



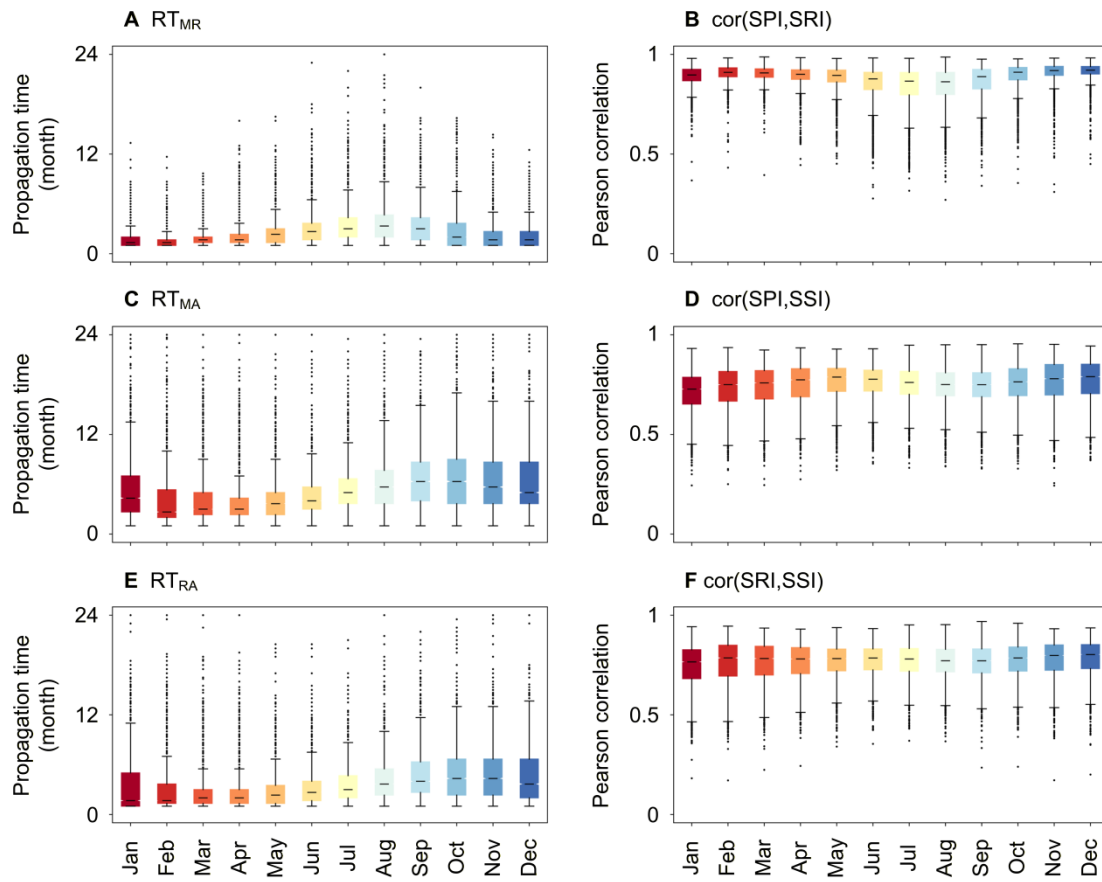
*Supplement of*

## **Understanding meteorological, runoff, and agricultural drought propagation and their influencing factors in an ensemble of multiple datasets**

