

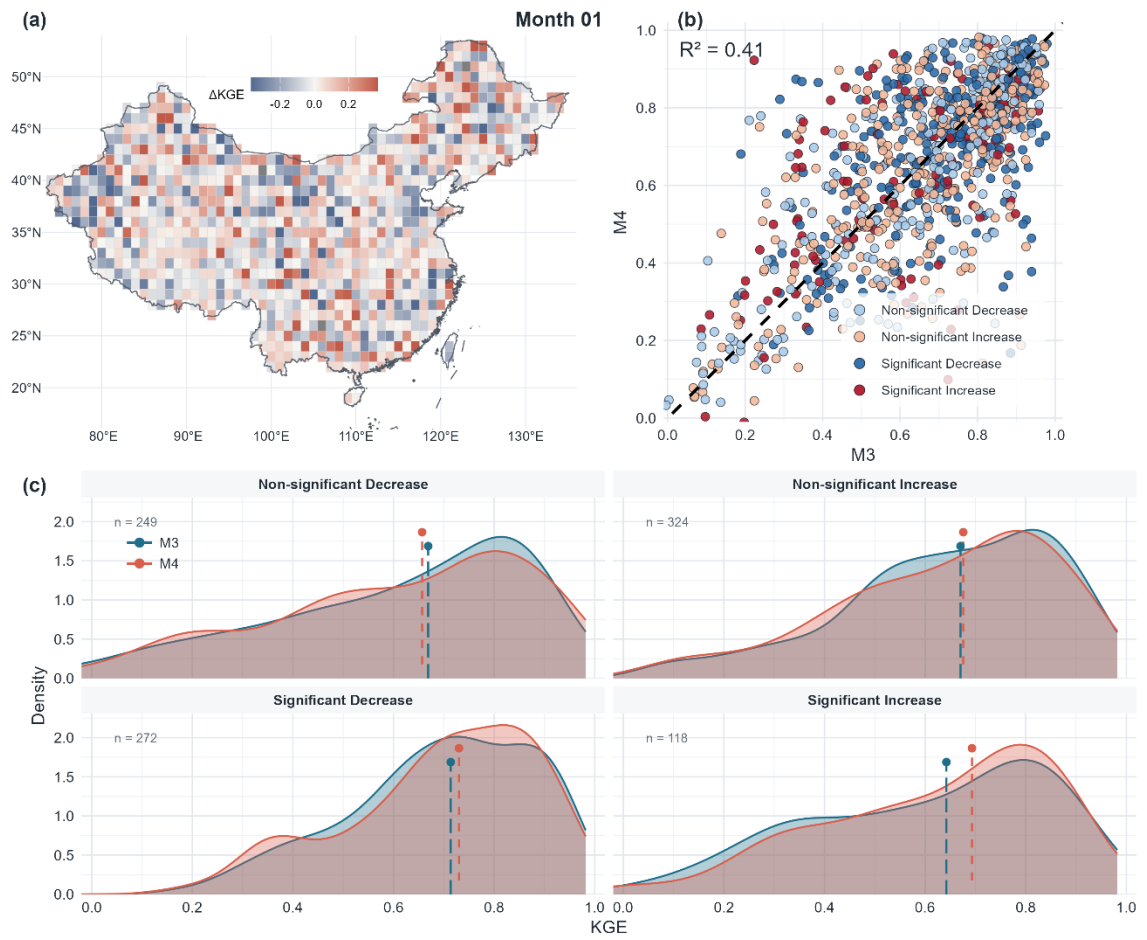


Fig. S3. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in February.

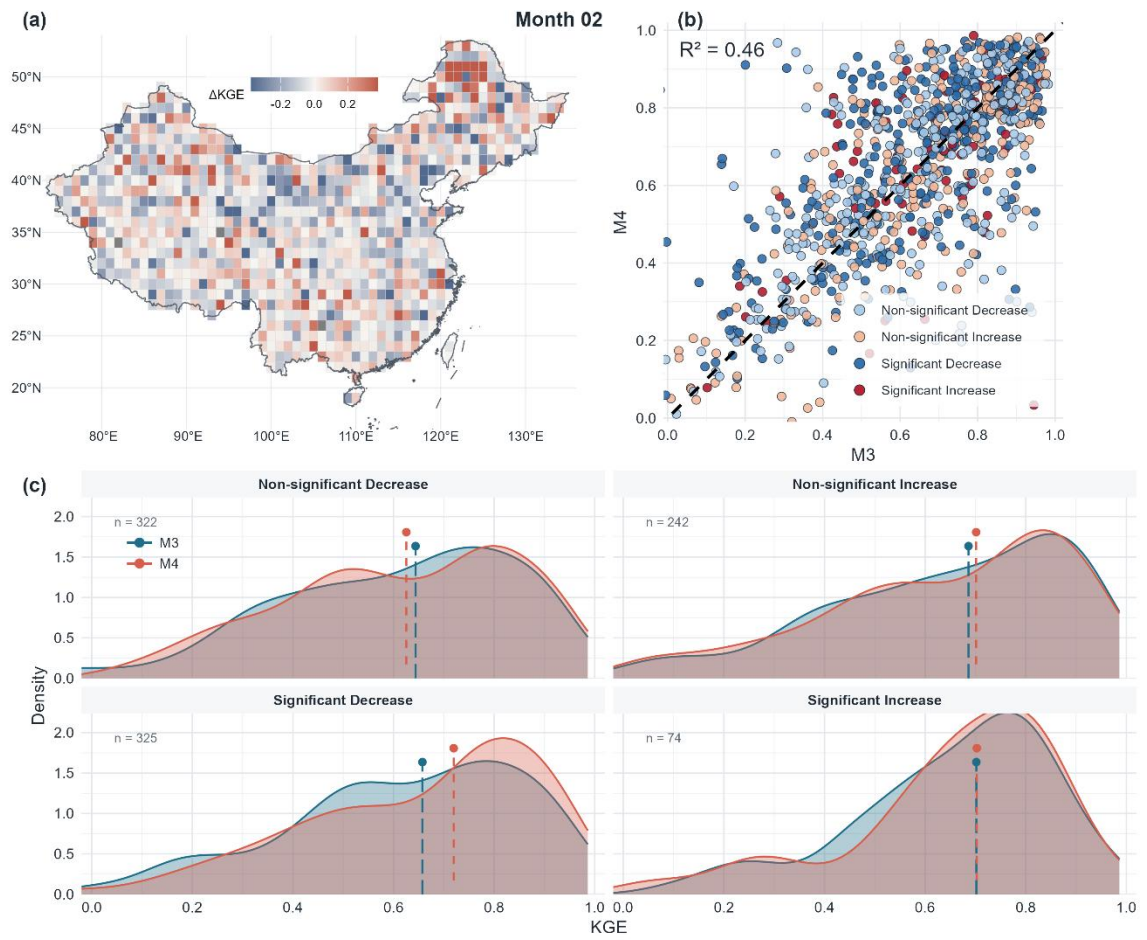


Fig. S4. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in March.

