

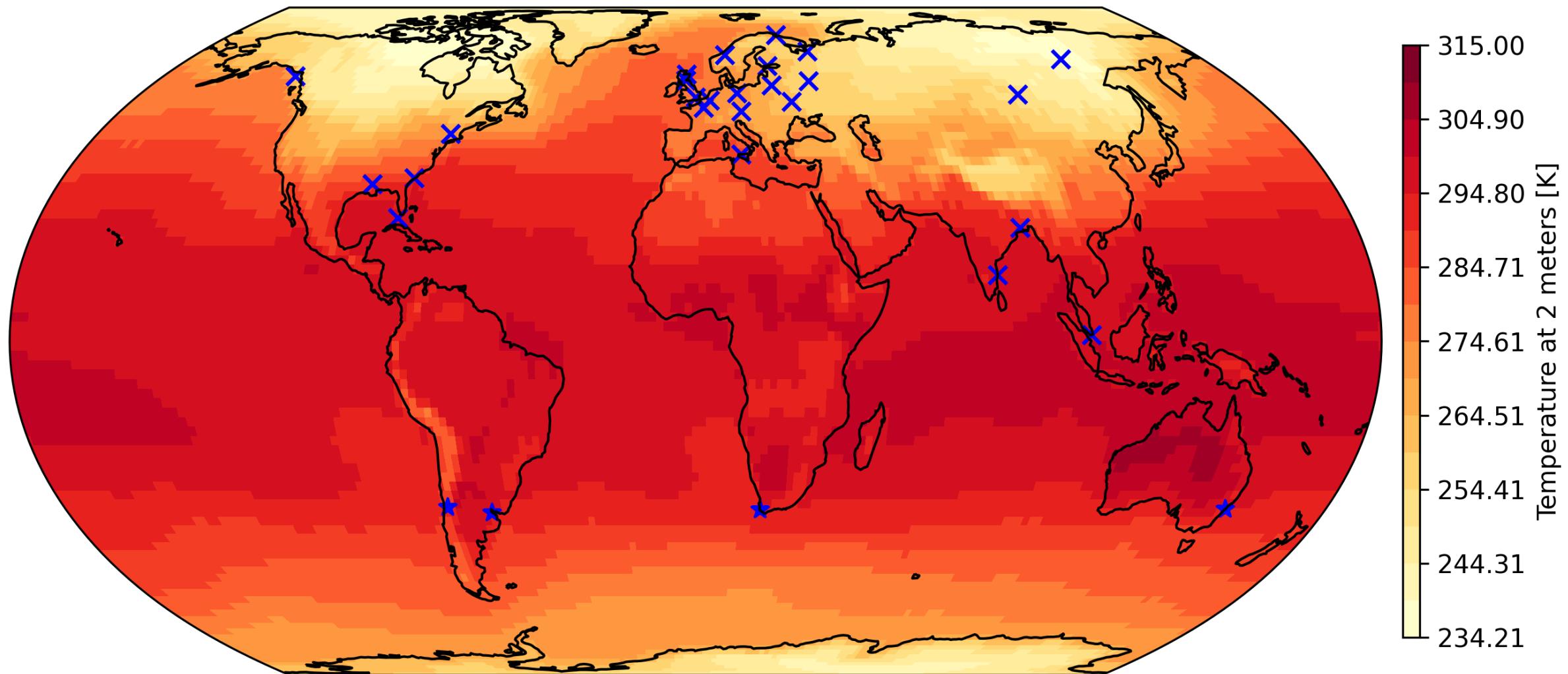
A very simple recurrent neural network's capabilities of reconstructing global temperature anomalies.

Data

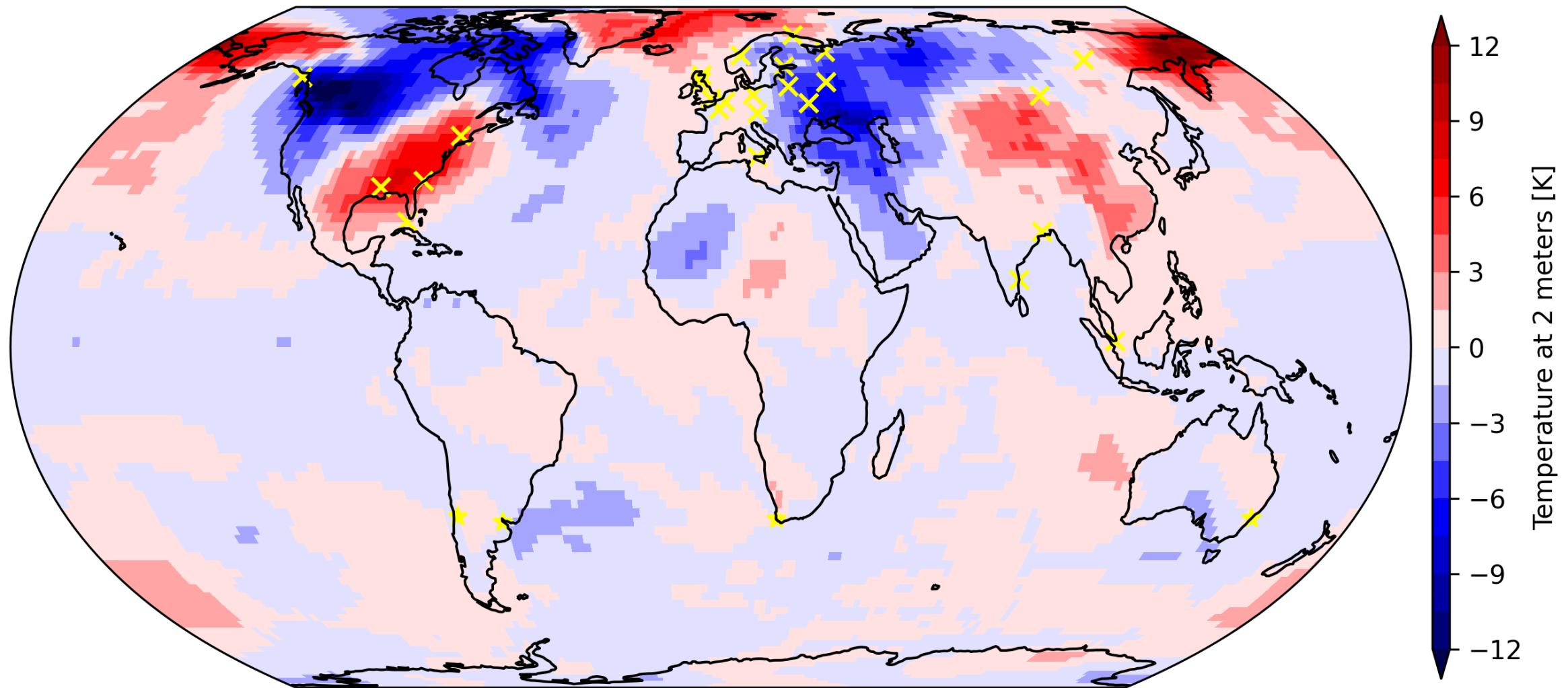
- 20CRv3 (1851-2015 as training, 1836-1850 as test)
- CSM-LME (1851-2005 x 14)
- MPI-GE (1851-2005 x 100)
- EKF400v2 ens mean
- ISTI temperature stations (select 25 early, long term stations)

We going to work with anomalies wrt 1951–1981

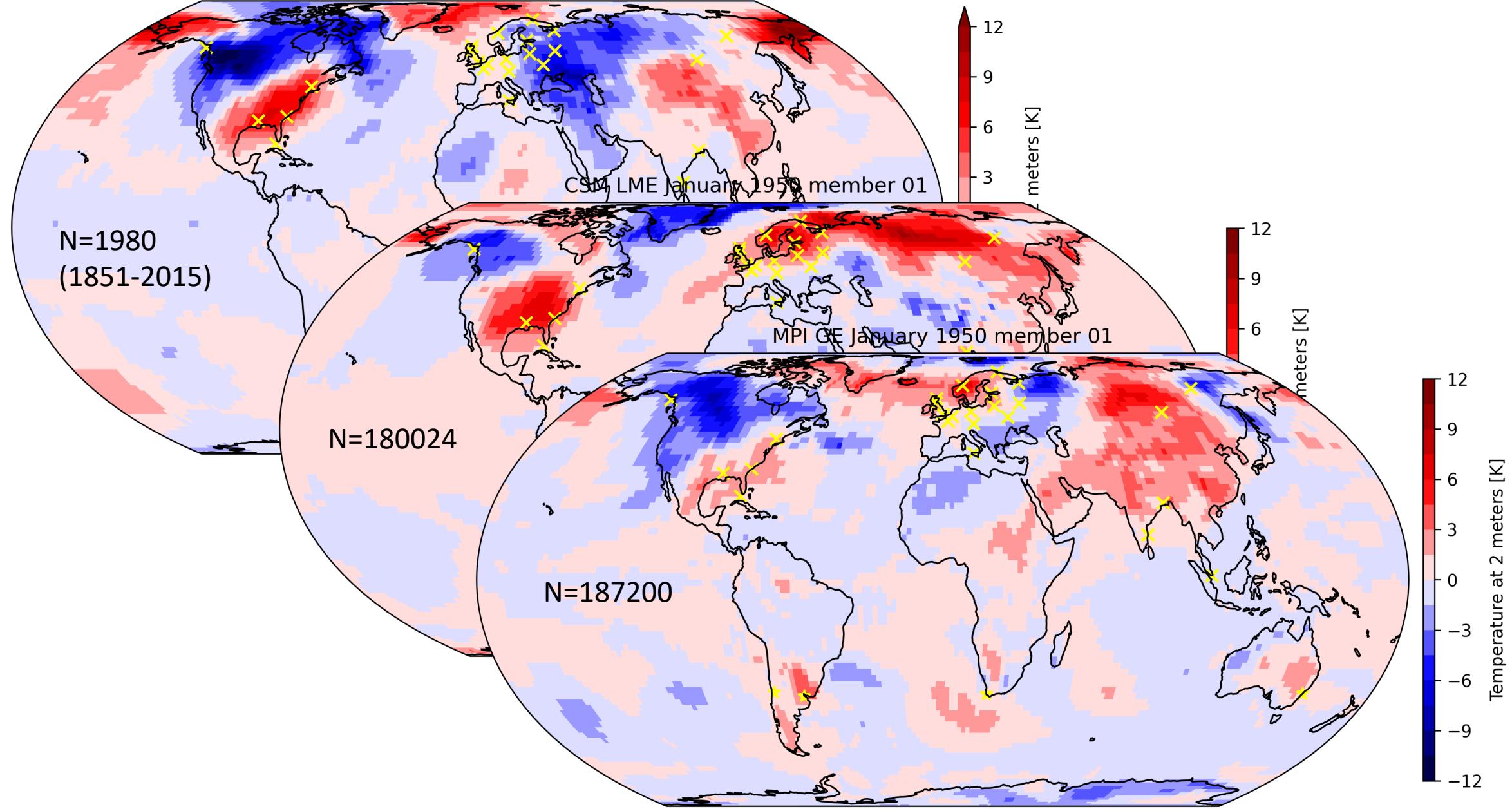
20CRv3 January 1950 ens mean



20CRv3 January 1950 ens mean



20CRv3 January 1950 ens mean



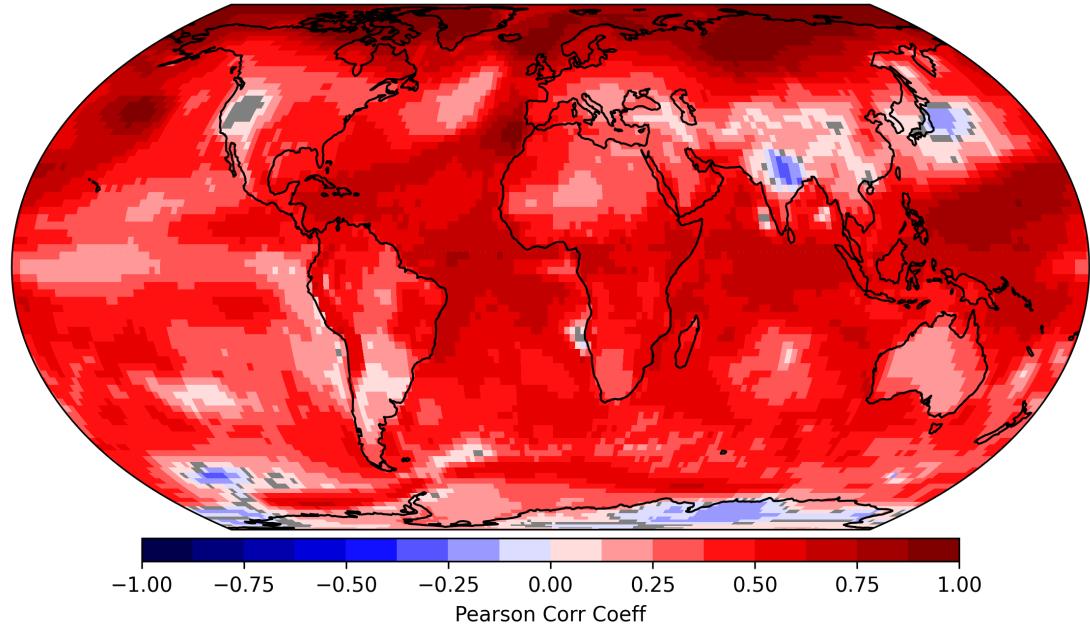
Methods

- 25 points reconstruct 18432 points
 - Randomize 1979 or 20000 months as input
 - Create an ensemble of 5 reconstructions
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- Comparison with 4824 months of EKF400v2 ens mean
 - Comparison with 168 months of 20CRv3

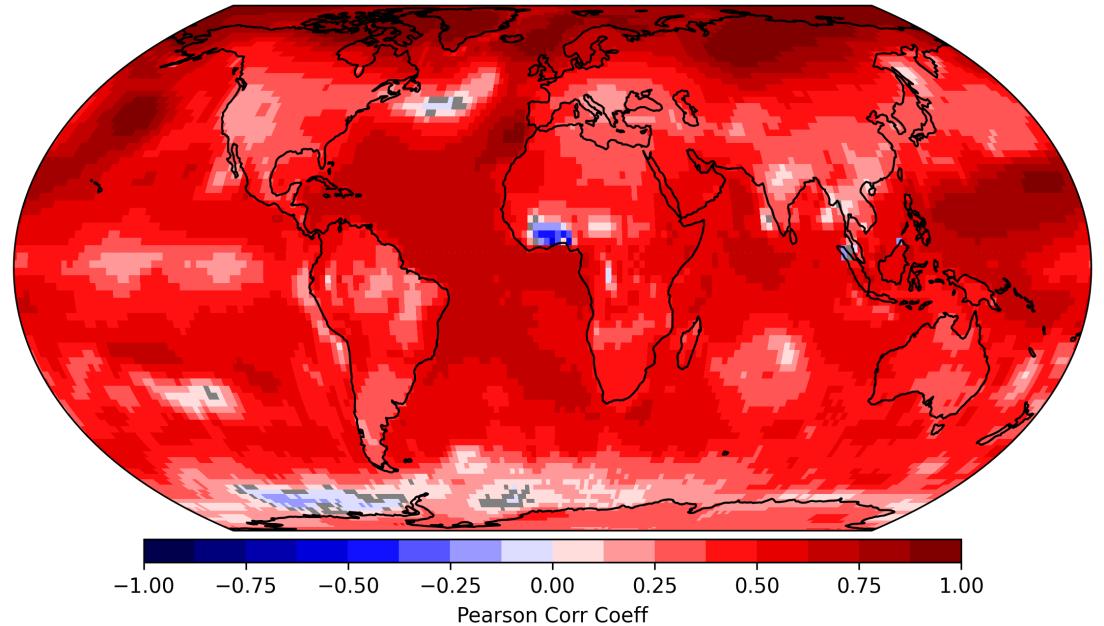
Correlation with EKF400 monthly

N= 4824

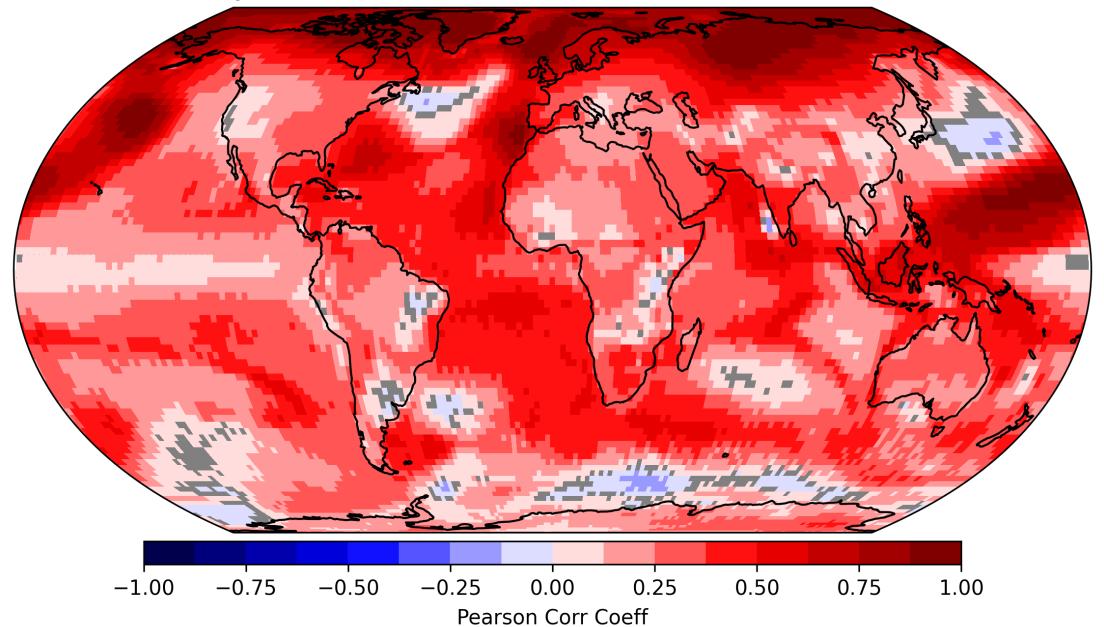
Monthly corr with EKF400 & RRN1lstm 1979 25 based on 20CR