**Yuanrui Liu et al.**

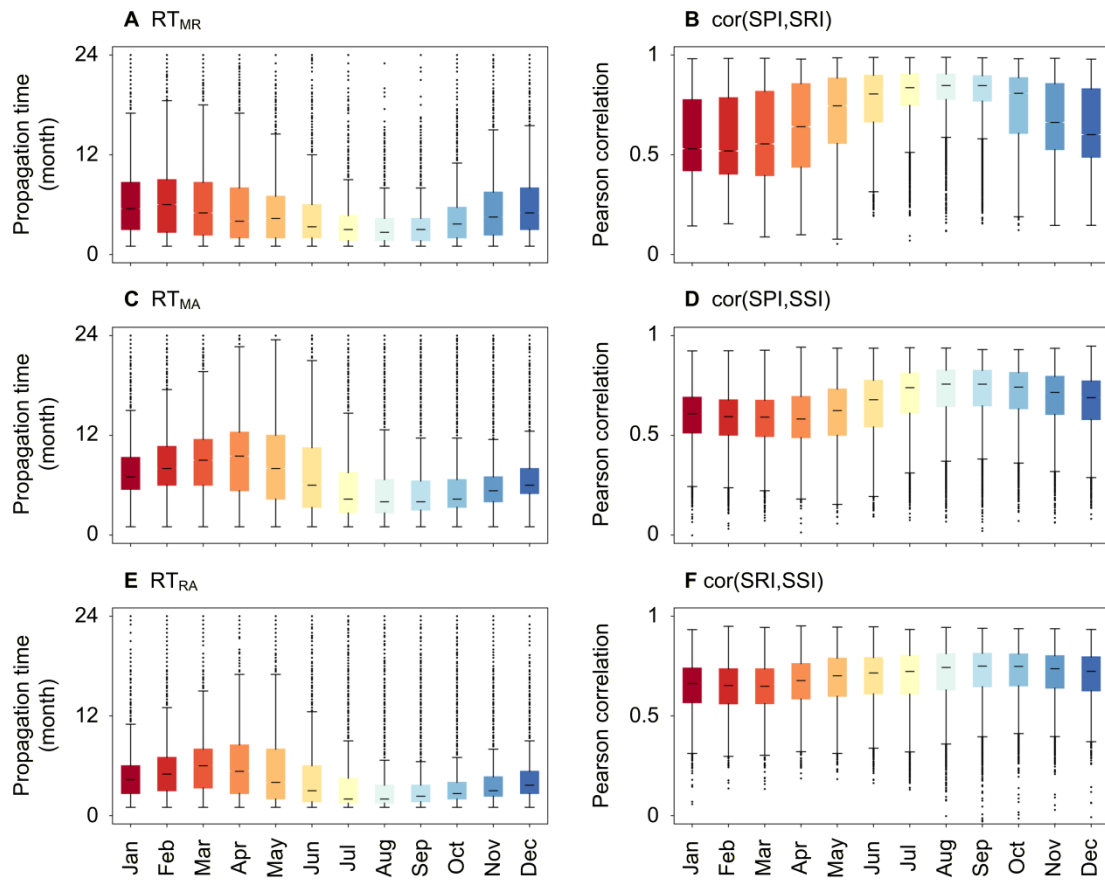
*Correspondence to:* Lei Yu ([yulei2018@zzu.edu.cn](mailto:yulei2018@zzu.edu.cn))