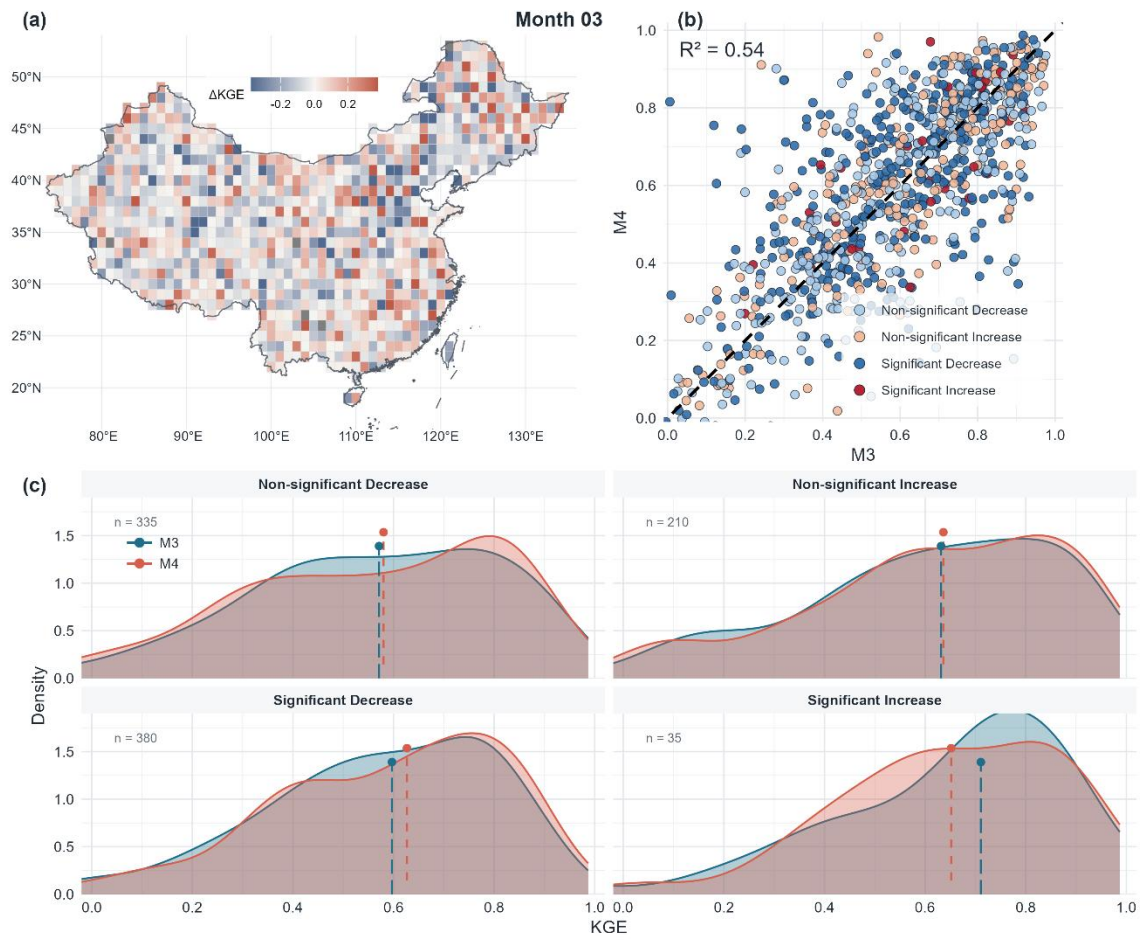


Fig. S5. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in April.

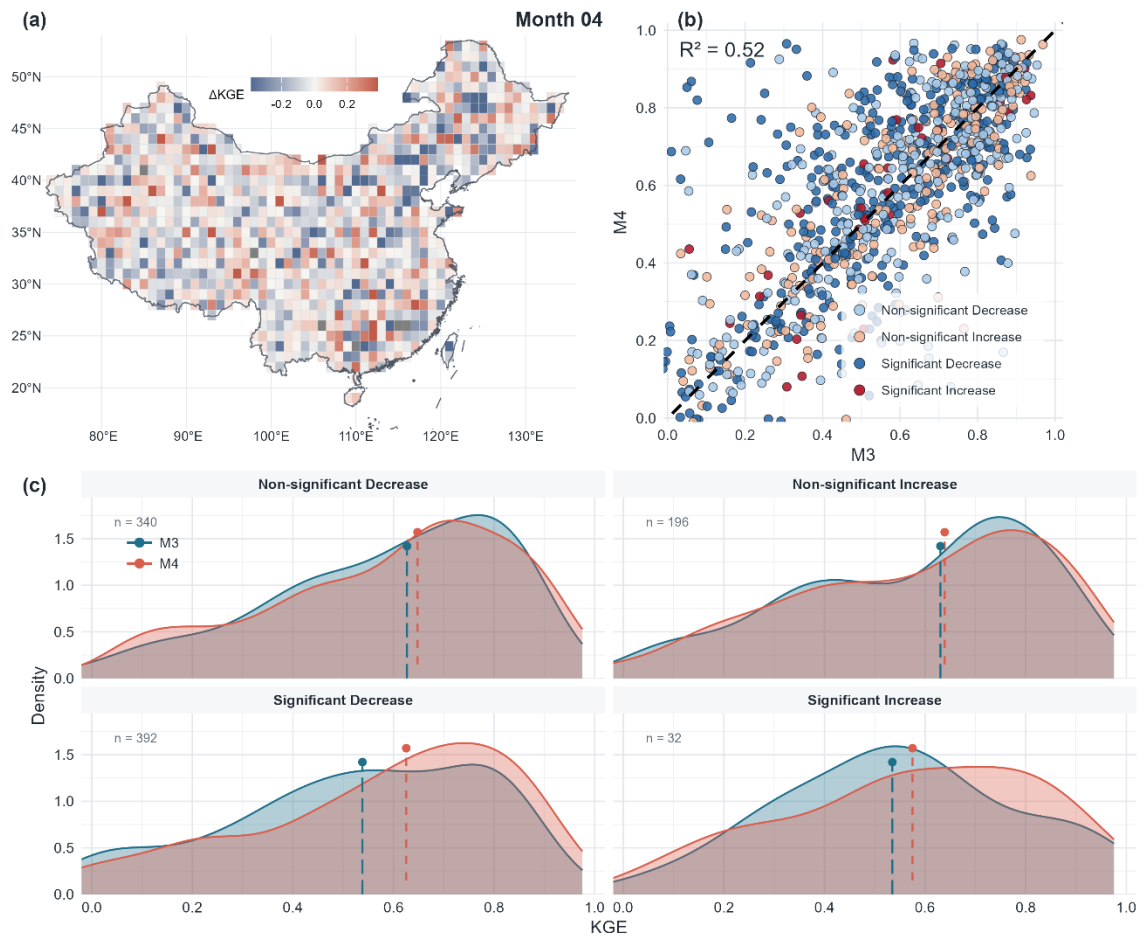


Fig. S6. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in May.