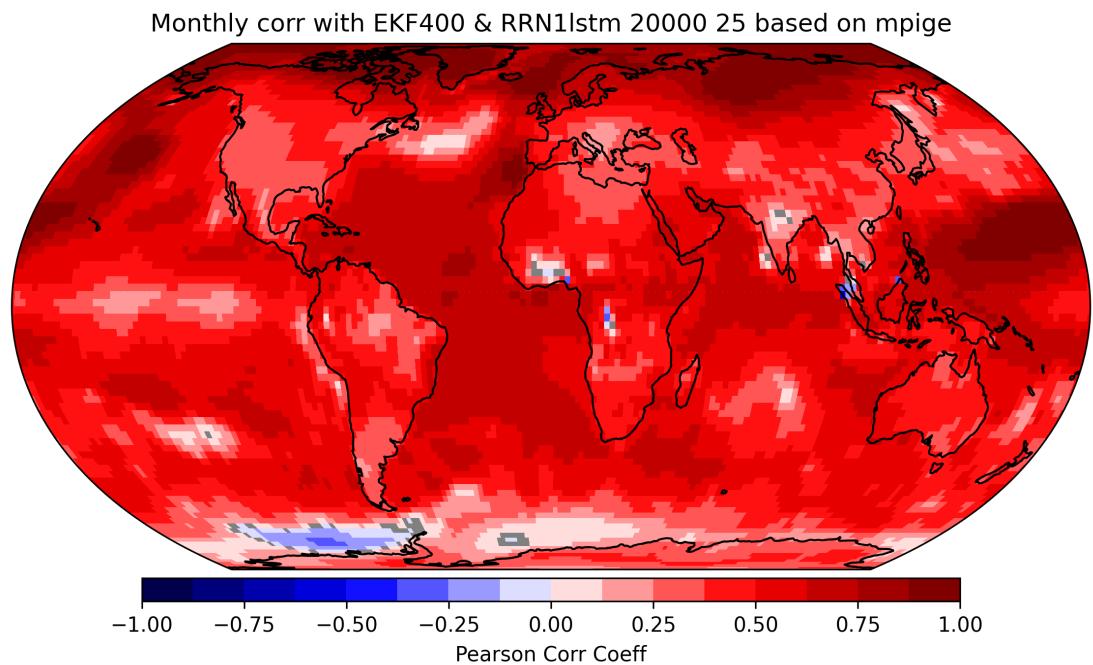
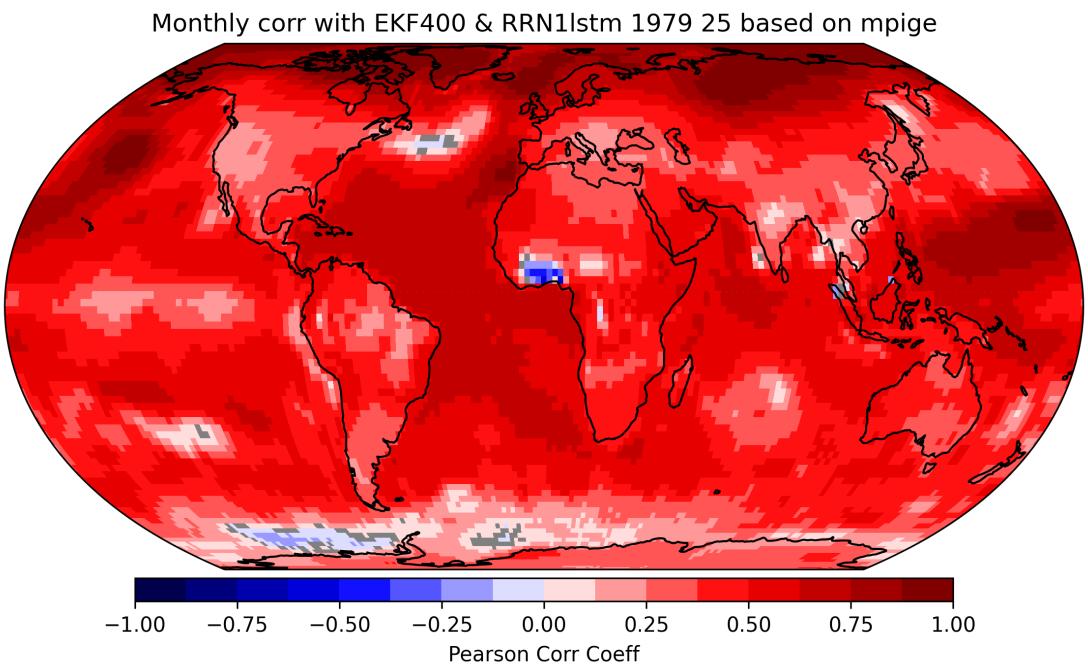
Monthly corr with EKF400 & RRN1lstm 1979 25 based on mpige