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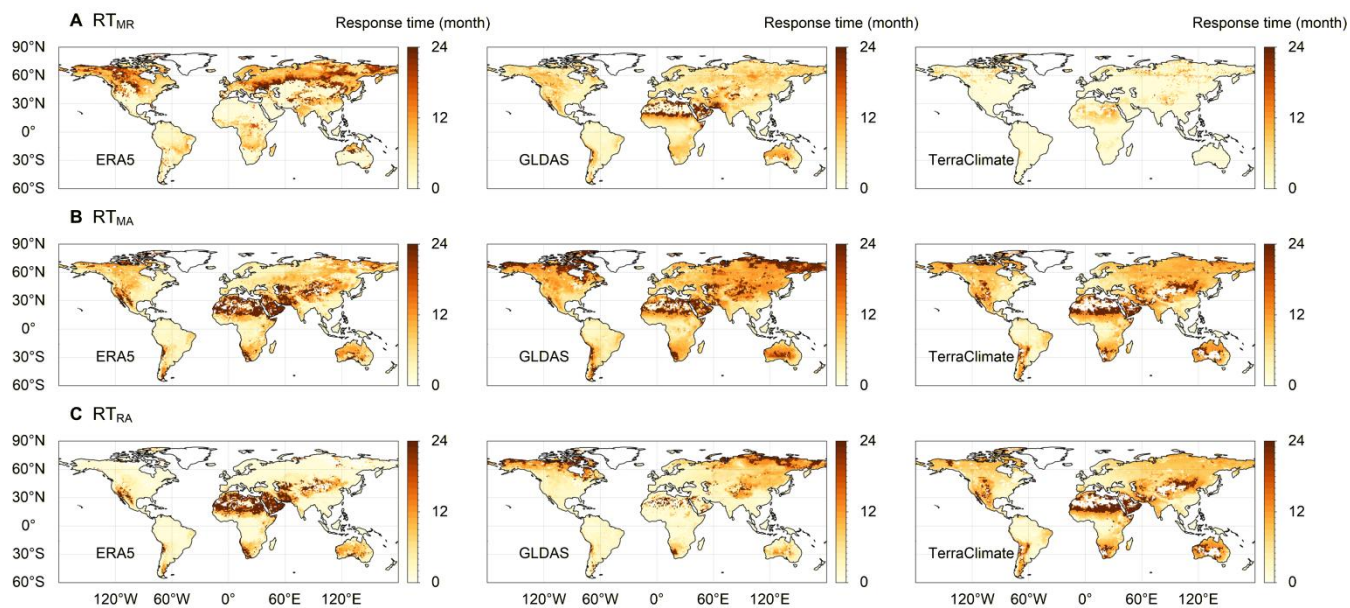


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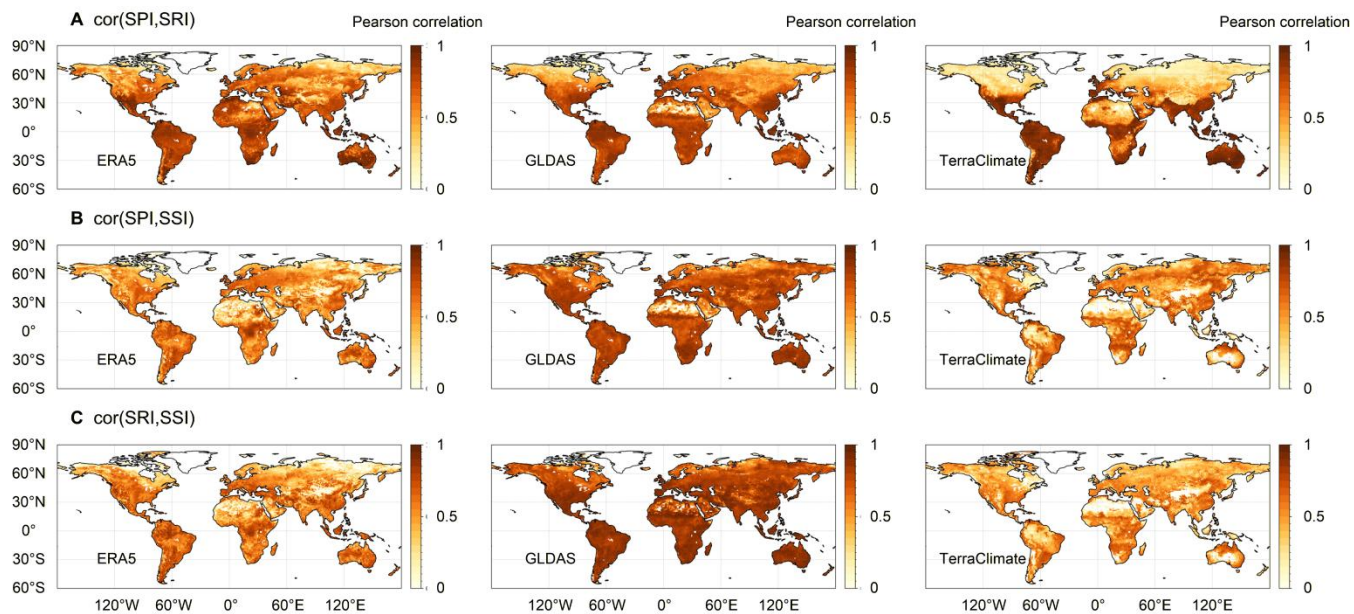
**Figure S1.** Box plots of  $RT_{MR}$ ,  $RT_{MA}$  and  $RT_{RA}$  for each calendar month in the Southern Hemisphere, along with the corresponding Pearson correlation coefficients.



