Description of R codes and data for CCA Summer

This Github repository contains the code and a selection of the data for the core elements of Buchmann and DelSole (2024). Below is a brief description of each code.

era40.cca.R

Calculates CCA of lagged temperature

cca.era40.week12.RData

CCA outputs when applied to each season, lag is associated with weeks 1-2

cca.era40.week34.RData

CCA outputs when applied to each season, lag is associated with weeks 3-4

t2m.era40.eof.ave.14day.RData

EOFs and PCs of 2-week mean 2m temperature data over the US

oos.cca.montecarlo.R

For a given Tx and Ty, generates synthetic data such that the leading PC of X and the leading PC of Y have a known population correlation and the remaining PCs of both X and Y are iid. CCA is applied to that data. It then applies the CCA model to independent data with the same population correlation. Doing this many times builds a distribution of leading canonical correlations and a distribution of correlation of the leading mode in independent data *as a function of population correlation*.

Functions

cca.gev.R

Computes CCA on X and Y

gev.R

Solves a generalized eigenvalue problem

cca.null.rm.sig.R

Computes the significance value for all canonical correlations, with the option to account for the removal of an additional signal

rm.seas.cycle.R

Removes the leading three harmonics, trend, and mean

rm.seas.mean.R

Removes the local seasonal mean (e.g. the mean of JJA 1950 is removed, the mean of JJA 1951 is removed, etc.)

cca.gev.pc.R

Computes CCA on X and Y. The same procedure as cca.gev.R, but without requiring the input X and Y to be lists. Used in oos.cca.montecarlo.R.

References

Buchmann, P. and T. DelSole, 2024: A New Mode of Subseasonal Predictability Over the US: Boreal Summer. *Journal of Climate*, **submitted**.