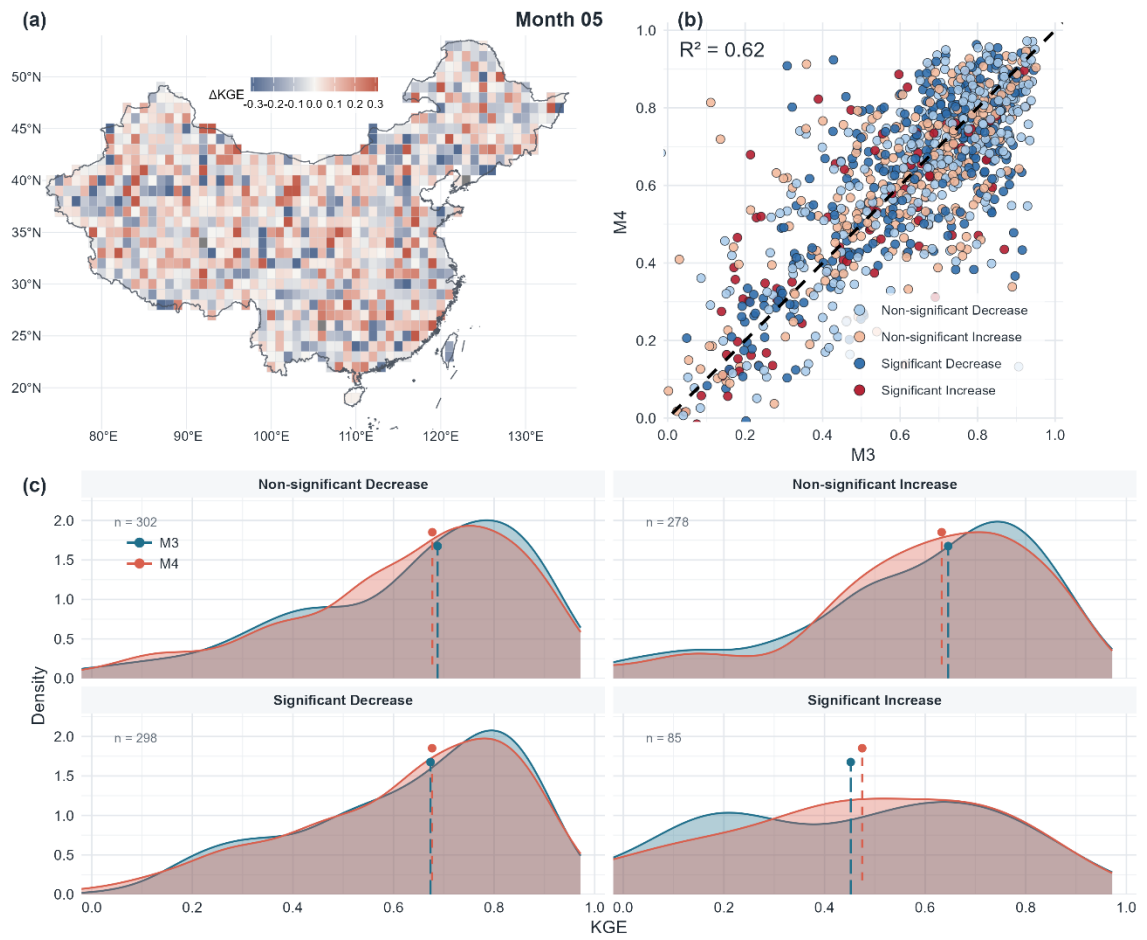


Fig. S7. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in June.

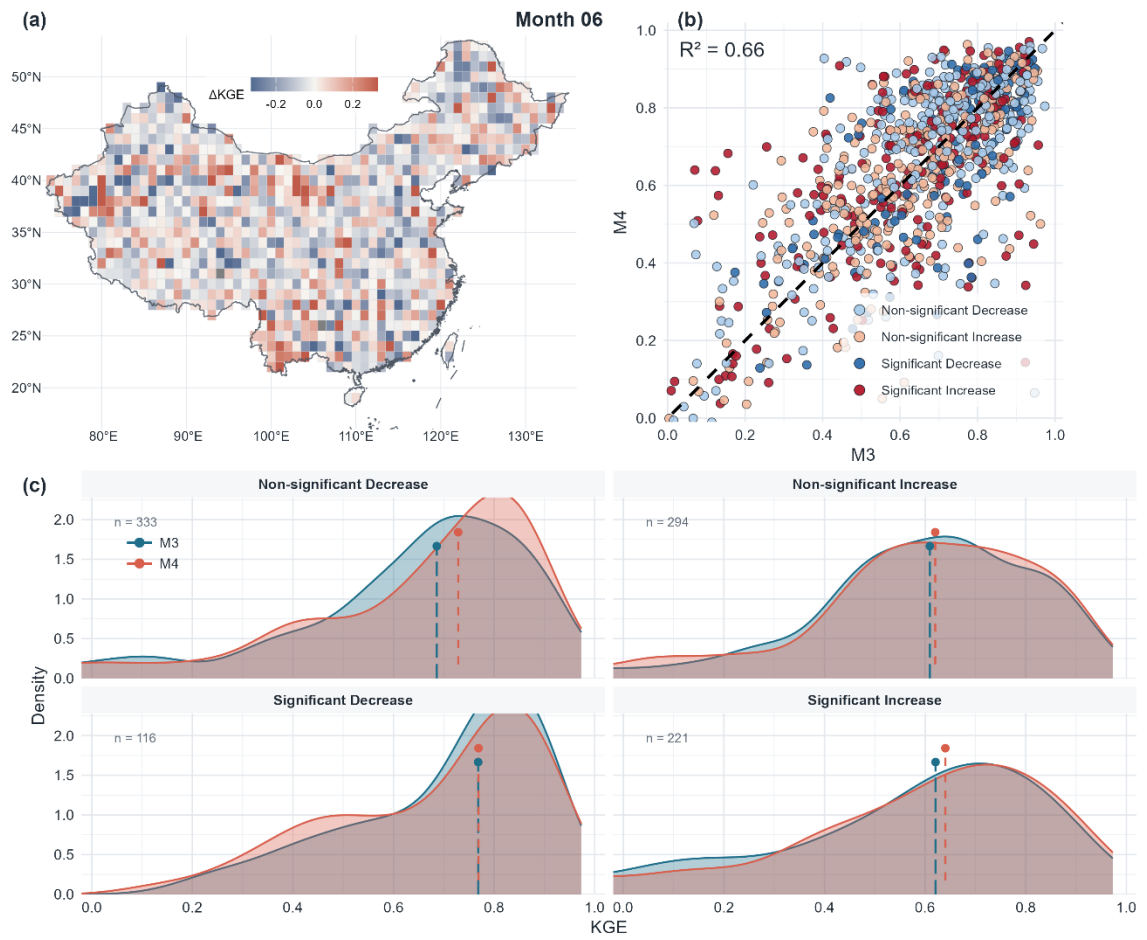


Fig. S8. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in July.