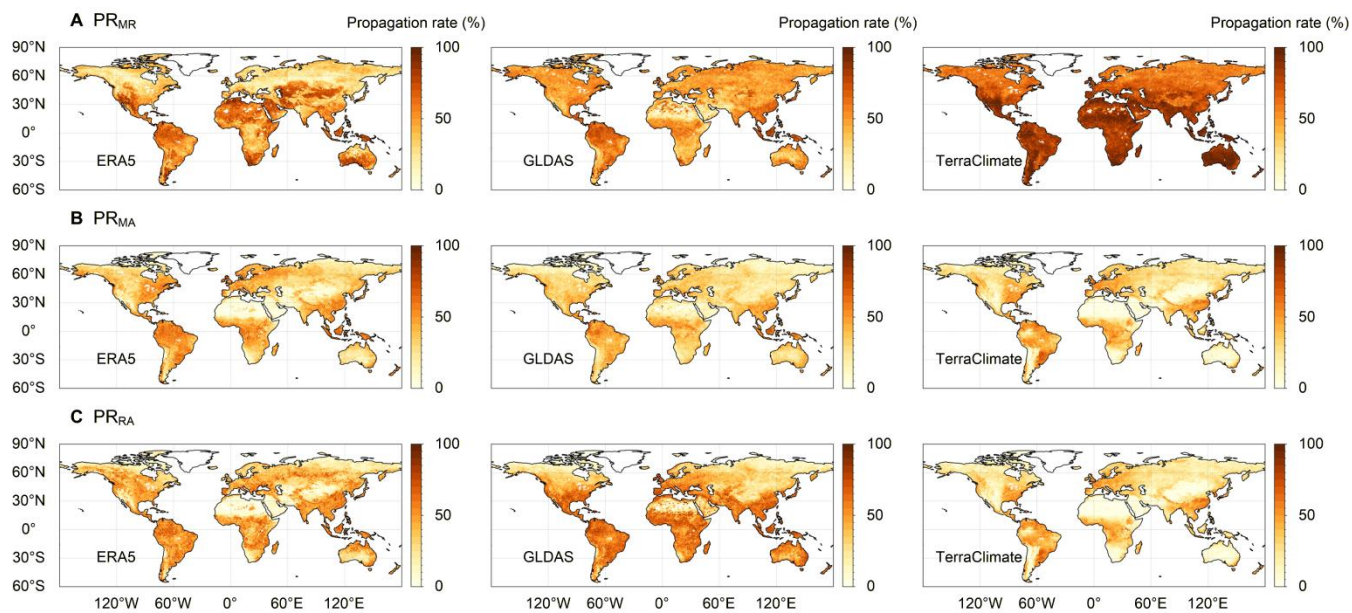
15 **Figure S2.** Box plots of  $RT_{MR}$ ,  $RT_{MA}$  and  $RT_{RA}$  for each calendar month in the Northern Hemisphere, along with the corresponding Pearson correlation coefficients