Monthly corr with EKF400 & RRN1lstm 1979 25 based on csmlme

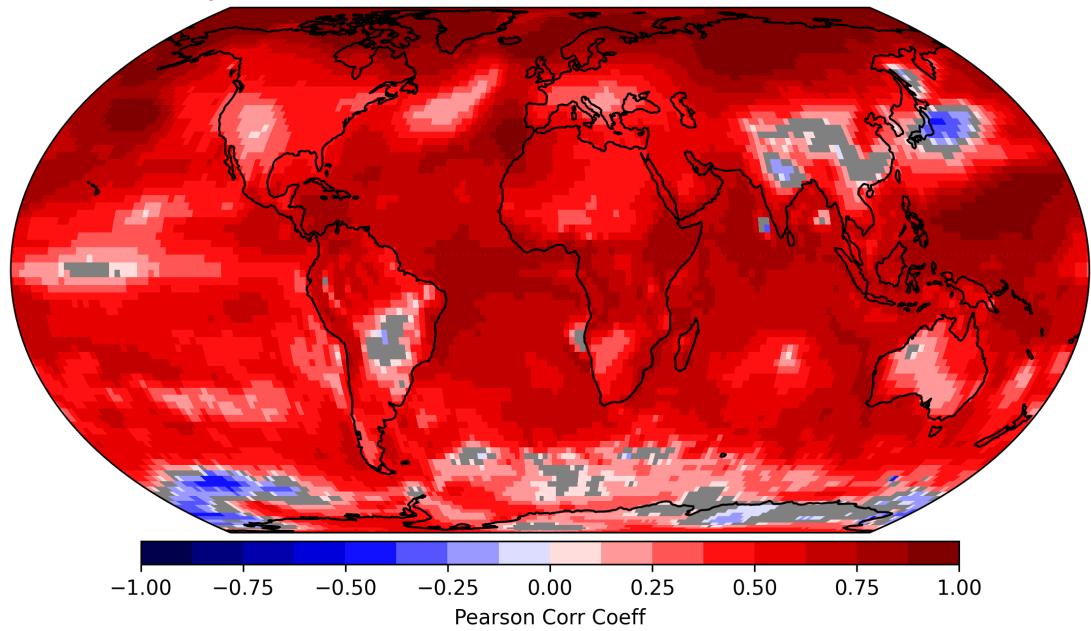


Correlation with EKF400



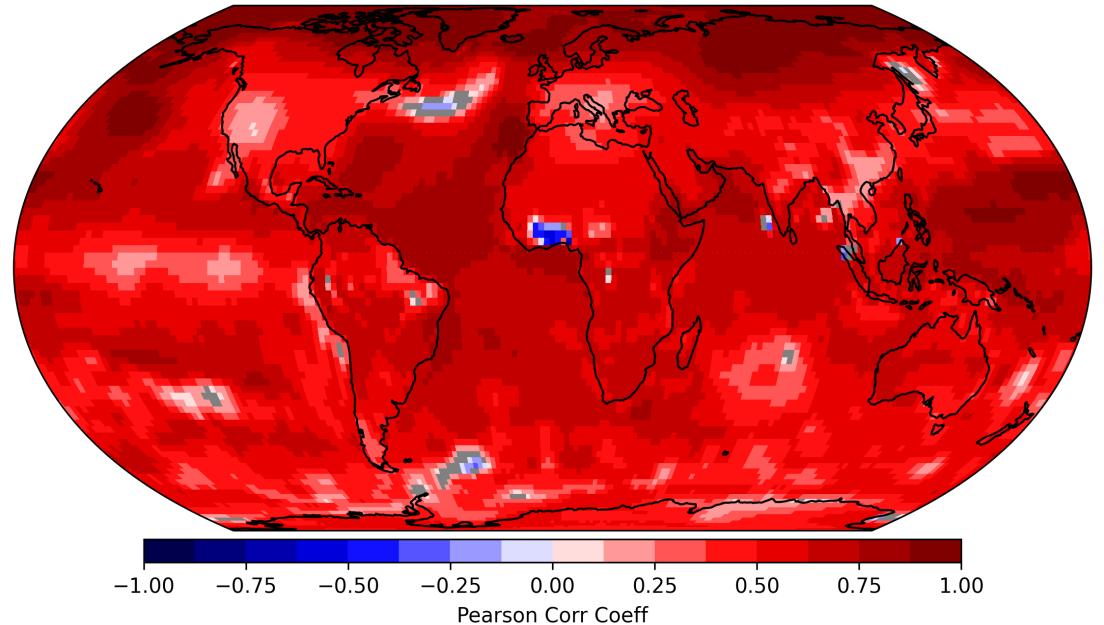
Correlation with EKF400 DJF

DJF corr with EKF400 & RRN1lstm 1979 25 based on 20CR

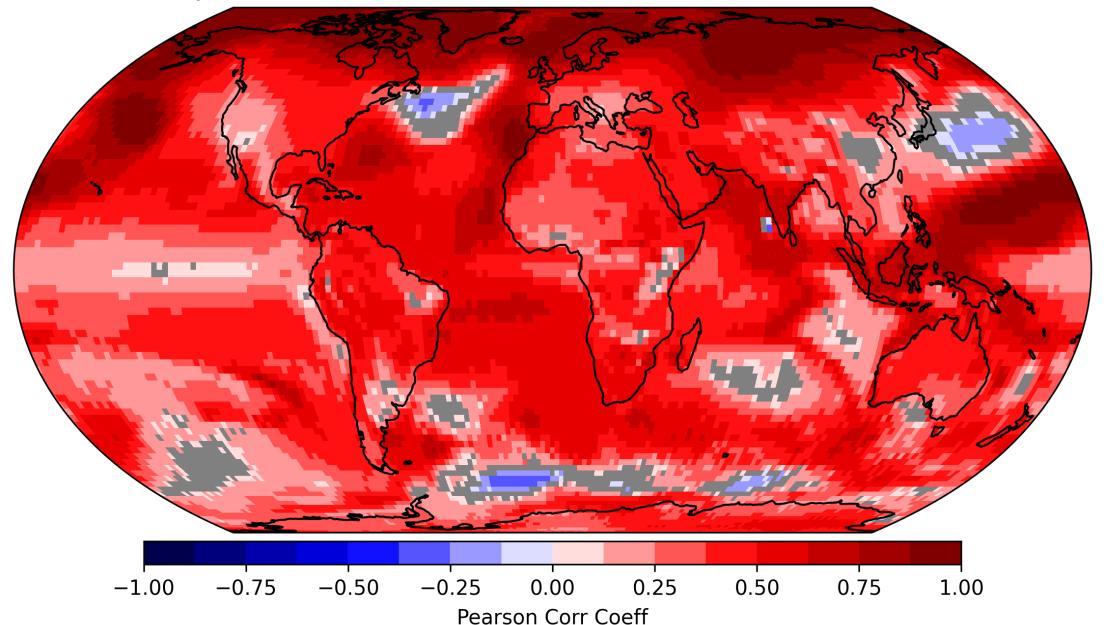


N= 4824/12 - 1

DJF corr with EKF400 & RRN1lstm 1979 25 based on mpige

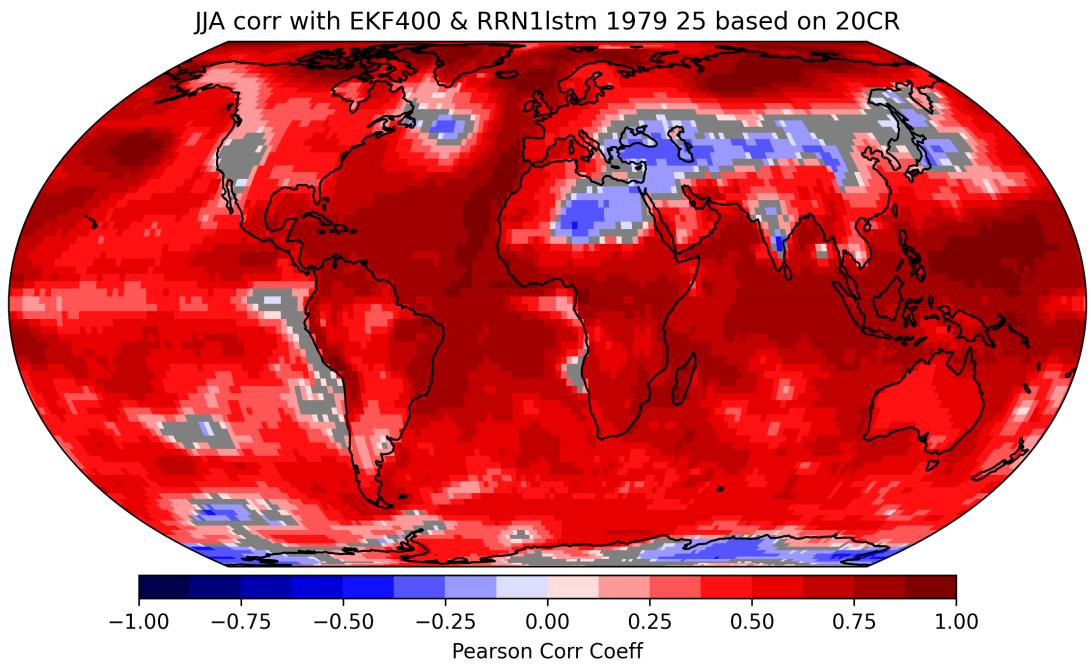


DJF corr with EKF400 & RRN1lstm 1979 25 based on csmlme

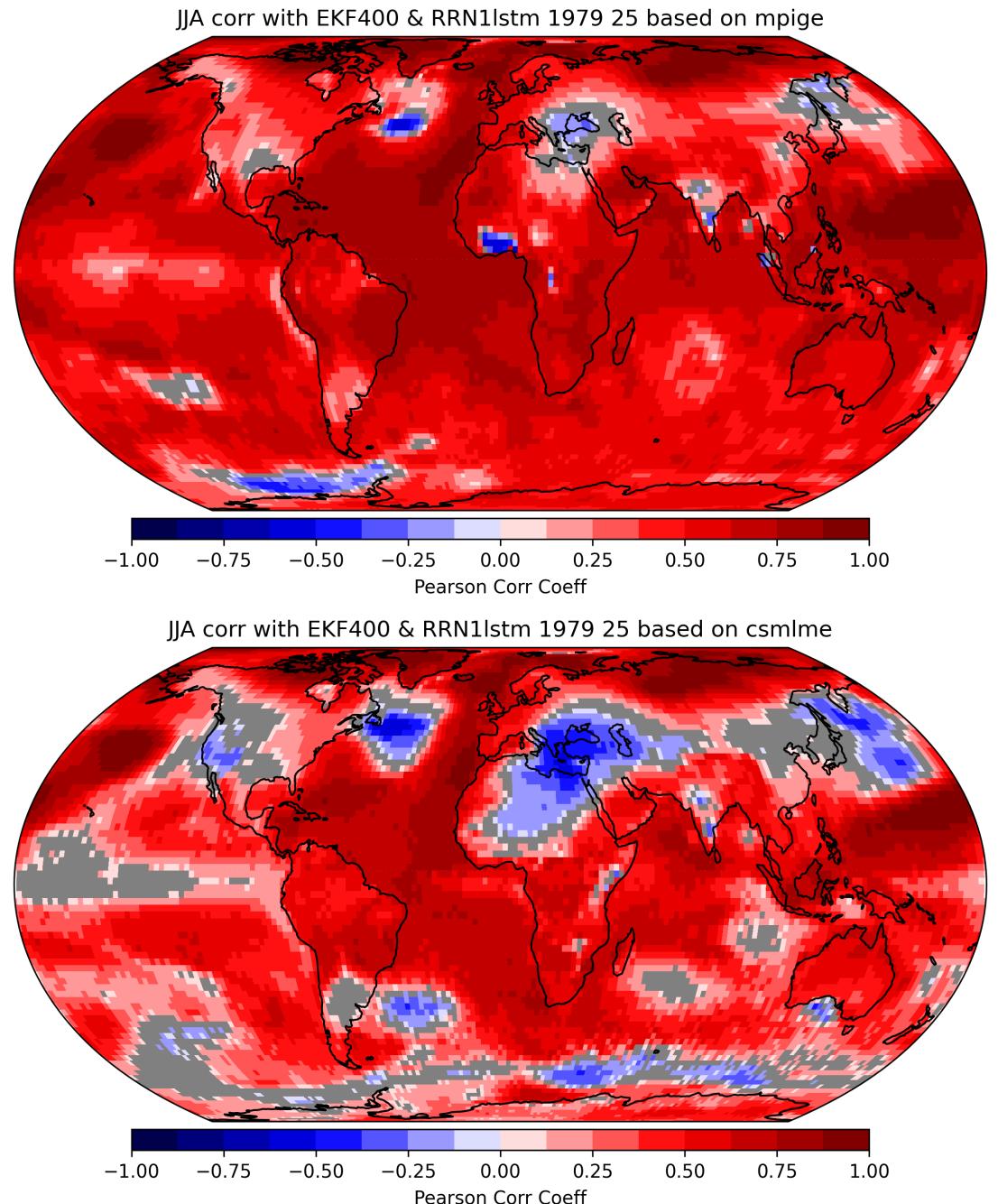


Correlation with EKF400

JJA

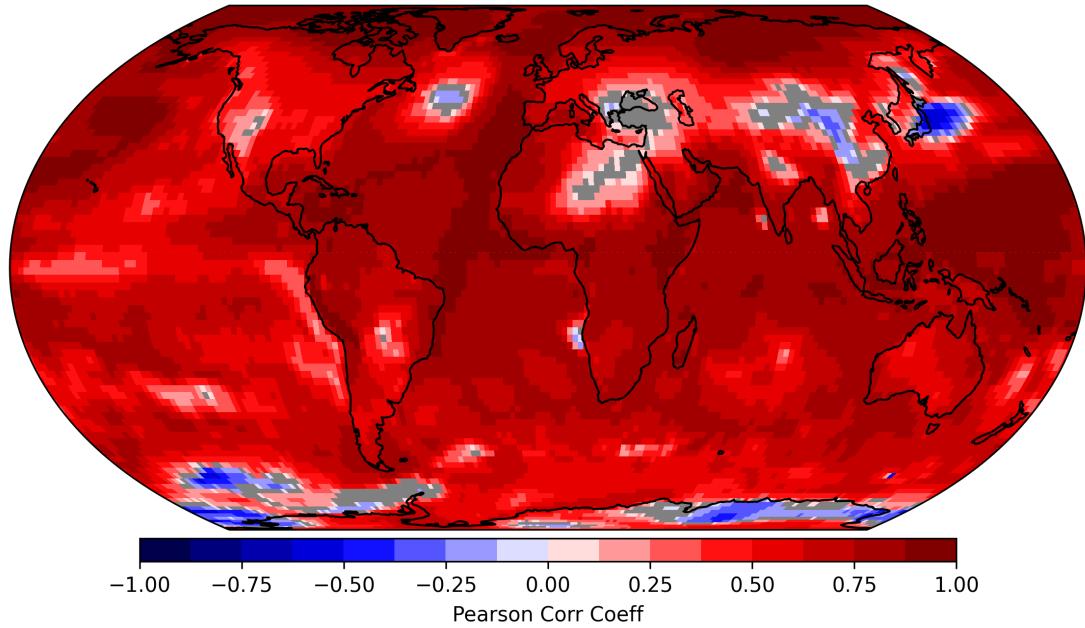


N= 4824/12



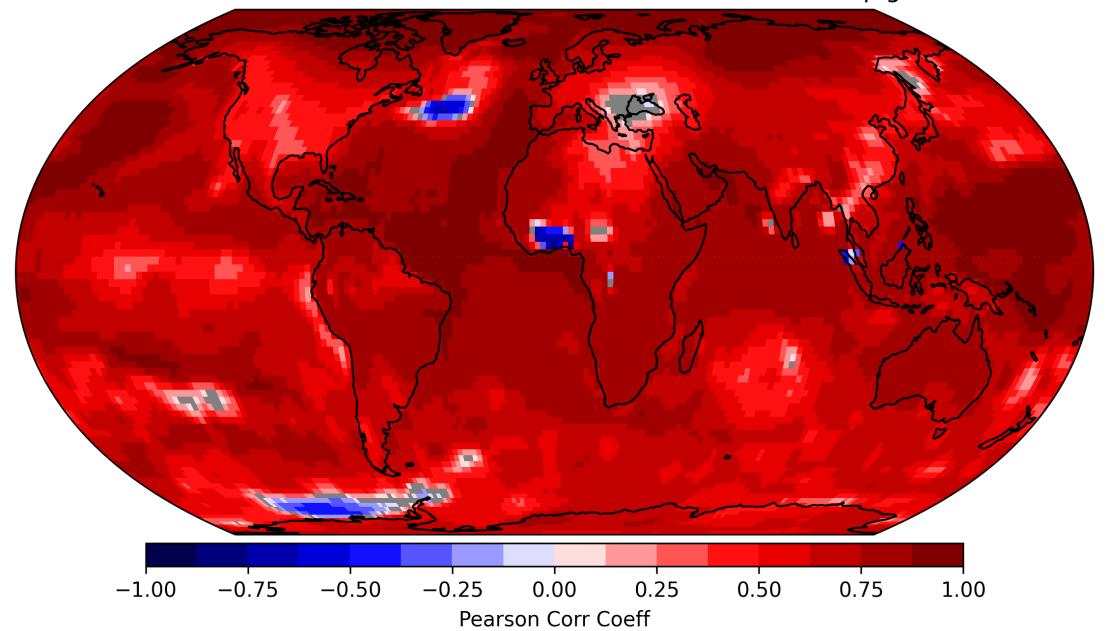
Correlation with EKF400 yearly mean

YM corr with EKF400 & RRN1lstm 1979 25 based on 20CR

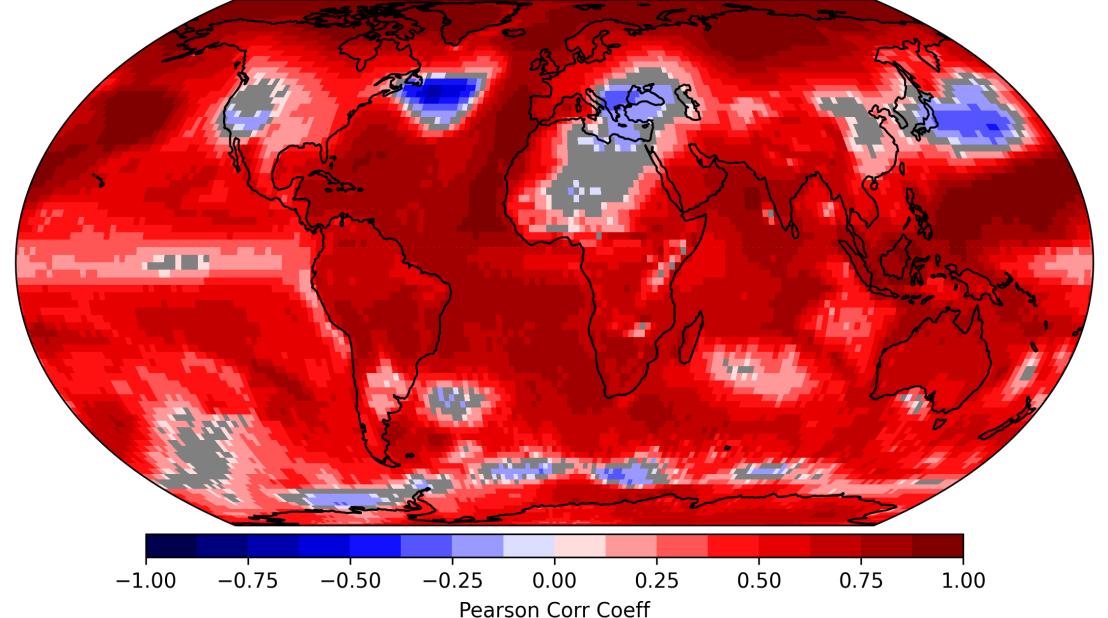


N= 4824/12

YM corr with EKF400 & RRN1lstm 1979 25 based on mpige

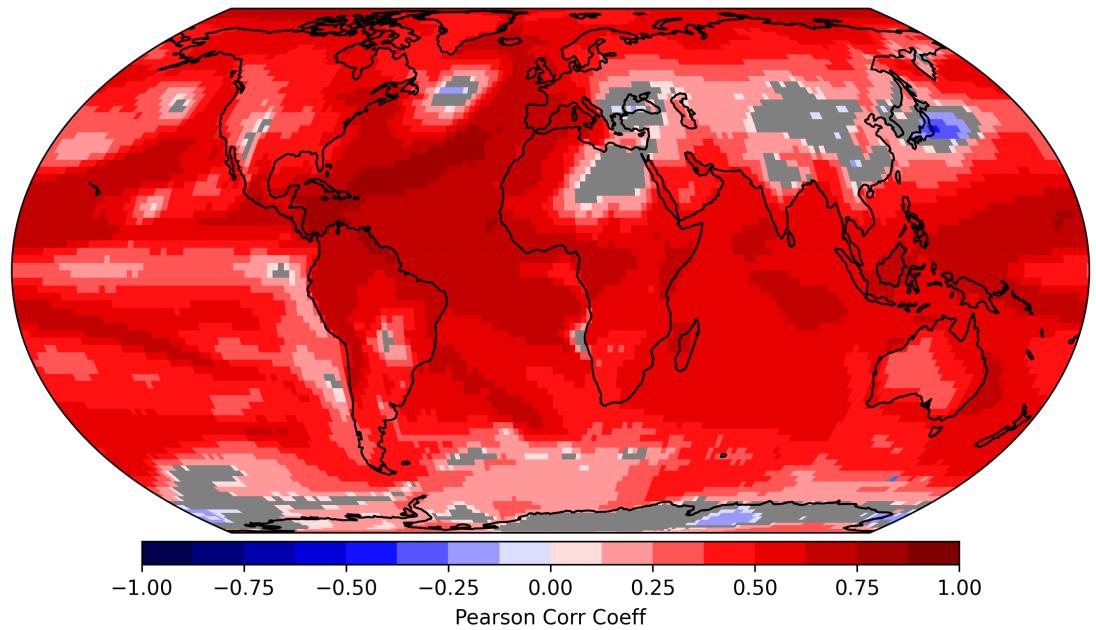


YM corr with EKF400 & RRN1lstm 1979 25 based on csmlme

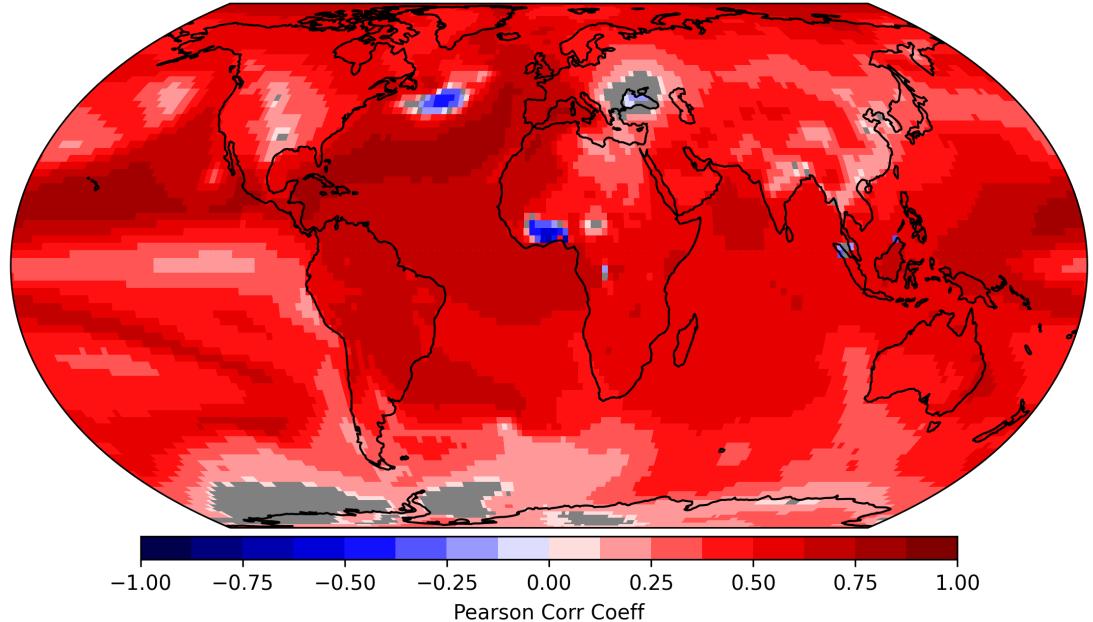


Correlation with LMR yearly mean

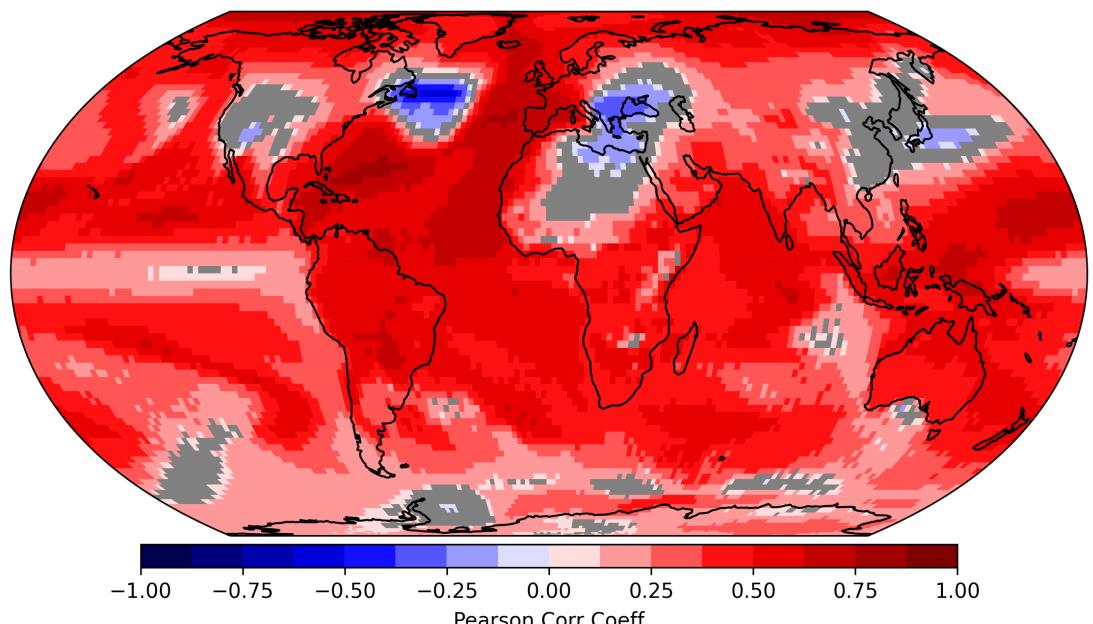
YM corr with lmr & RRN1lstm 1979 25 based on 20CR