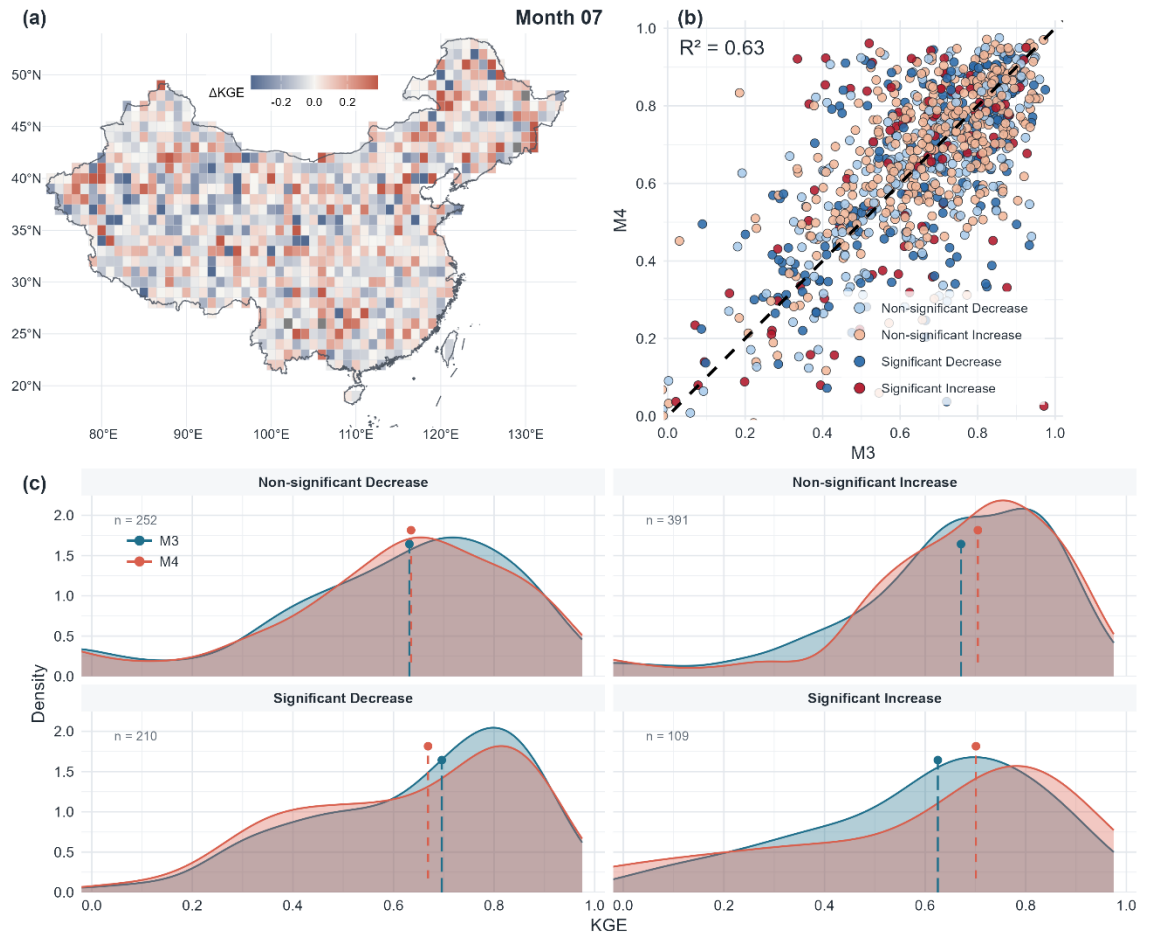


Fig. S9. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in August.

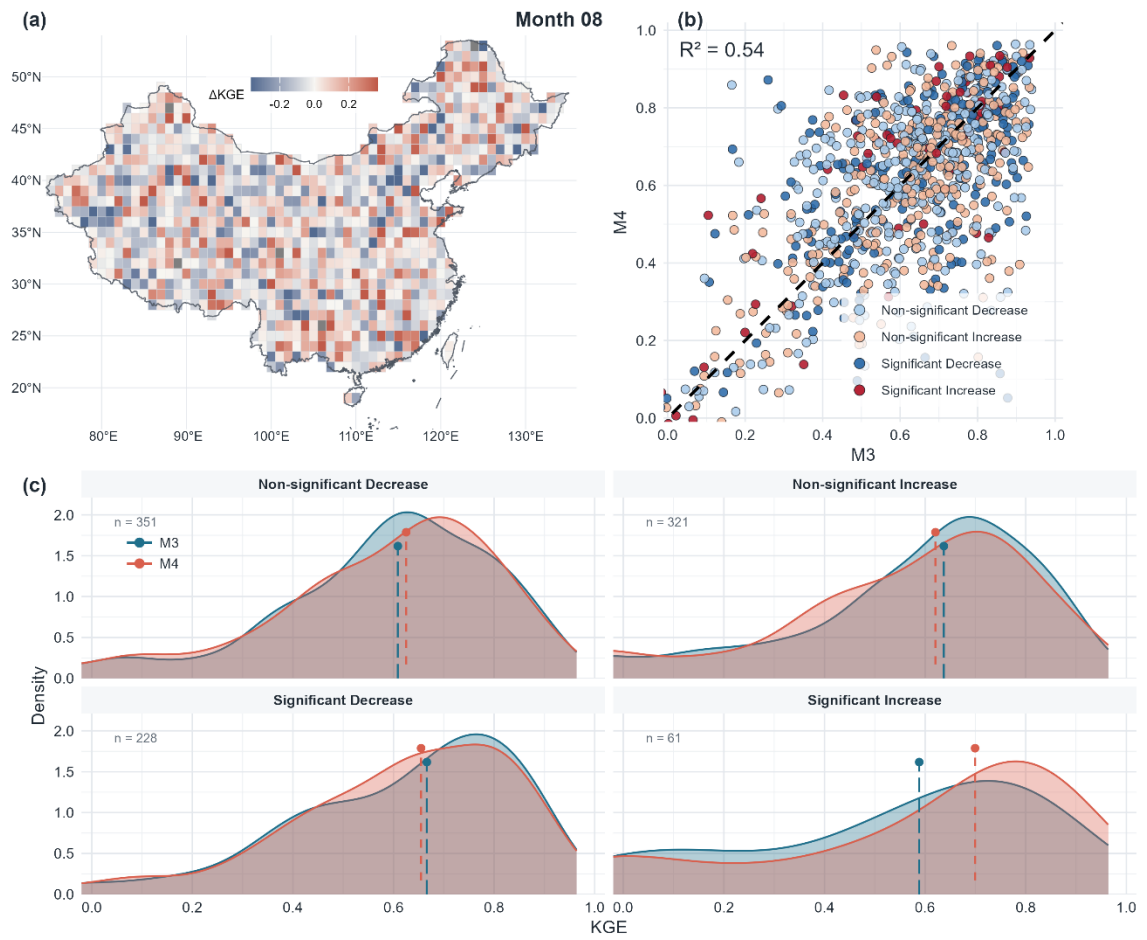


Fig. S10. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in September.