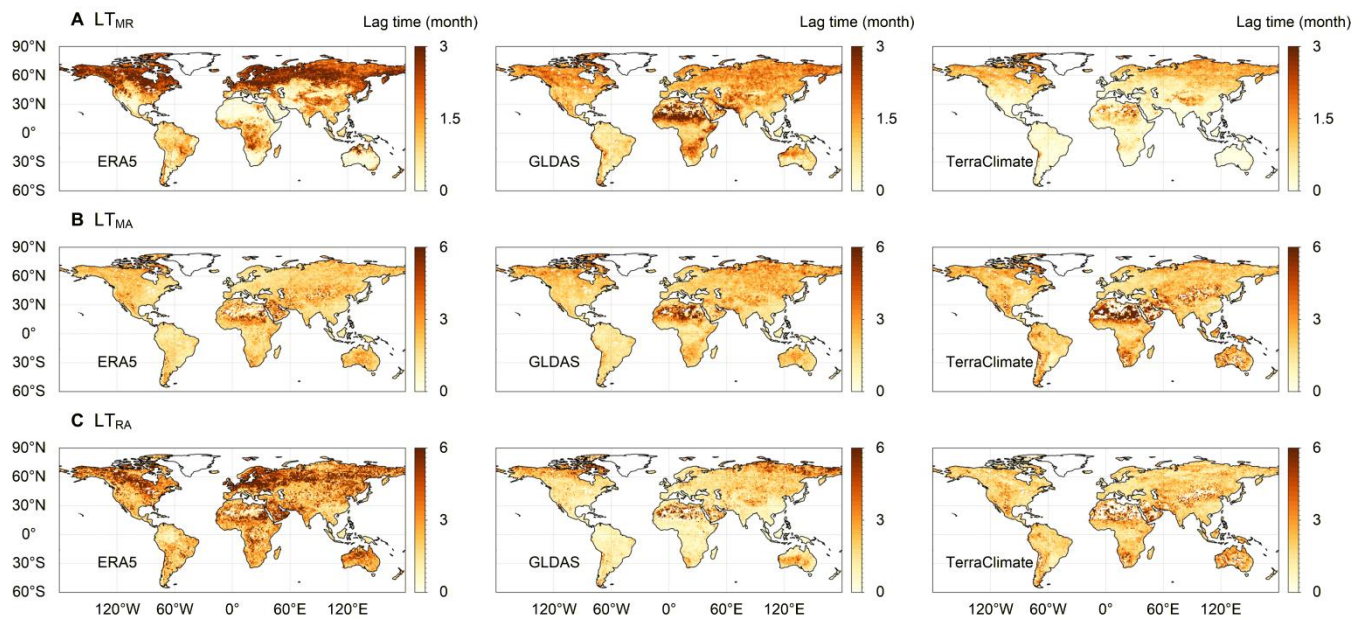
**Figure S3.** Spatial patterns of average  $RT_{MR}$ ,  $RT_{MA}$ , and  $RT_{RA}$  across global land areas in the ERA5, GLDAS, and TerraClimate datasets.



20 **Figure S4.** Spatial patterns of maximum Pearson correlation coefficients for  $\text{RT}_{\text{MR}}$ ,  $\text{RT}_{\text{MA}}$ , and  $\text{RT}_{\text{RA}}$  across global land areas in the ERA5, GLDAS, and TerraClimate datasets.



**Figure S5.** Spatial patterns of average  $PR_{MR}$ ,  $PR_{MA}$ , and  $PR_{RA}$  across global land areas in the ERA5, GLDAS, and TerraClimate datasets.



**Figure S6.** Spatial patterns of average  $LT_{MR}$ ,  $LT_{MA}$ , and  $LT_{RA}$  across global land areas in the ERA5, GLDAS, and TerraClimate datasets.

**Table S1.** The performance metrics in validation sets for each XGBoost model

Model name	RT <sub>MR</sub>	RT <sub>MA</sub>	RT <sub>RA</sub>	PR <sub>MR</sub>	PR <sub>MA</sub>	PR <sub>RA</sub>	LT <sub>MR</sub>	LT <sub>MA</sub>	LT <sub>RA</sub>
R <sup>2</sup>	0.653	0.878	0.858	0.824	0.944	0.913	0.646	0.581	0.652
RMSE	1.736	1.779	1.667	4.613	3.252	4.416	1.177	4.221	1.411