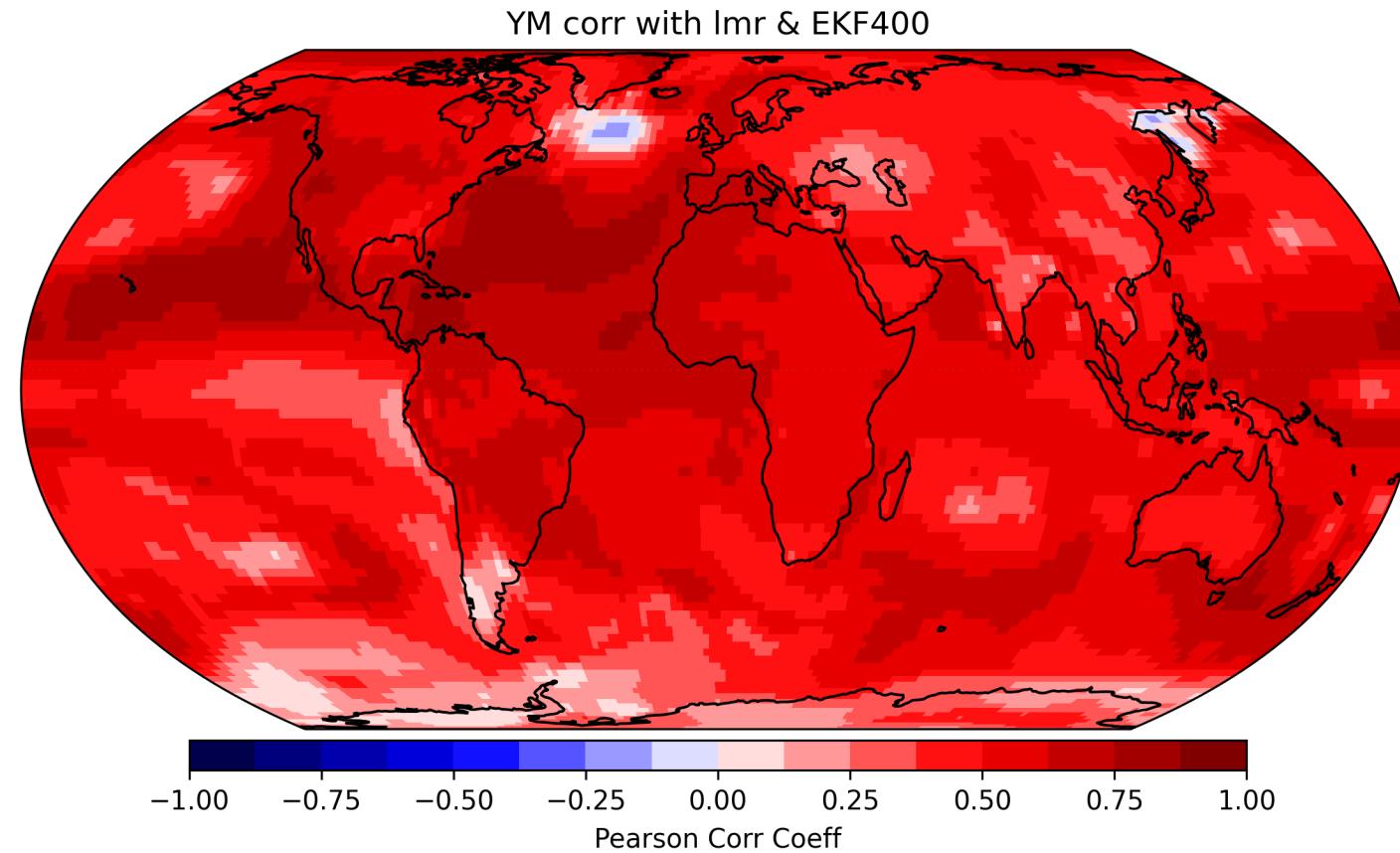
YM corr with lmr & RRN1lstm 1979 25 based on mpige