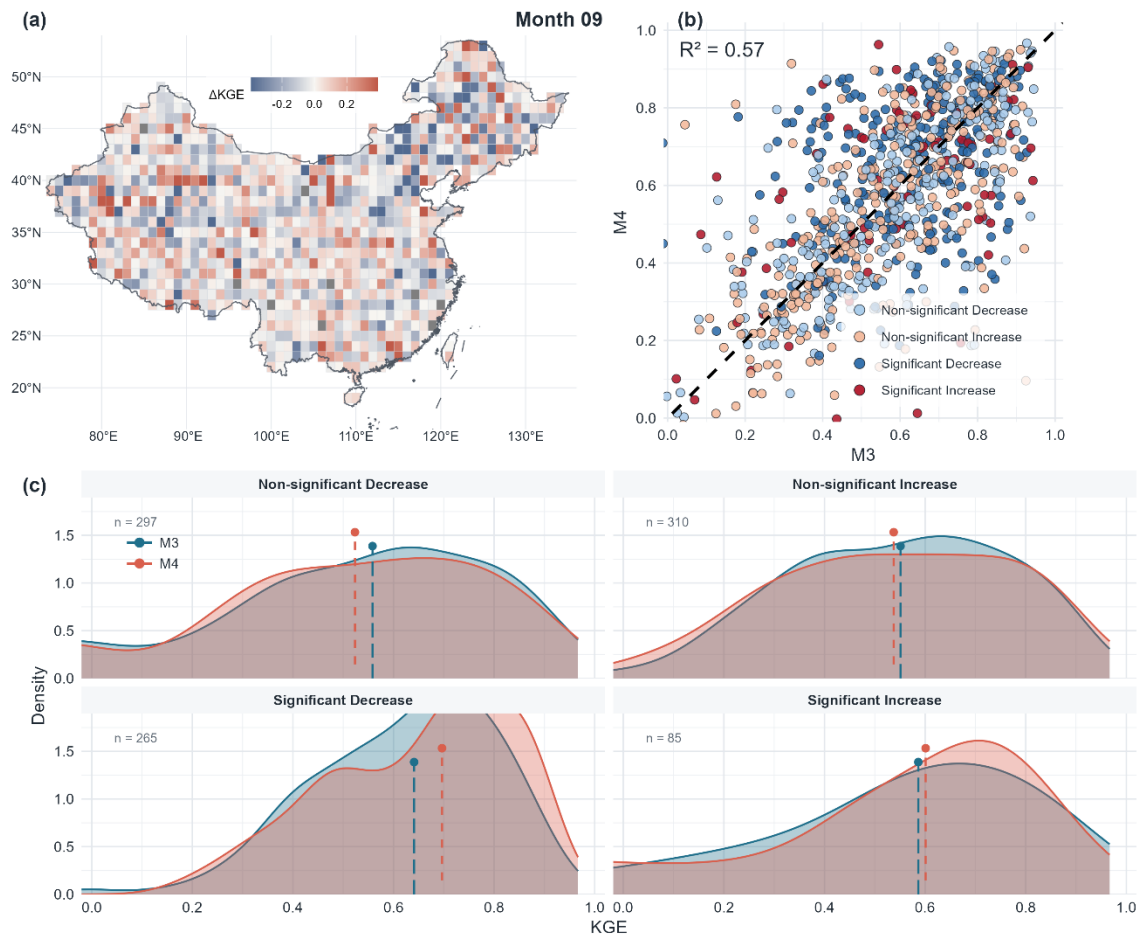


Fig. S11. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in October.

