Research Data Supporting the publication "Improvement of decadal predictions of monthly extreme Mei-yu rainfall via a causality guided approach"

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Note:

Please note that the data in this repository is post-processed and not raw data to make storage more efficient. The raw data that were used in this study were obtained through the following channel:

- ERA5 and ERA5-BE were obtained from the Copernicus Climate Data Store (CDS, https://cds.climate.copernicus.eu/#!/home).
- PDO indices are obtained from NCEI, available at https://www.ncei.noaa.gov/access/monitoring/pdo/ (last accessed 13th July 2023).
- Historical simulation of CMIP6 outputs and Monthly DePreSys4 hindcast outputs were obtained from the Centre for Environmental Data Analysis (CEDA) via JASMIN.
- Sub-daily DePreSys4 hindcast outputs were provided by Dr Leon Hermanson at the UK Met Office.
- CN05.1 was provided by Dr Jia Wu at National Climate Center, China Meteorological Administration.

If you have questions about any of the data below, please do not hesitate to contact the corresponding author Kelvin Ng, k.s.ng@bham.ac.uk

Description

(1) CGSM2_chosen_predictors

The files contain information of the chosen causal predictors that are used for the construction of CGSM2. Figure 2, Table S1, and Table S2 can be generated using these files.

File name: CGSM2_chosen_predictors_month{m}_{period}.nc

- {m} is the month of interest
- {period} is the period of interest

(2) PearsonR

The files contain values of the Pearson R between CGSM2 outputs and observations, CN05.1. Figure 3, Table 2, Figure S3, and Figure S5 can be generated using these files.

File name: PearsonR_map_month{m}_{period}.nc

- {m} is the month of interest
- {period} is the period of interest

(3) RMSE_CGSM2_DePreSys4

The files contain the RMSE of monthly mean MYR (mm/d) in the middle/lower Yangtze River Valley predicted by PDO phase specific CGSM2 and DePreSys4 direct extreme precipitation simulation in PDO+ and PDO- phases for different months and for lead years 2 to 10. Figure 4 can be generated using these files.

File name: RMSE_CGSM2_DePreSys4_month{m}.csv

- {m} is the month of interest

(4) MYFDD

The files contain the climatological MYF Detection Density (MYFDD) of DePreSys4 and climatological MYFDD of HadGEM3-GC31-MM historical simulation for different months. Figure S2 can be generated using these files.

File name: mean_MYFDD_{model}_month{m}.nc

- {model} indicates DePreSys4 or HadGEM3-GC31-MM_historical
- {m} is the month of interest

(5) num_correctly_predicted_PDO_phase

The files contain Number of correctly predicted cases for PDO+ (red) and PDO- (blue) phases in each lead year of a month. Figure S4 can be generated using these files.

File name: num_correctly_predicted_PDO_phase_month{m}.csv

- {m} is the month of interest

<u>Acknowledgement:</u>