YM corr with lmr & RRN1lstm 1979 25 based on csmlme

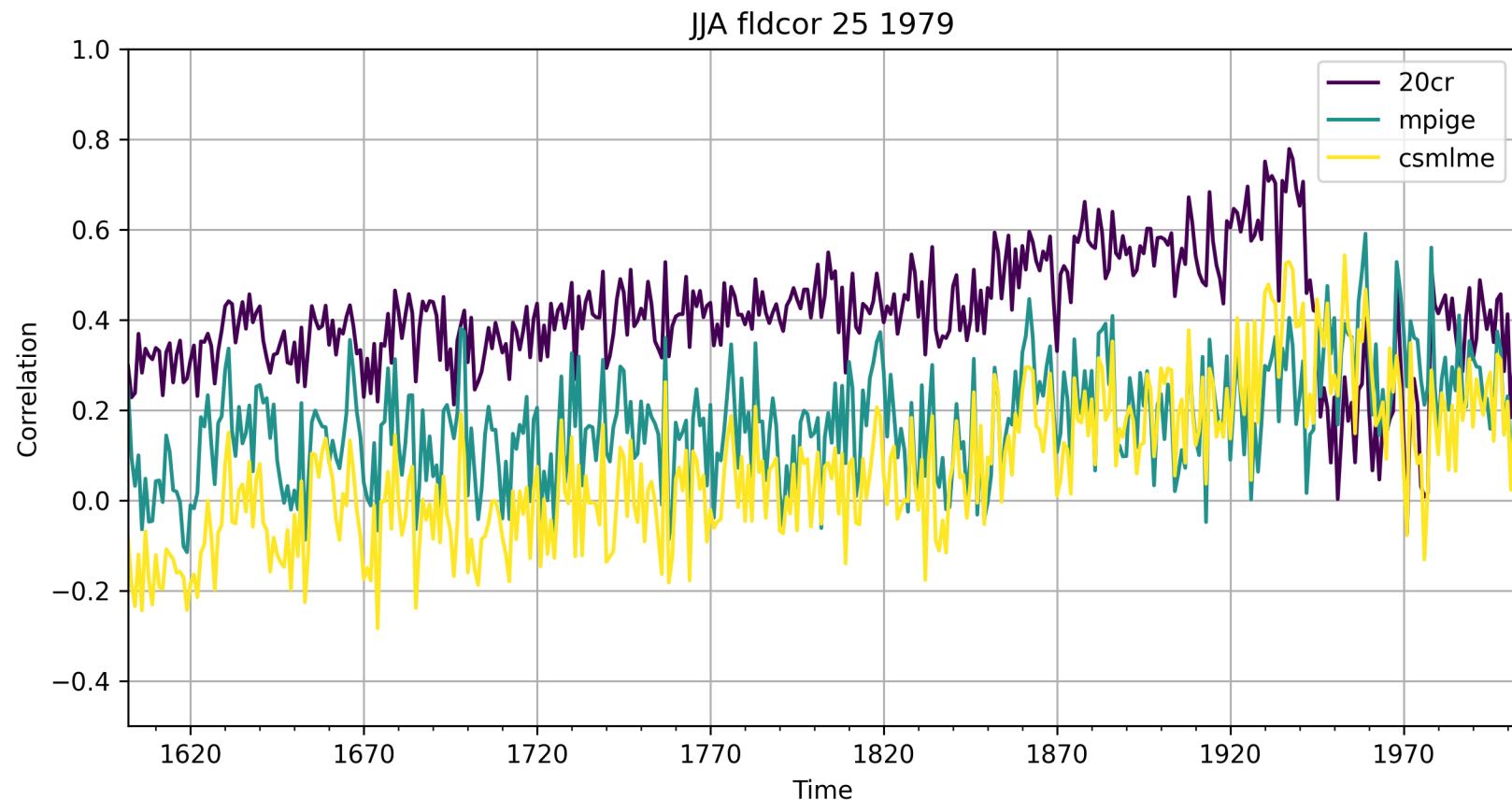


Correlation with LMR yearly mean



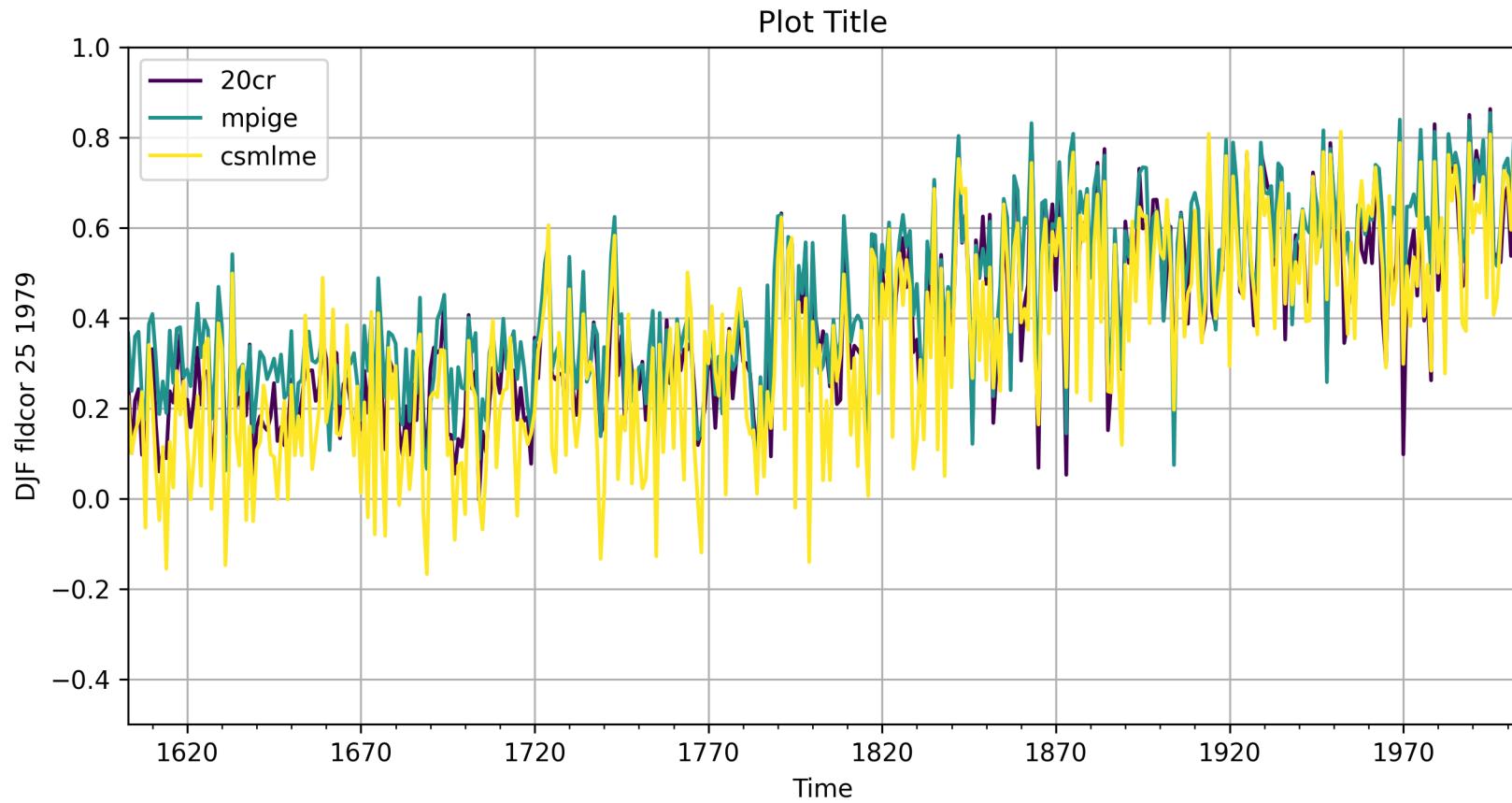
Correlation with EKF400

JJA



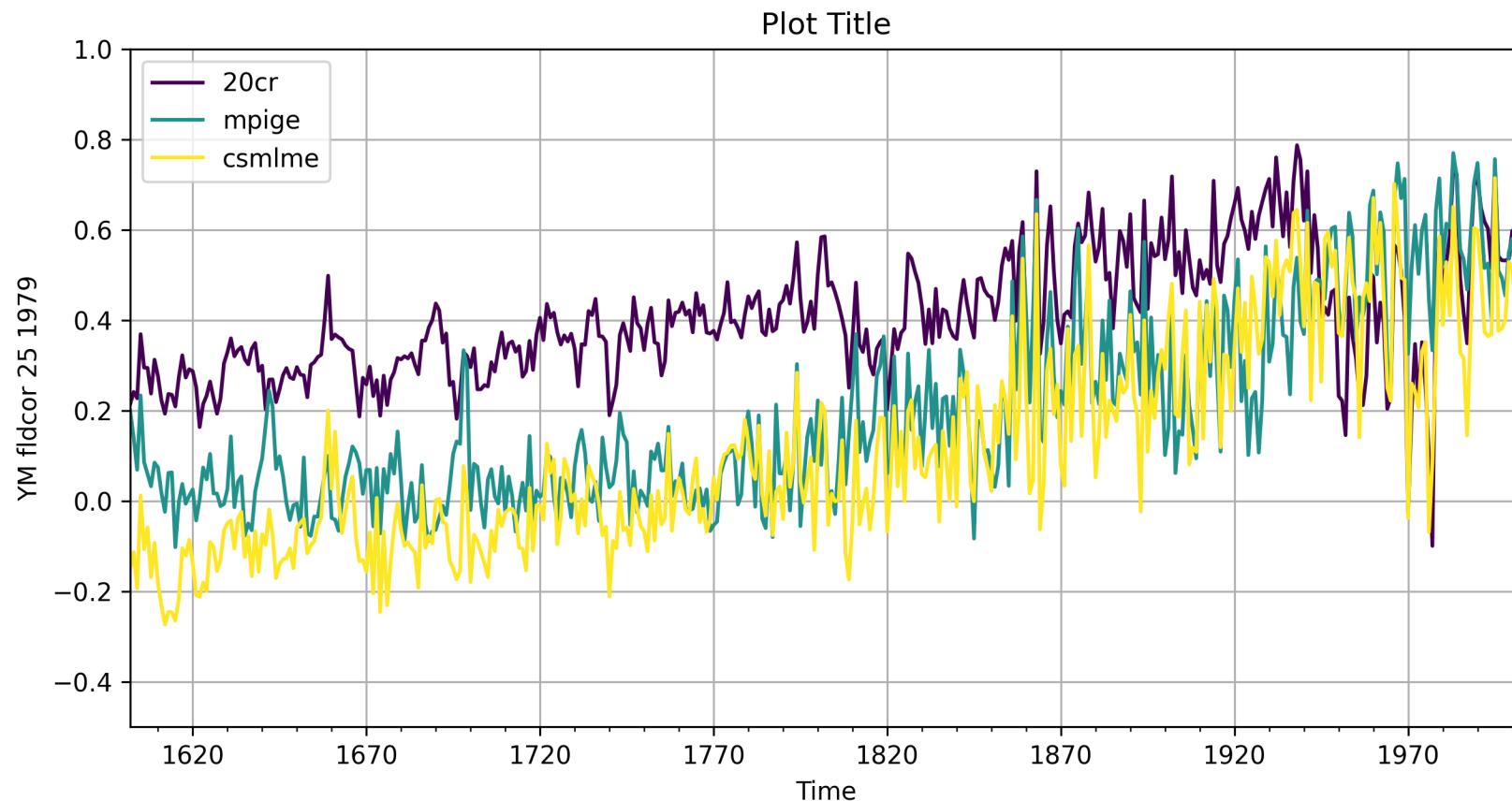
Correlation with EKF400

DJF

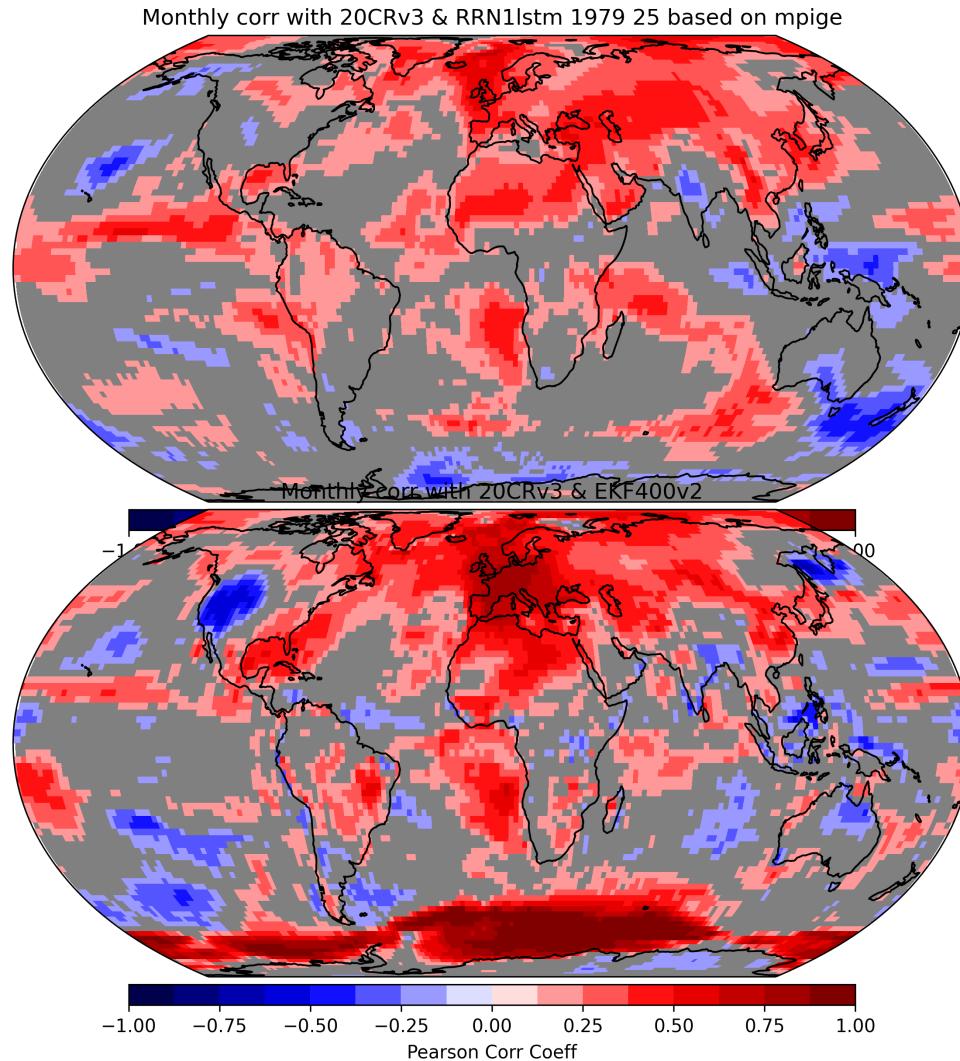
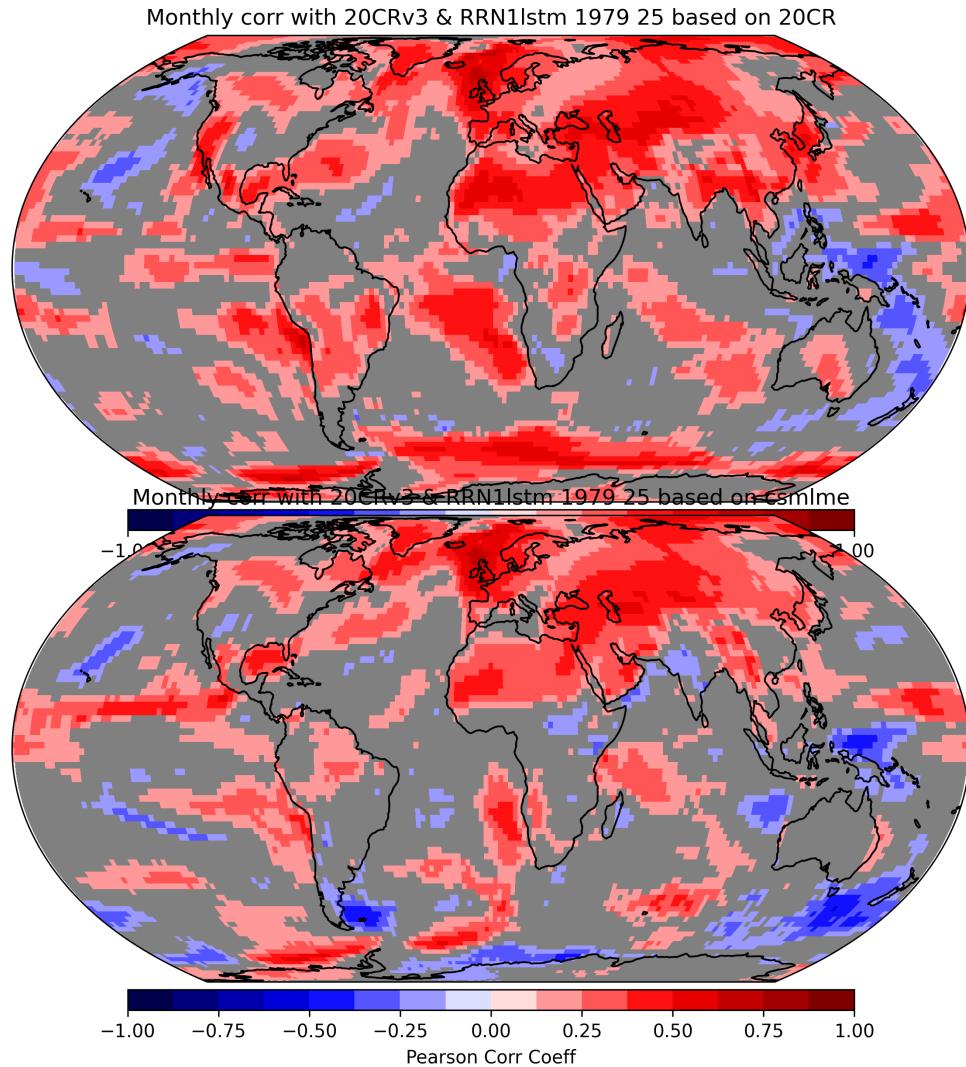


Correlation with EKF400

Yearly Mean

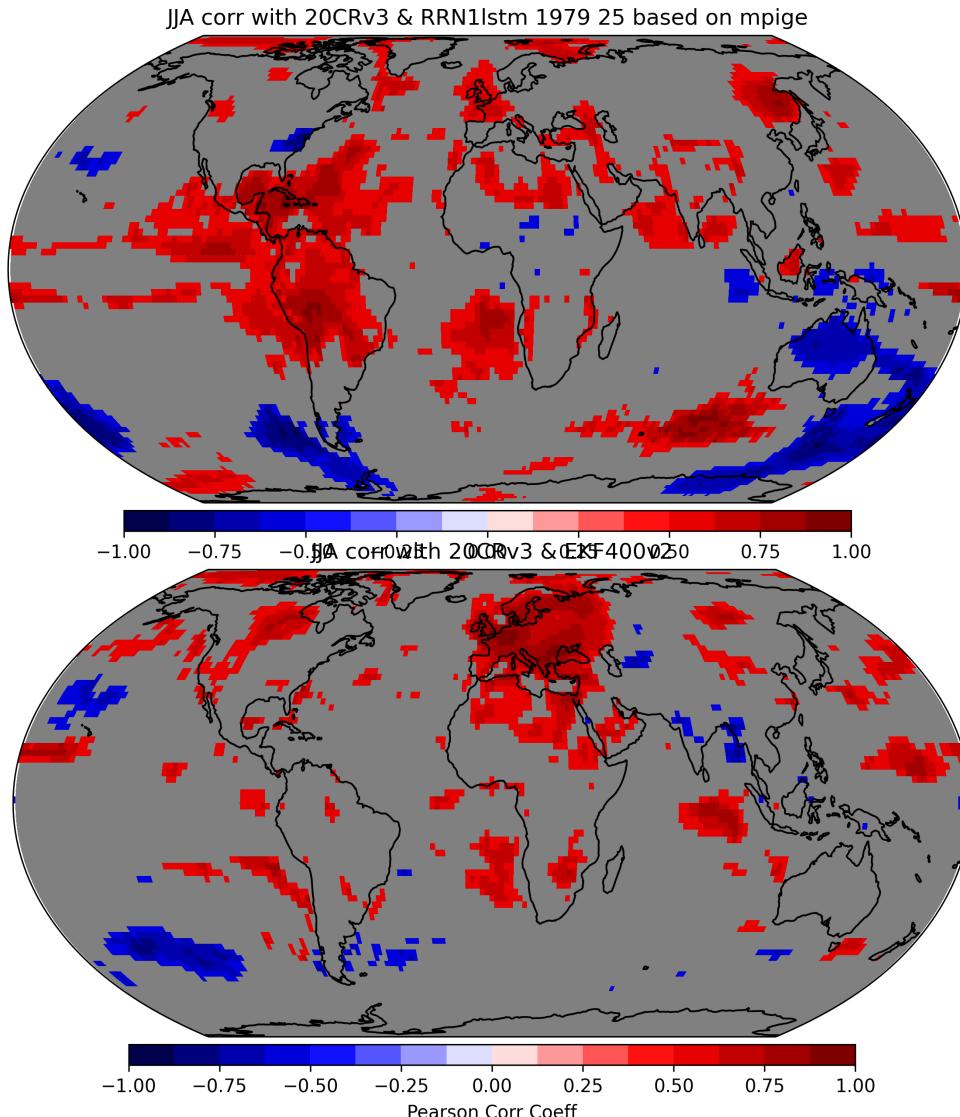
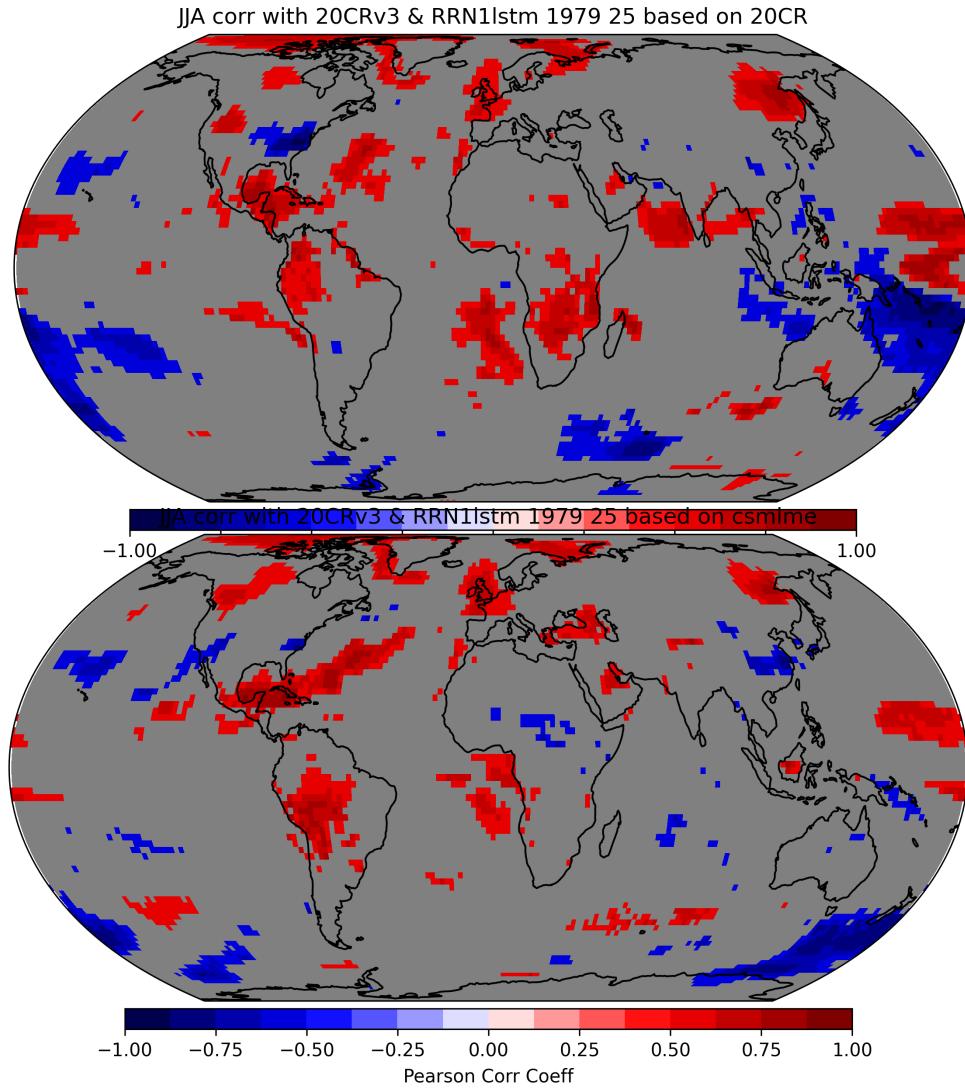