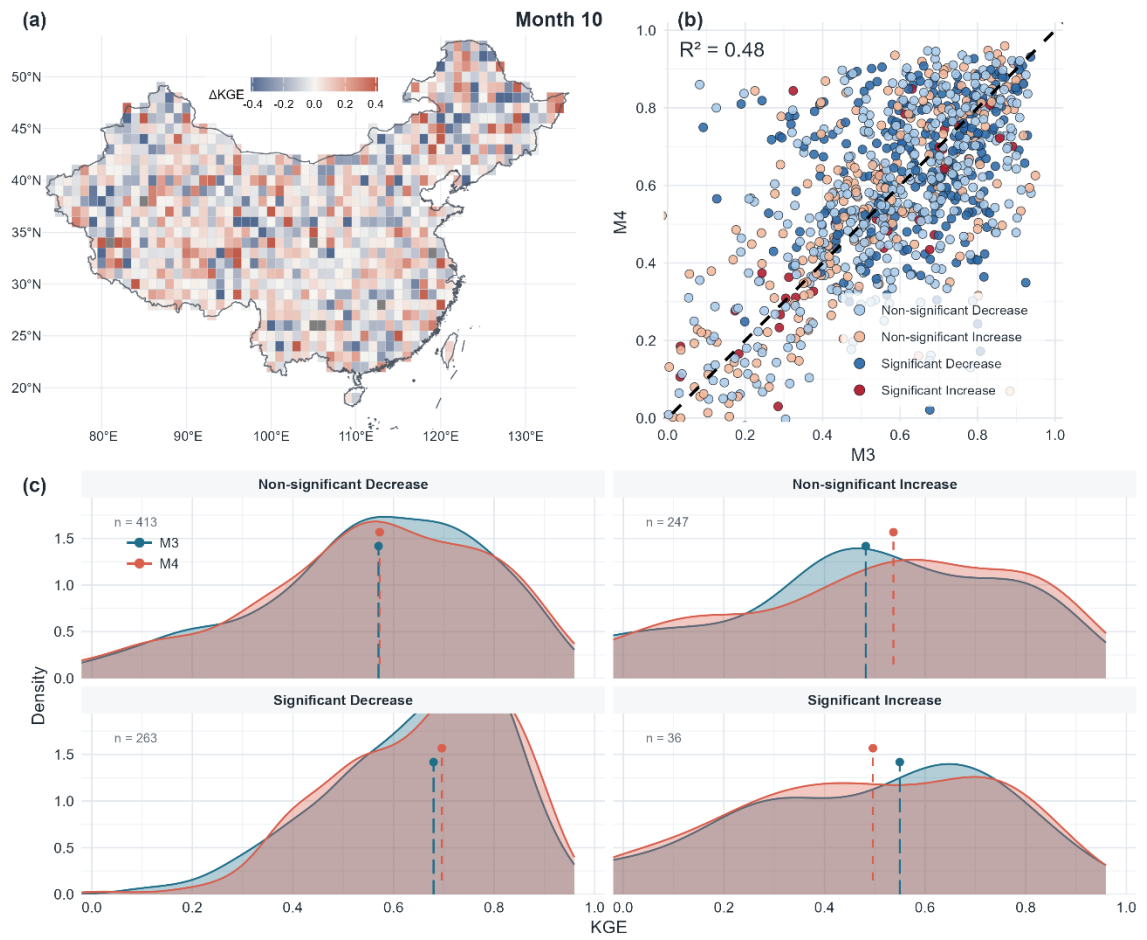


Fig. S12. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in November.

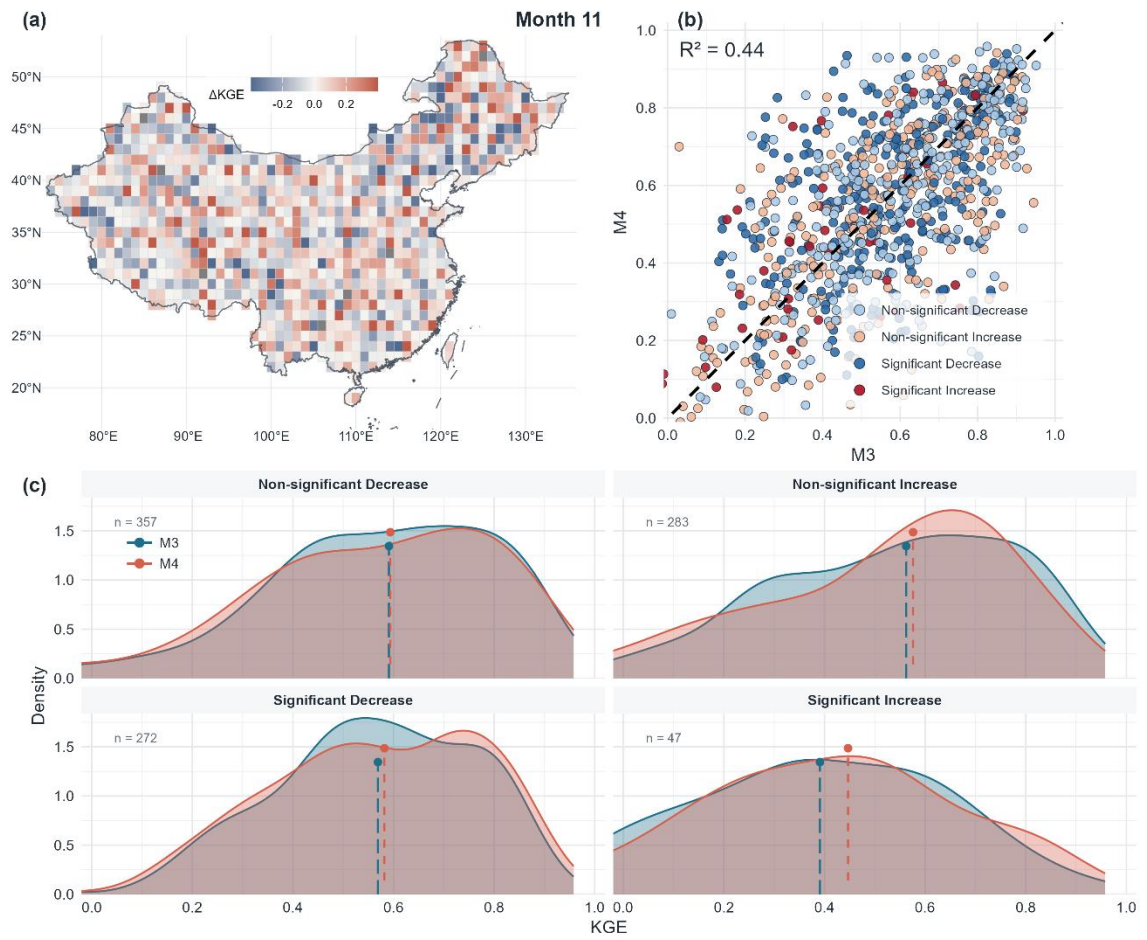


Fig. S13. Trend-related non-stationarity and predictive gain from non-stationary marginal fitting in December.