Correlation with 20CRv3 1836–1850 monthly



Correlation with 20CRv3 1836–1850

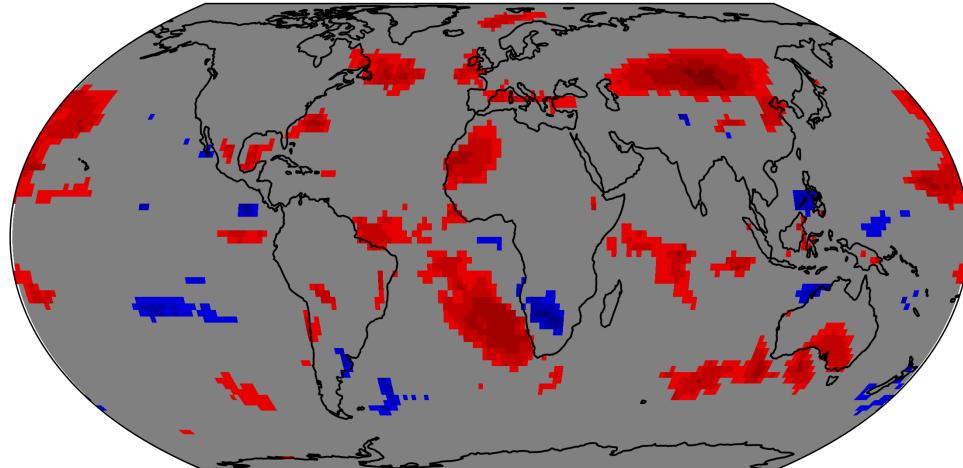
JJA



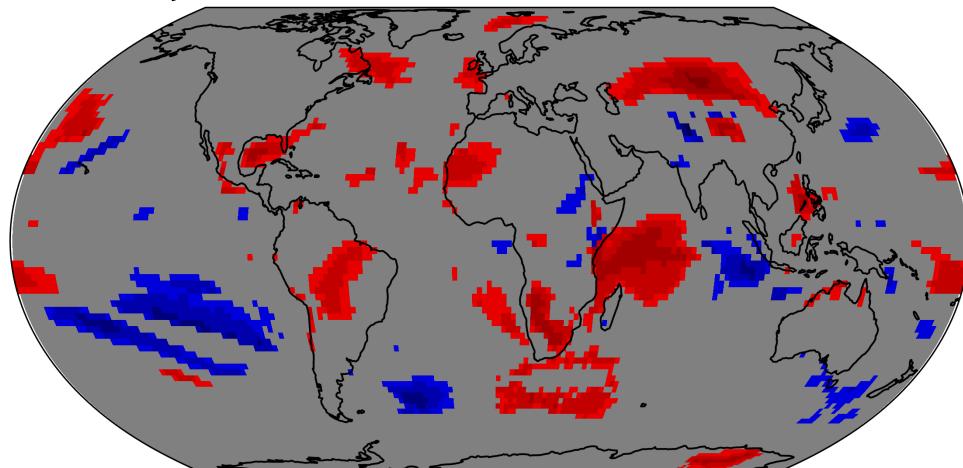
Correlation with 20CRv3 1836–1850

DJF

DJF corr with 20CRv3 & RRN1lstm 1979 25 based on 20CR

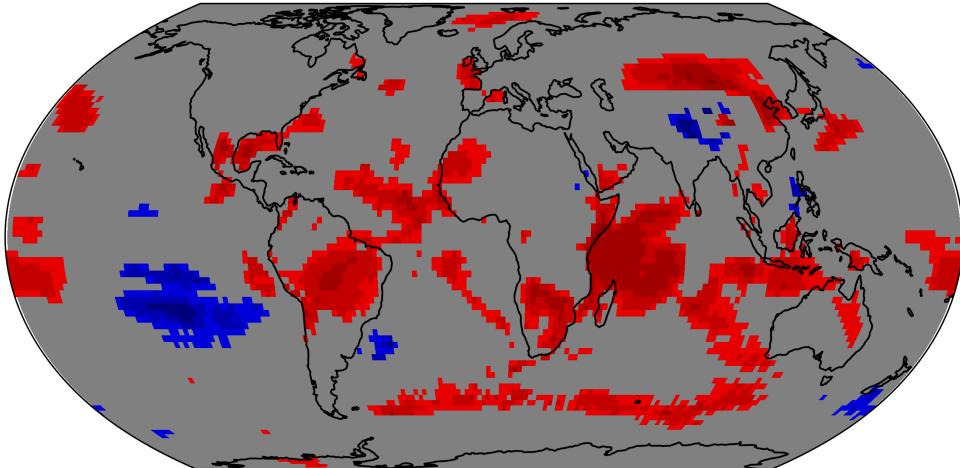


-1.00 DJF corr with 20CRv3 & RRN1lstm 1979 25 based on 20CR 1.00

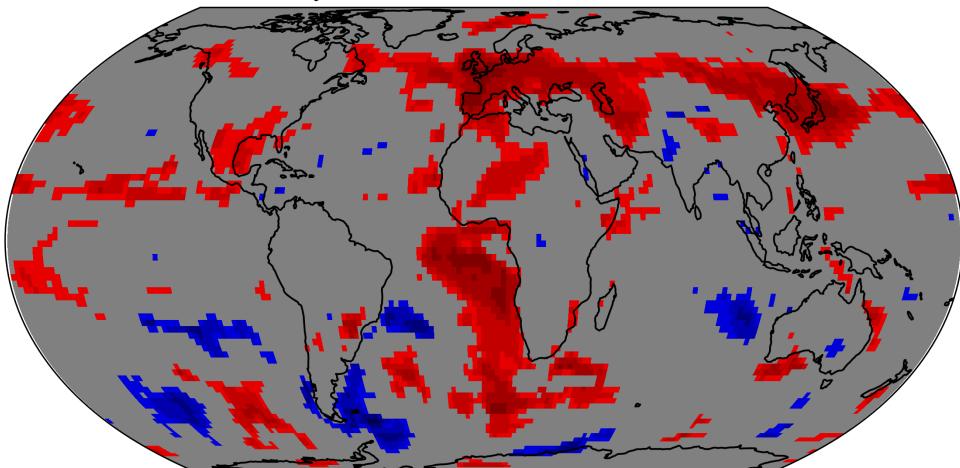


-1.00 -0.75 -0.50 -0.25 0.00 0.25 0.50 0.75 1.00 Pearson Corr Coeff

DJF corr with 20CRv3 & RRN1lstm 1979 25 based on mpige



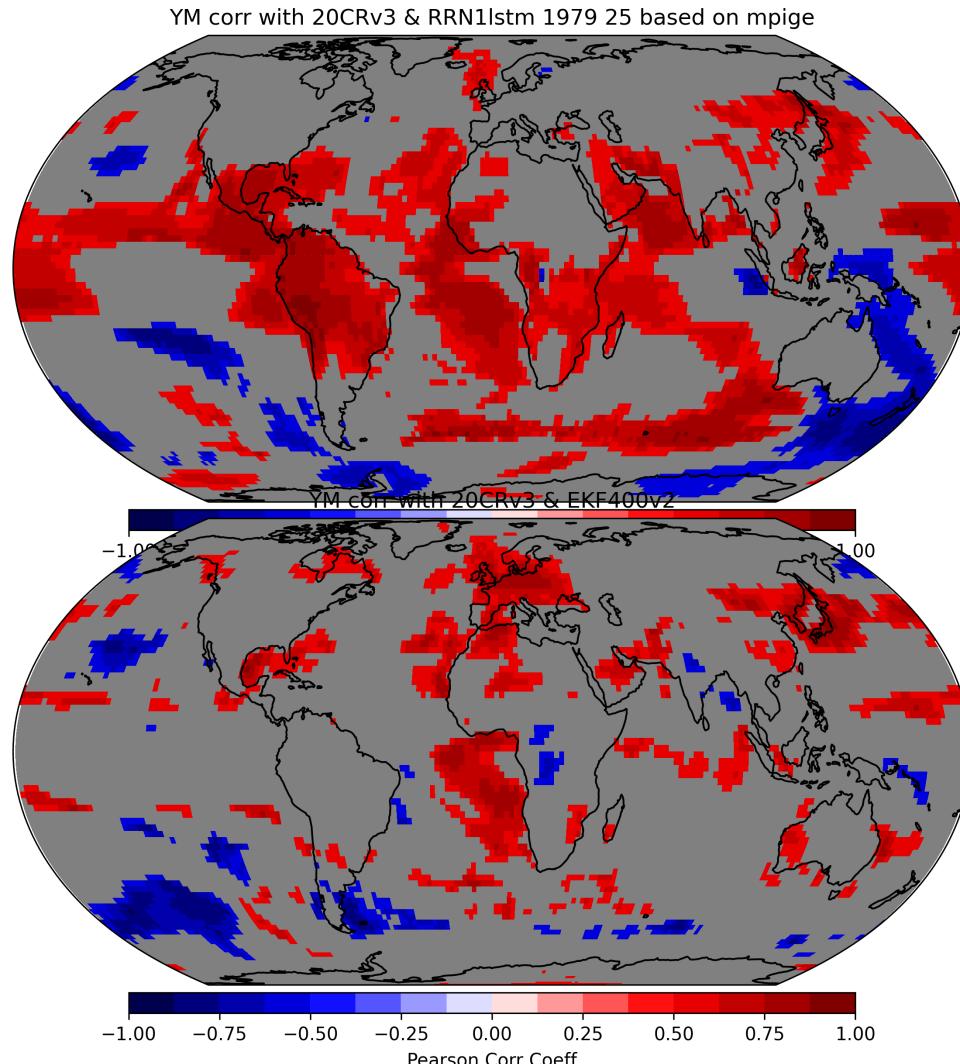
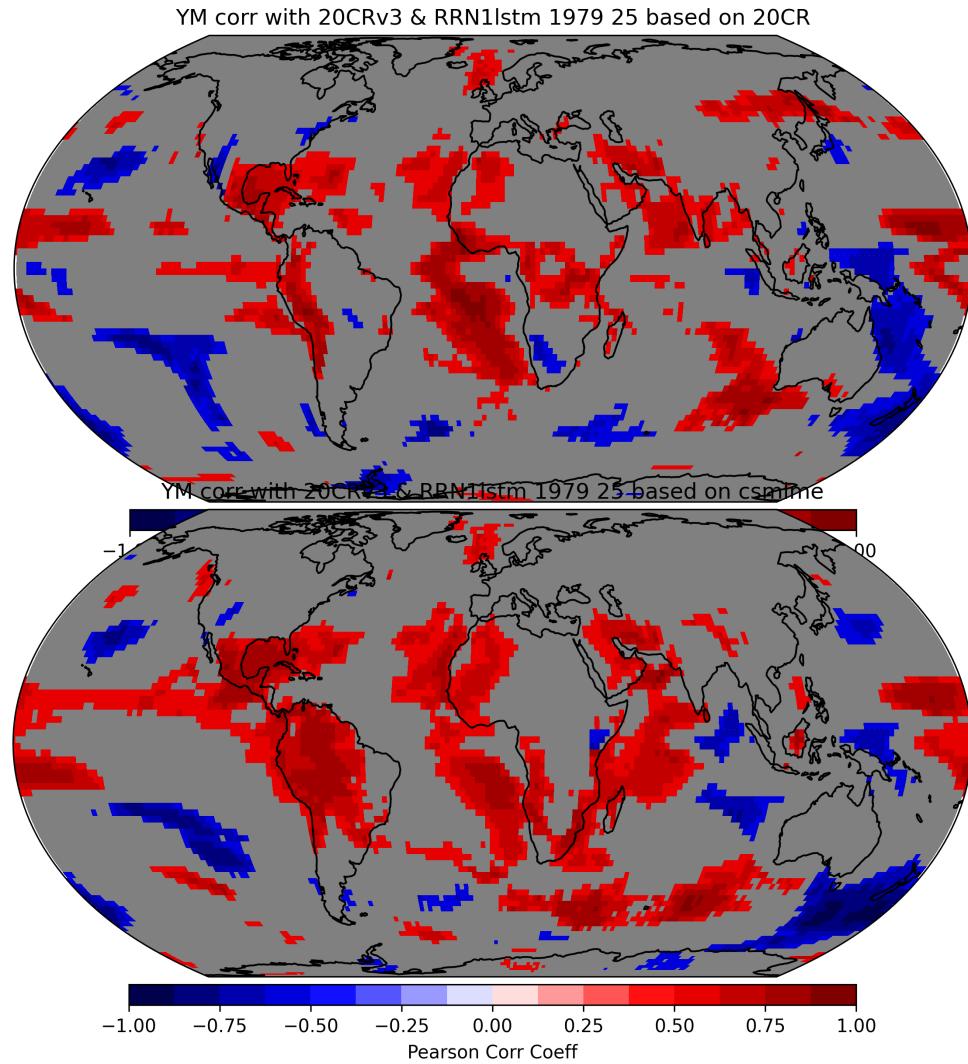
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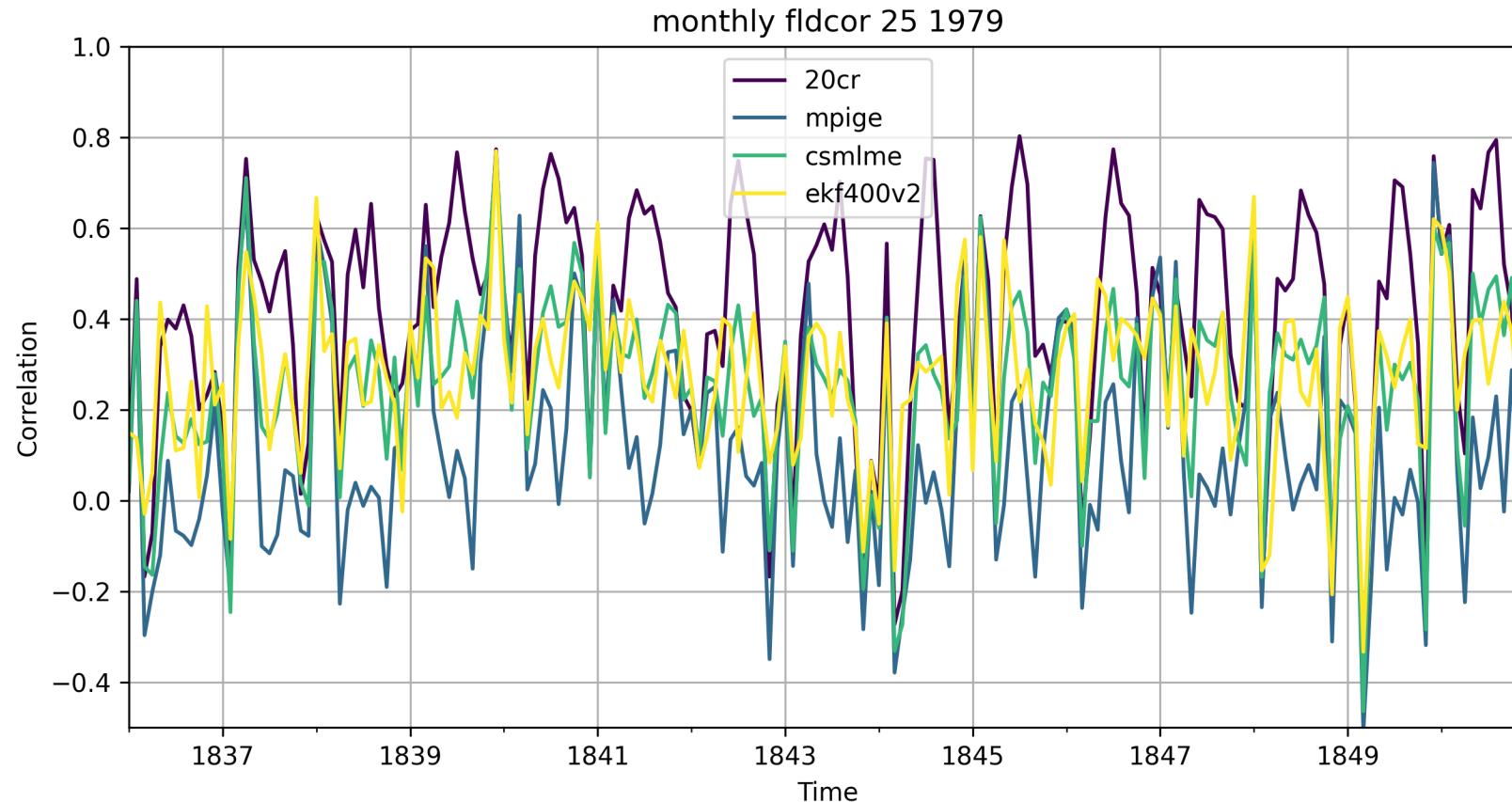
-1.00 -0.75 -0.50 -0.25 0.00 0.25 0.50 0.75 1.00 Pearson Corr Coeff

Correlation with 20CRv3 1836–1850

Yearly mean

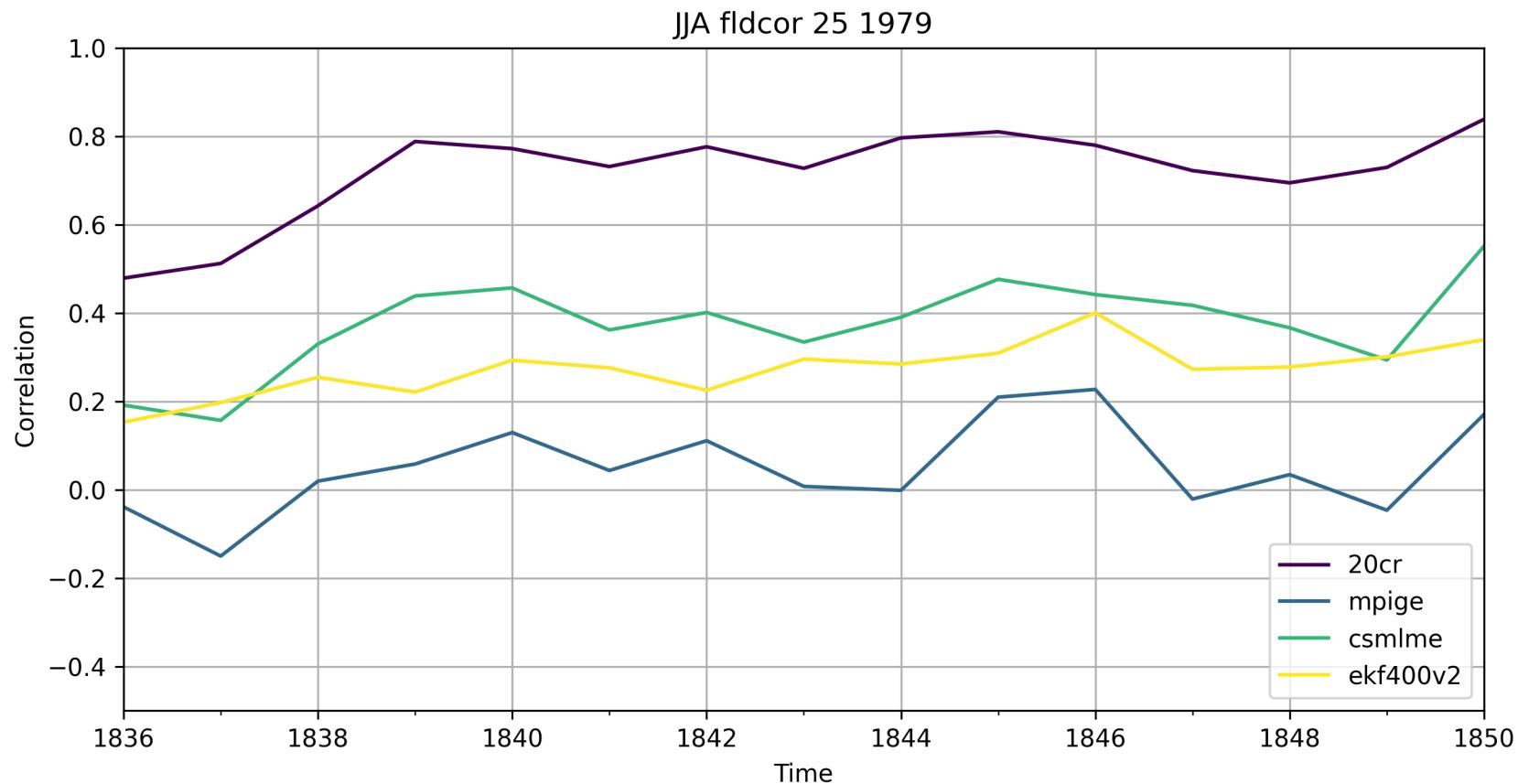


Correlation with 20CRv3 1836–1850 monthly



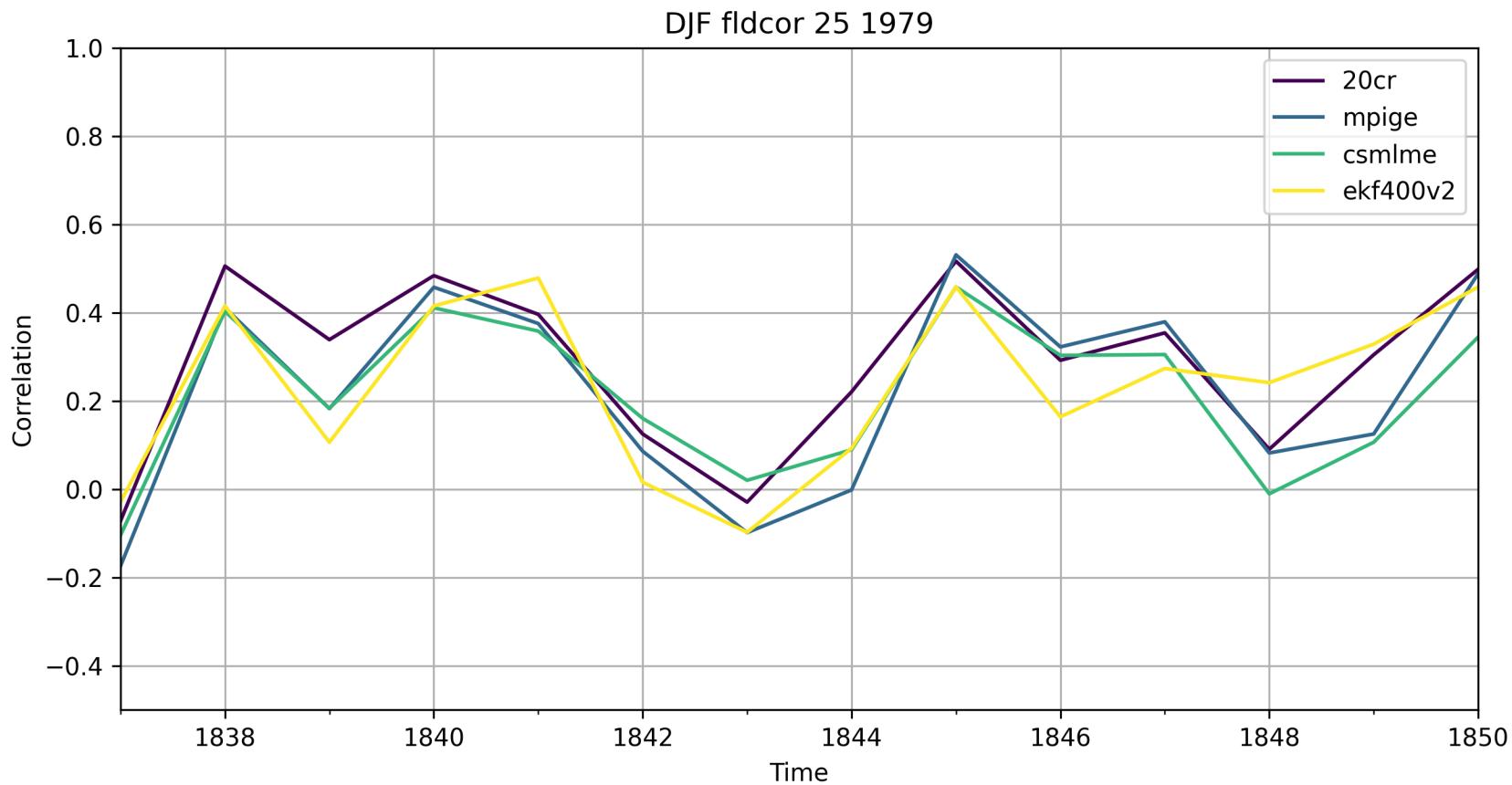
Correlation with 20CRv3 1836–1850

JJA

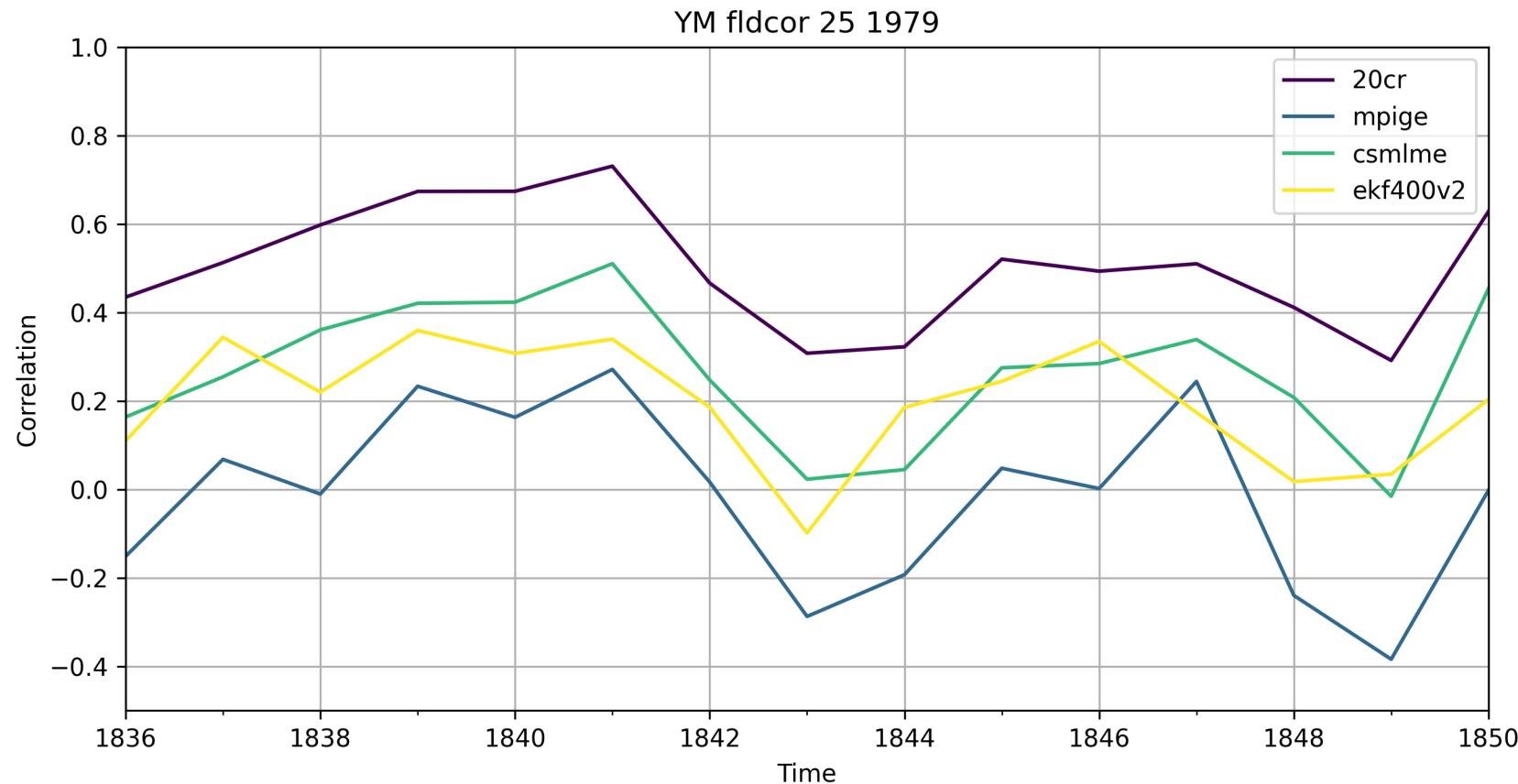


Correlation with 20CRv3 1836–1850

DJF

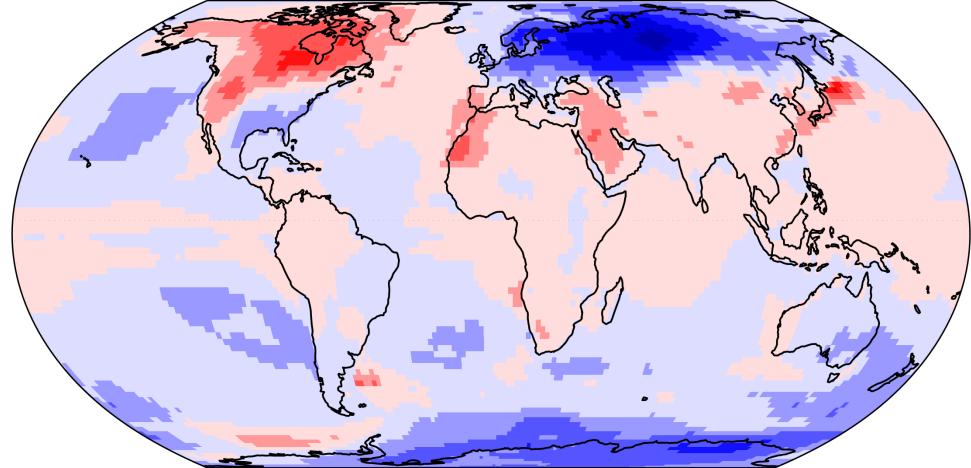


Correlation with 20CRv3 1836–1850 yearly mean



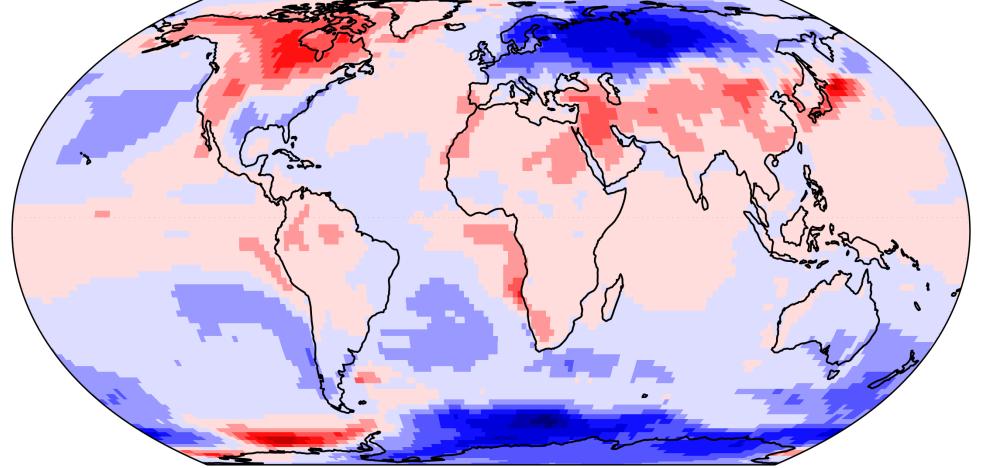
Difference with 20CRv3 1836–1850 monthly

monthly difference with 20CRv3 & RRN1lstm 1979 25 based on 20CR

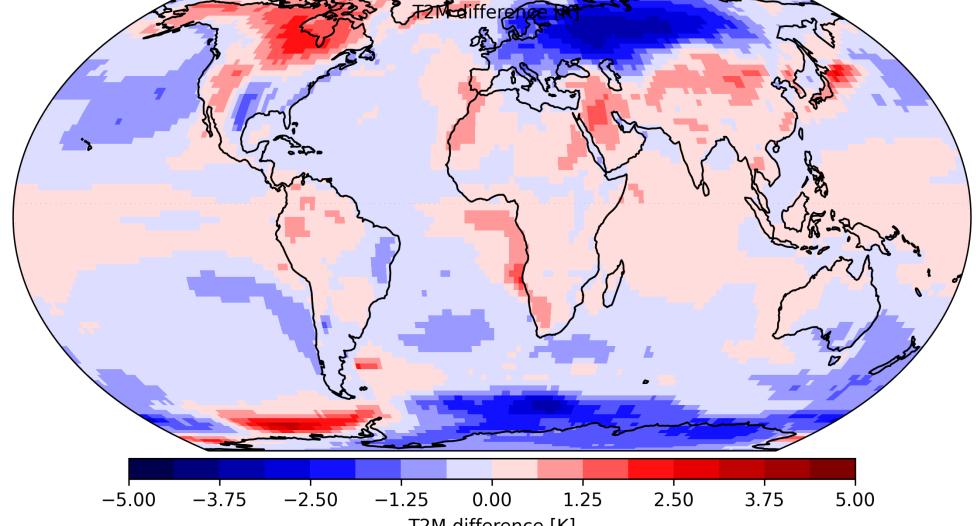


monthly difference with 20CRv3 & RRN1lstm 1979 25 based on mpige

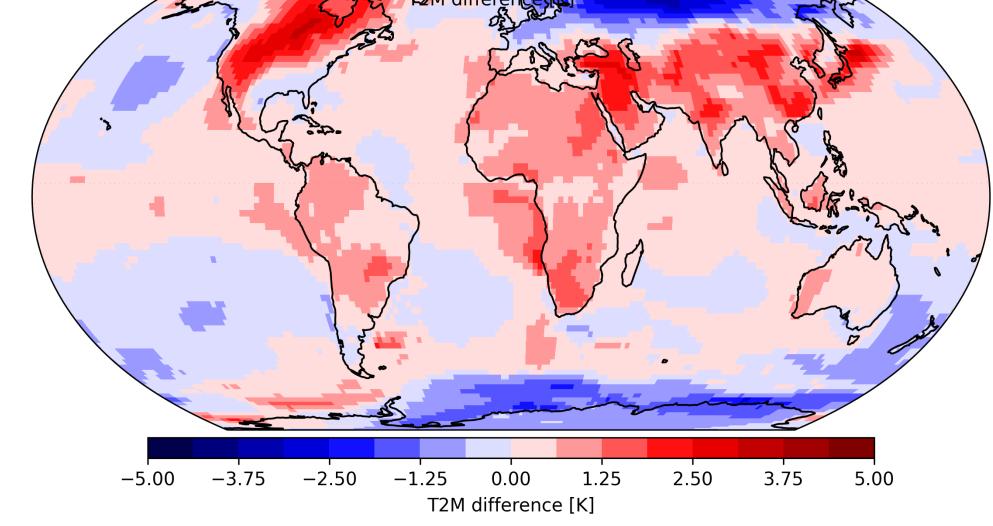
monthly difference with 20CRv3 & RRN1lstm 1979 25 based on mpige