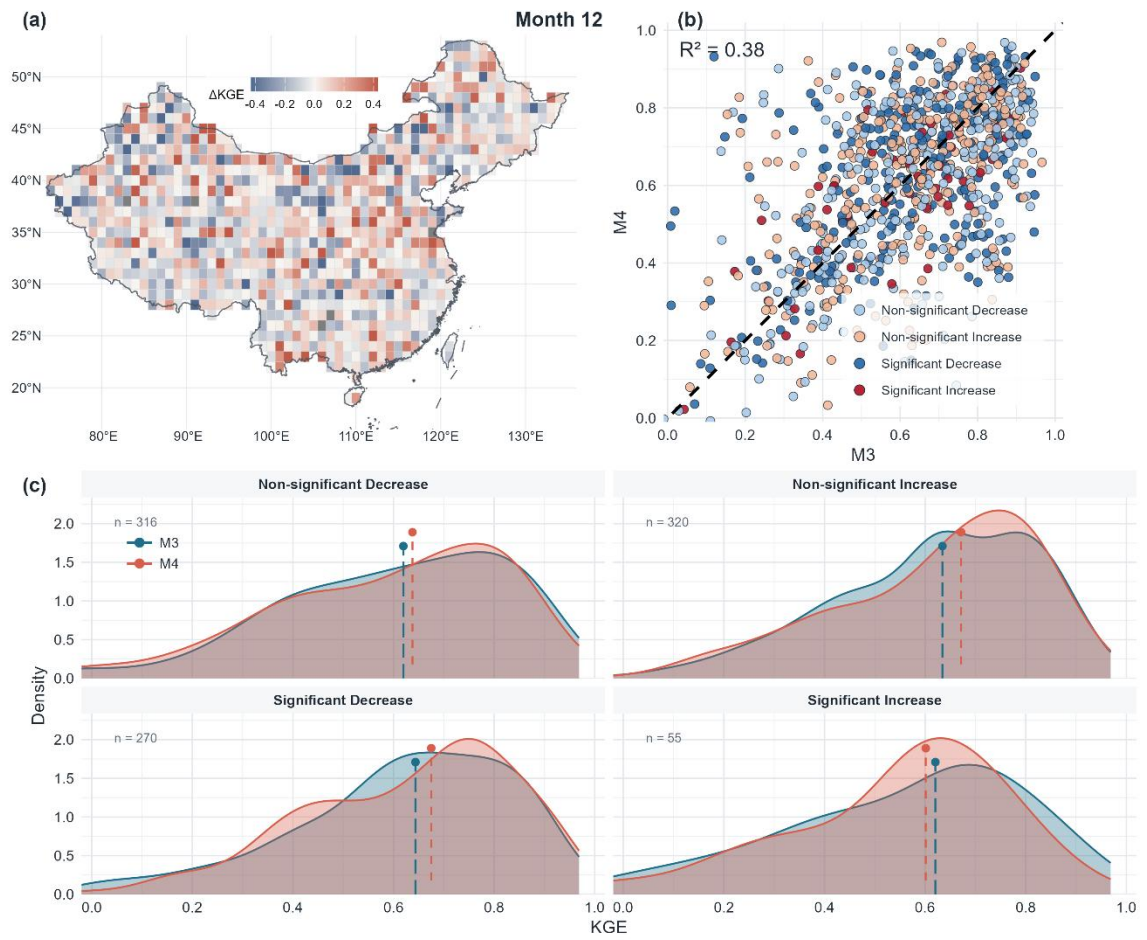


Fig. S14. Monthly mean KGE across AI regions for (a) M3_two and (b) M4_two.



Fig. S15. Faceted KGE-ITS relationships and LOESS fits for M1_two and M2_two.

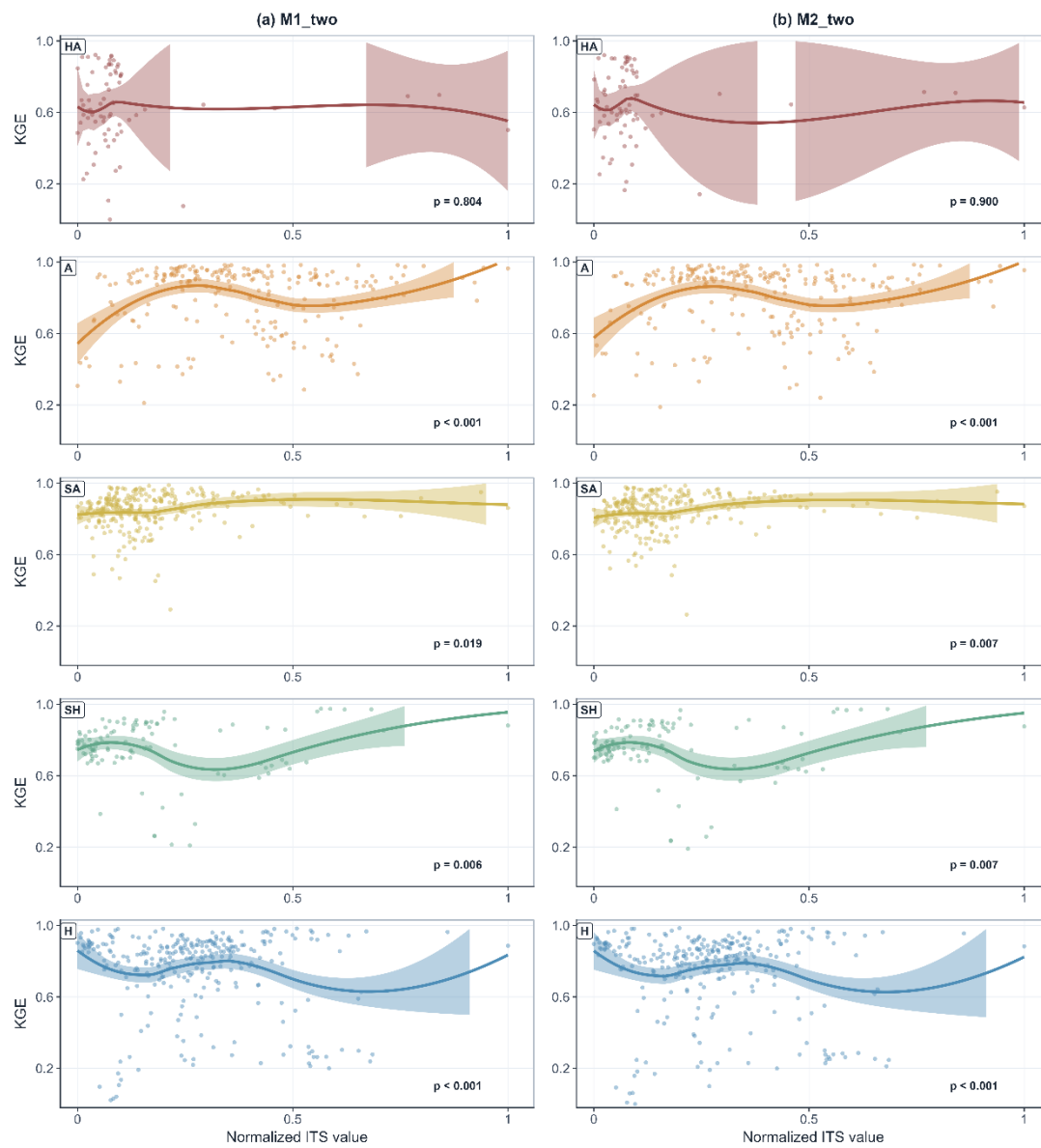


Fig. S16. Faceted KGE-ITS relationships and LOESS fits for M3_two and M4_two.