monthly difference with 20CRv3 & RRN1lstm 1979 25 based on csmame

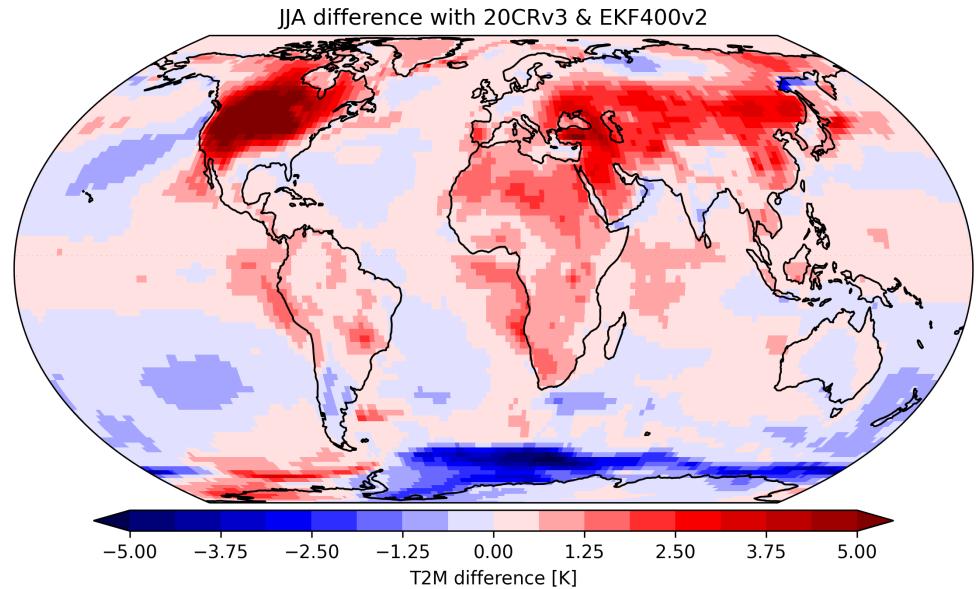
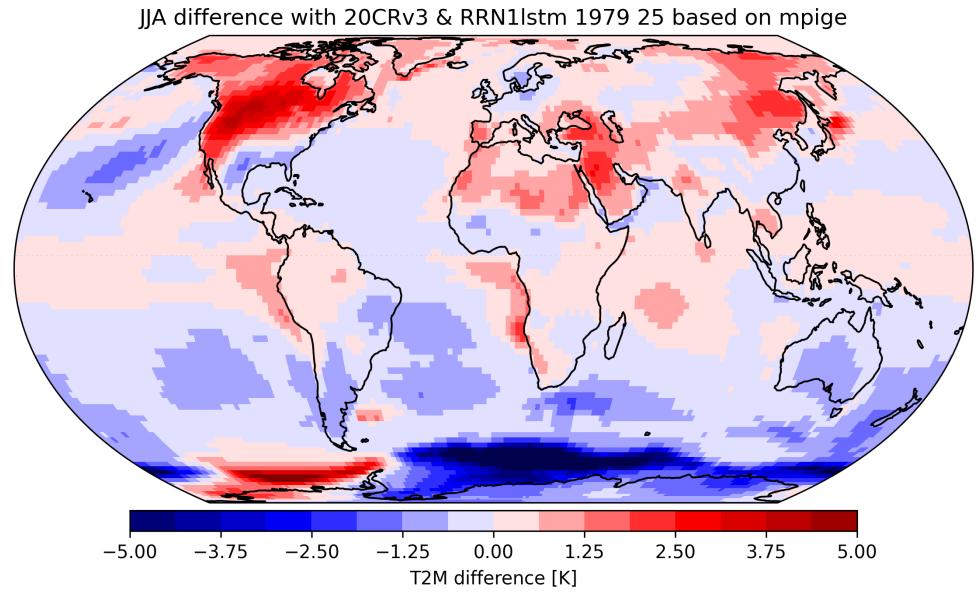
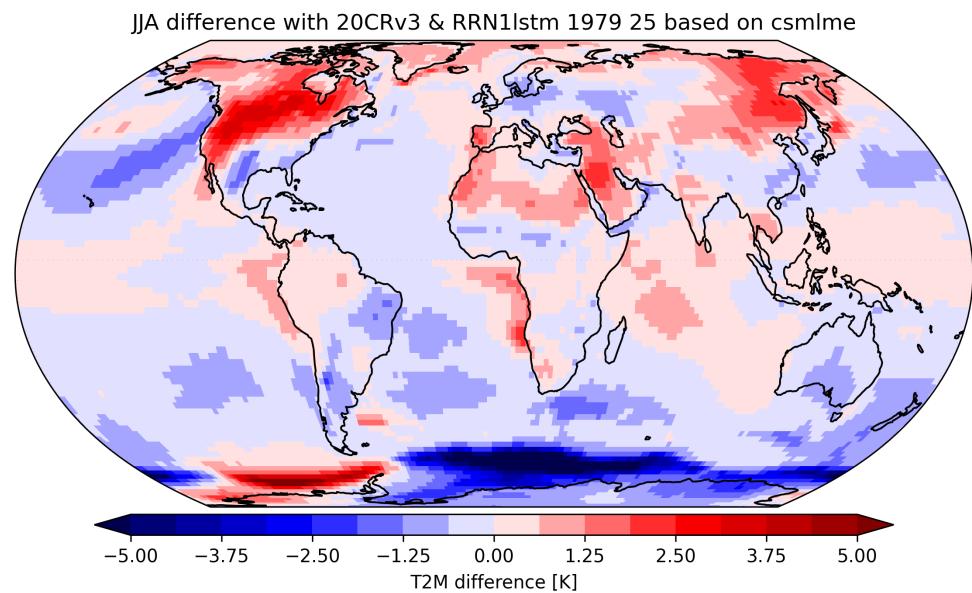


monthly difference with 20CRv3 & RRN1lstm 1979 25 based on T2M difference [K]



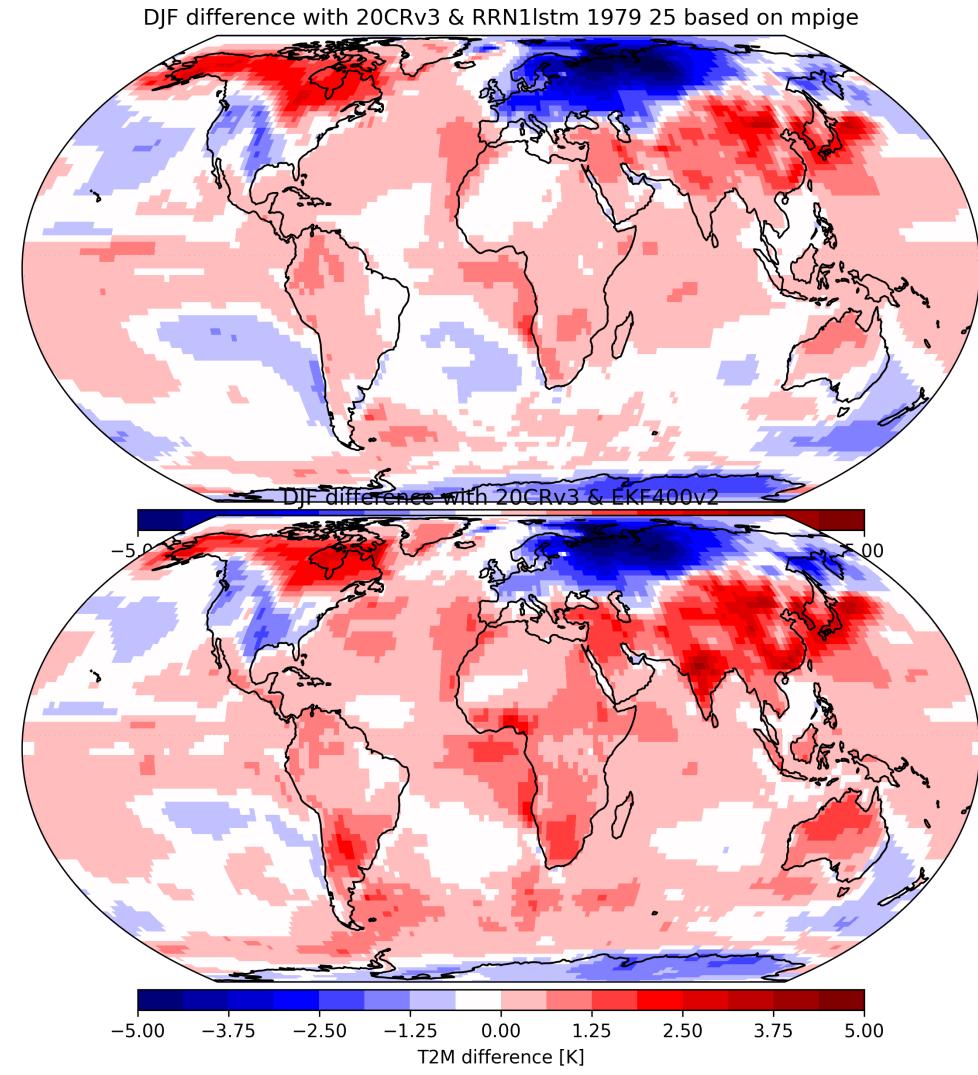
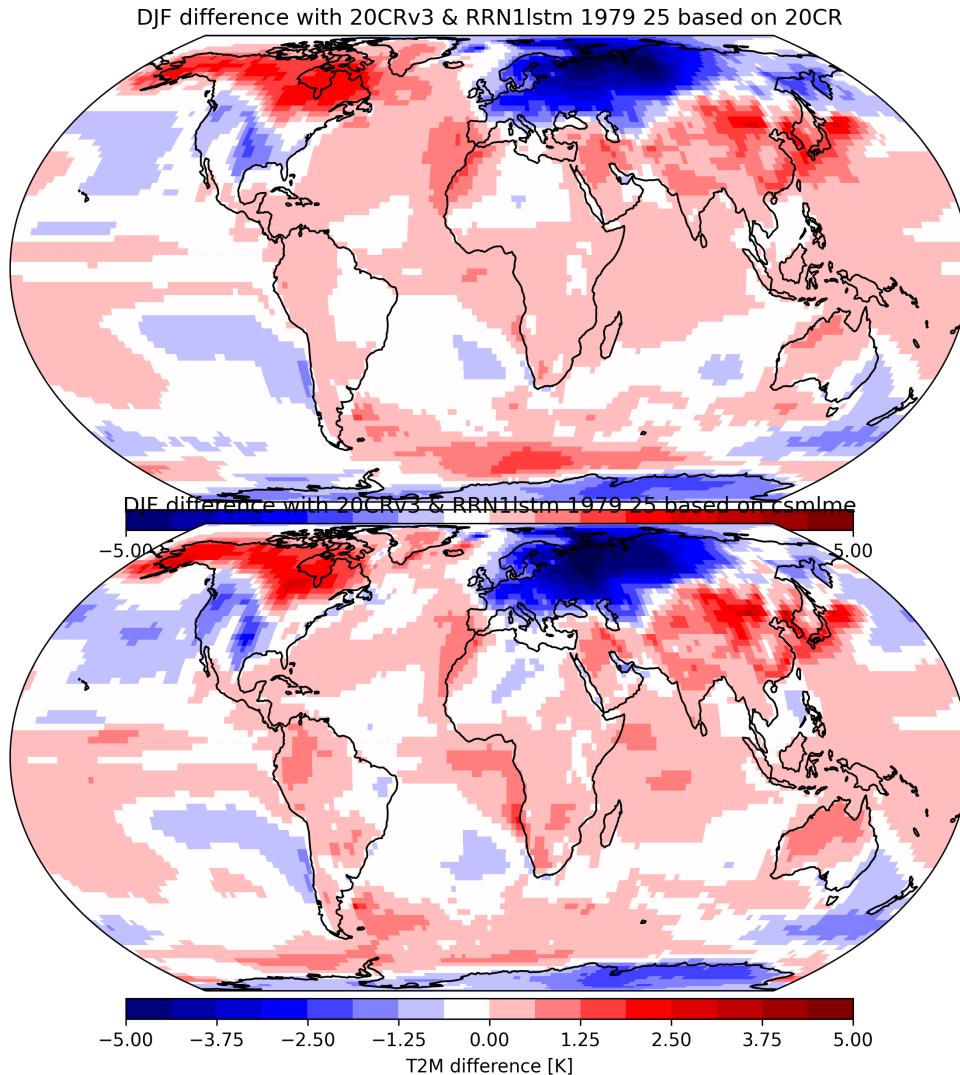
Difference with 20CRv3 1836–1850

JJA



Difference with 20CRv3 1836–1850

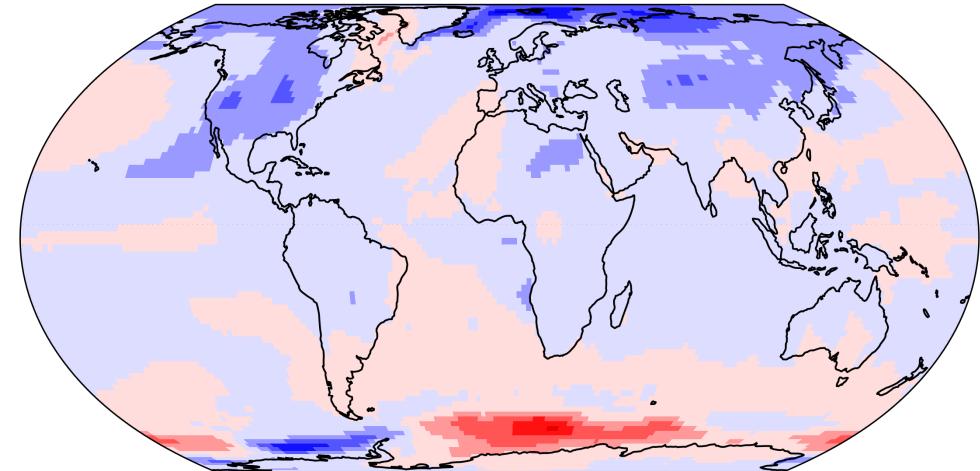
DJF



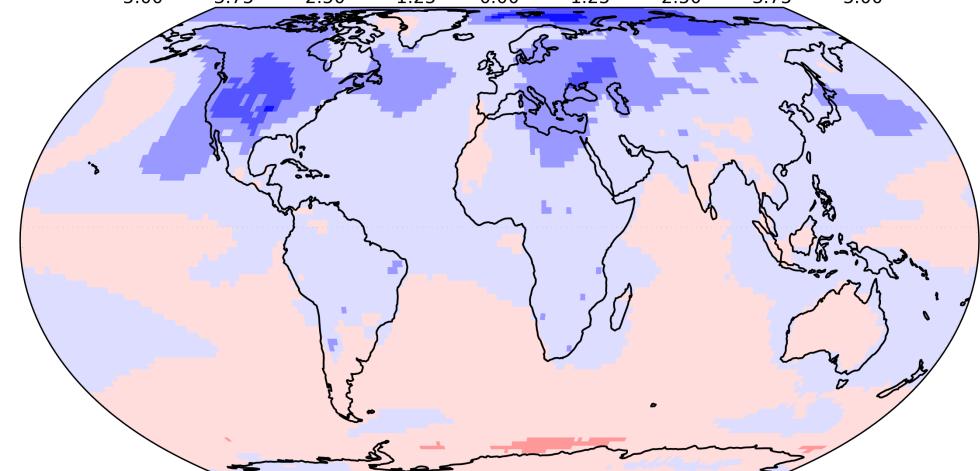
Difference with LMR 1836–1850

YM

YM difference with LMR short & RRN1lstm 1979 25 based on 20CR

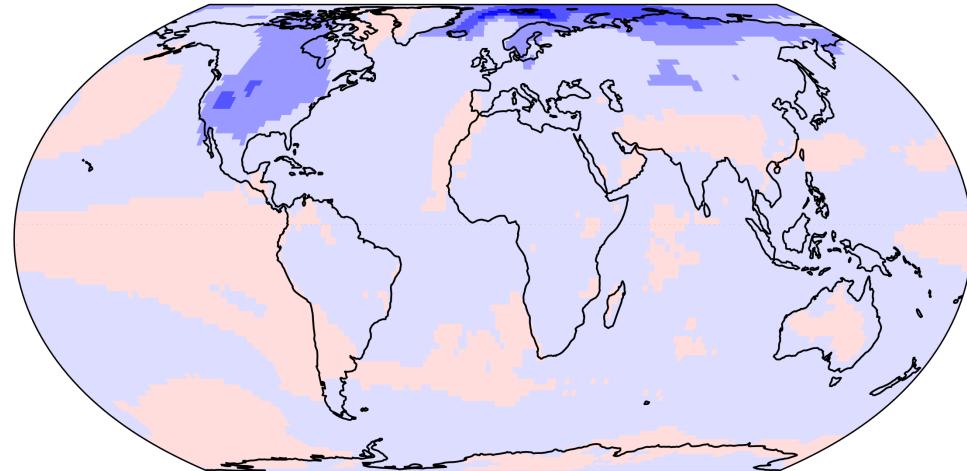


-5.00 -3.75 -2.50 -1.25 0.00 1.25 2.50 3.75 5.00
YM difference with LMR short & RRN1lstm 1979 25 based on 20CR

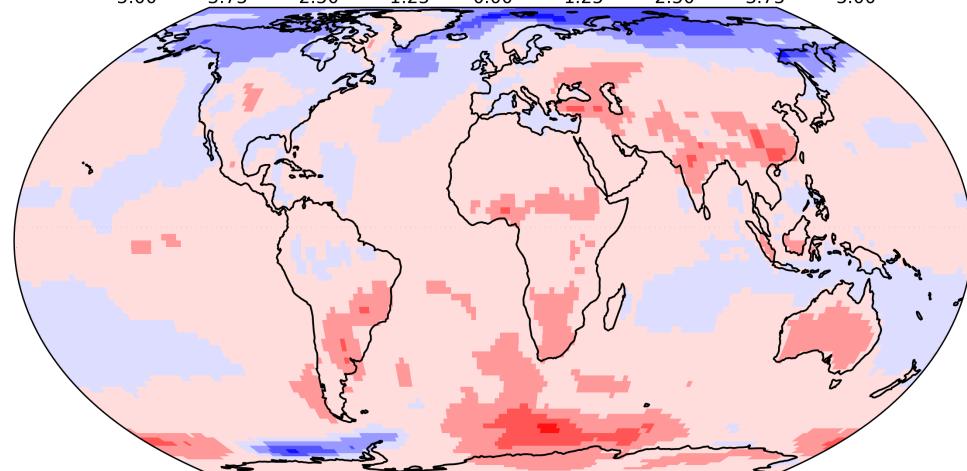


-5.00 -3.75 -2.50 -1.25 0.00 1.25 2.50 3.75 5.00
T2M difference [K]

YM difference with LMR short & RRN1lstm 1979 25 based on mpige



-5.00 -3.75 -2.50 -1.25 0.00 1.25 2.50 3.75 5.00
YM difference with LMR short & EKF400v2 25 based on mpige



-5.00 -3.75 -2.50 -1.25 0.00 1.25 2.50 3.75 5.00
T2M difference [K]

Difference EFK400 with LMR 1602-2000

YM