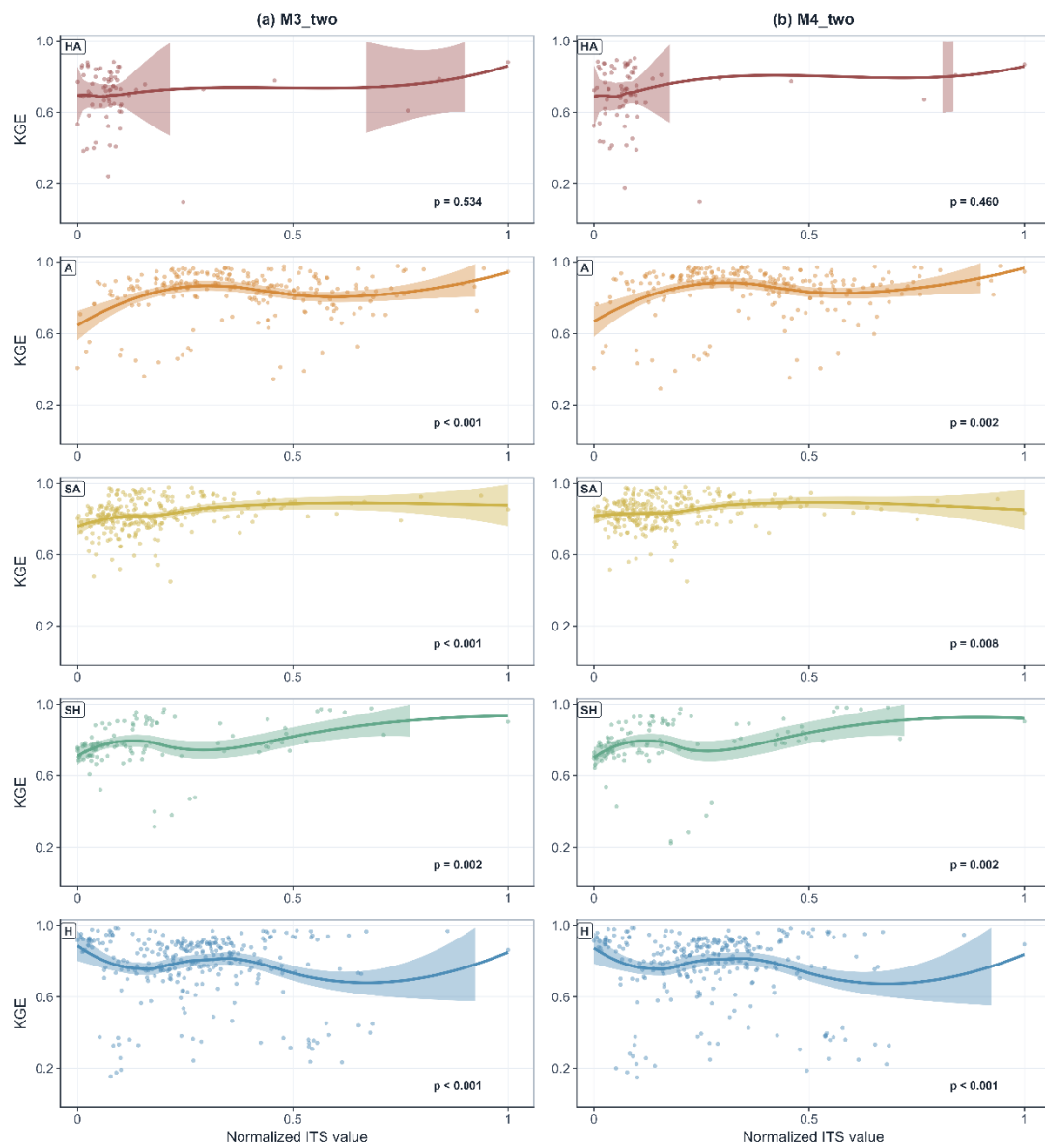


Fig. S17. Faceted KGE-ITS relationships and LOESS fits for M5_two and M6_two.

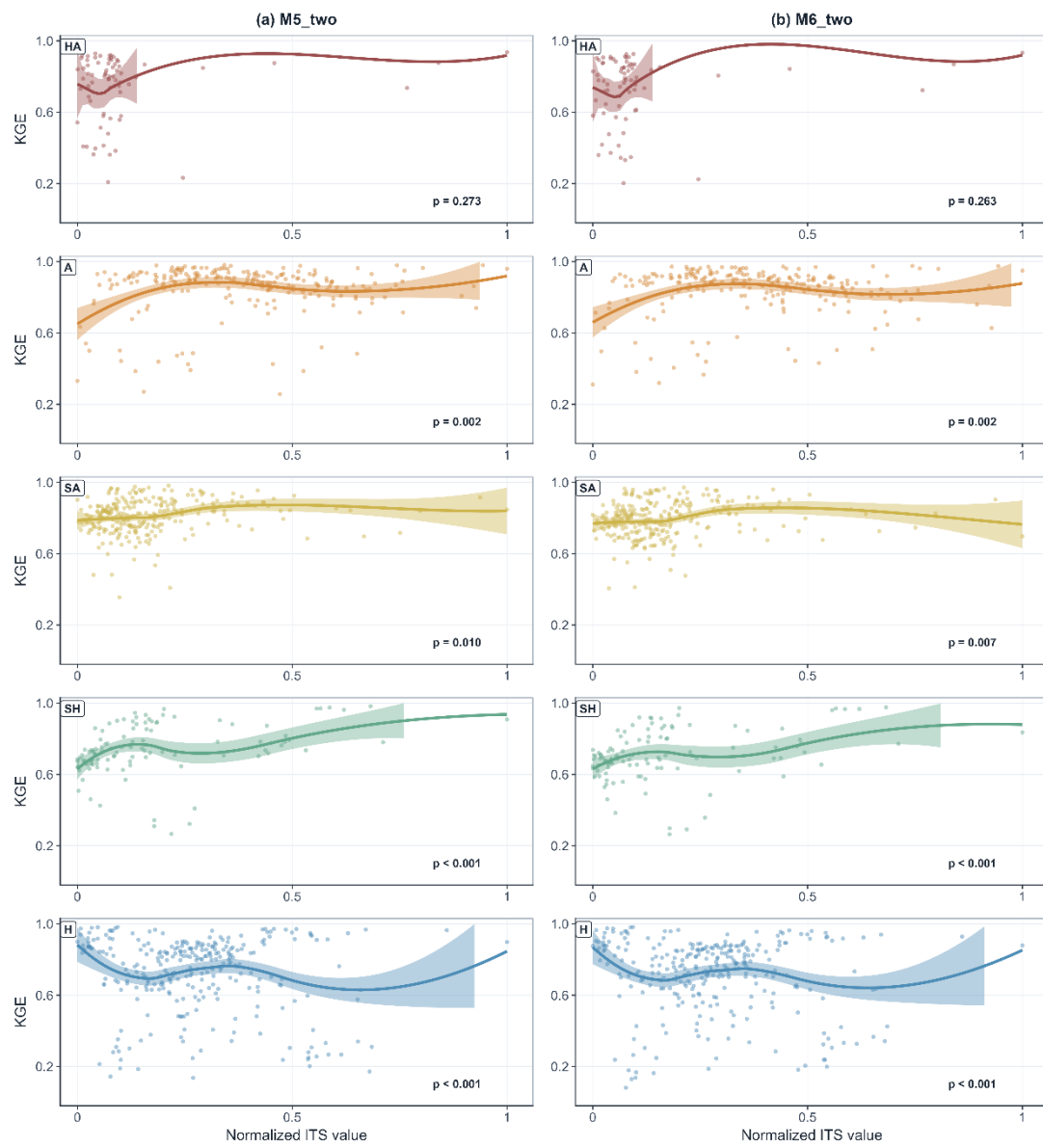


Fig. S18. Full comparison of predictor-importance rankings across SHAP, RF, XGB, and CCM. Rank labels indicate the within-method ordering of each predictor.

