Verifying T_{2m} in the CORe

1) Overview

- The new CPC T_{2m} analysis is up-scaled from its native grid of 0.05°lat/lon to the Guassian grid of 512x256 and used to verify the surface air temperature (T_{2m}) fields produced by the CORe;

- Monthly climatology is constructed for a 30-year base period from 1991 to 2020, and monthly anomalies are defined for both the CPC new T_{2m} analysis and the CORe T_{2m} simulations;

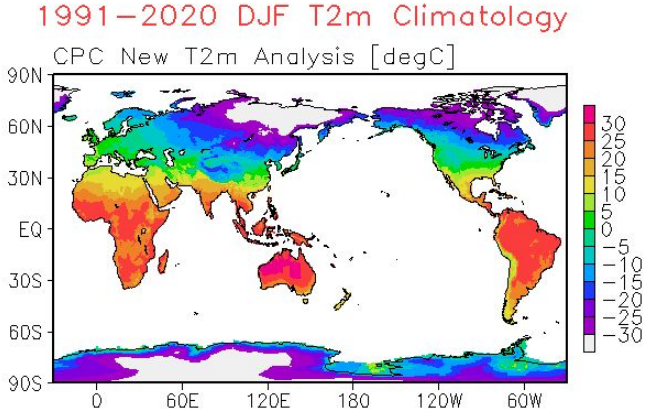
- Anomaly correlation is computed and ratio of anomaly magnitude, defined as the standard deviation of anomalies, between the CORe and the CPC new analysis is calculated to examine how well the observed anomaly is reproduced by the CORe in both the variation patterns and magnitude;

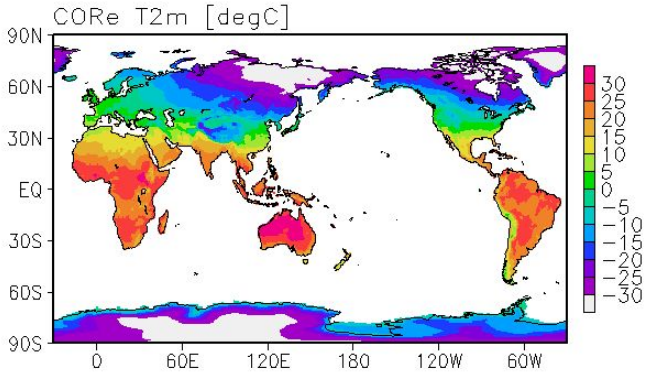
- Regressional coefficients of the T_{2m} anomalies from both the CPC new analysis and the CORE are calculated against three circulation indices (NINO3.4, PNA, and NAO) to check how surface air temperature (T_{2m}) variations in association with the climate major climate variability are captured by the CORe;

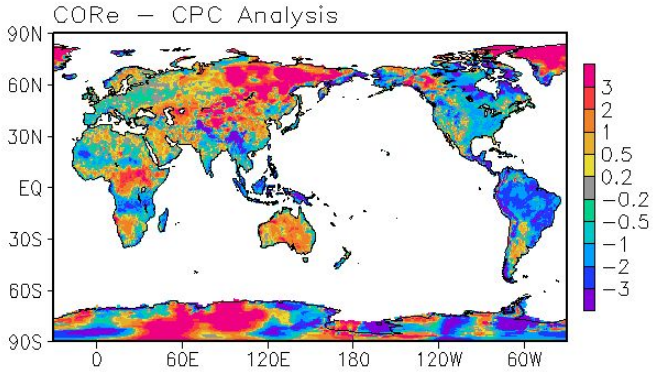
- Surface air temperature anomaly composites are constructed for the 8 phases of MJO evolution using the daily anomaly fields of the CPC new analysis and compared against those for the CORe analysis T2m fields;

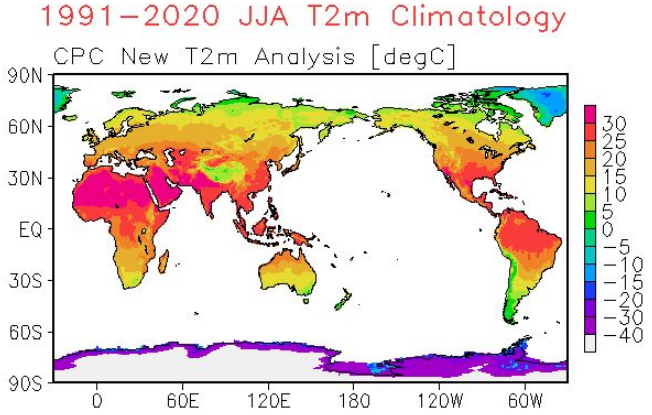
Verifying T_{2m} in the CORe

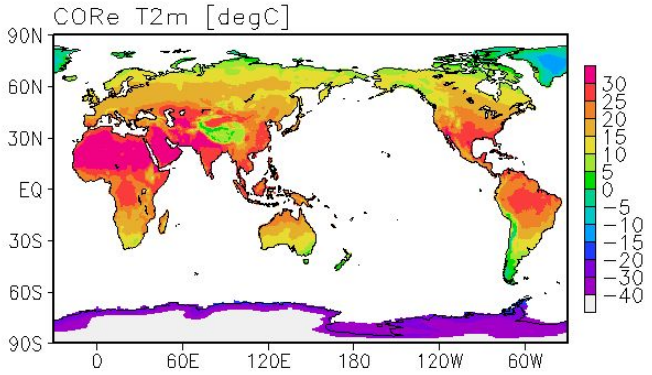
2) Climatology for DJF and JJA

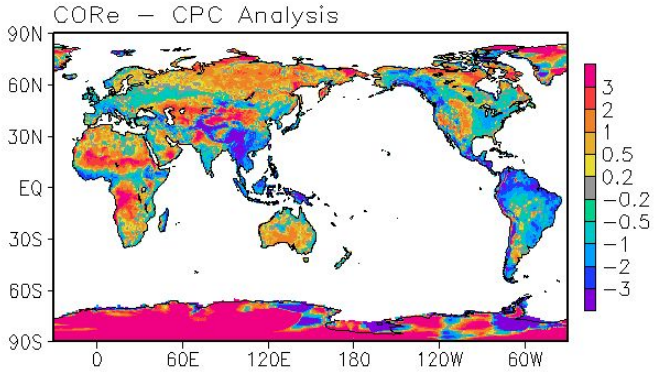






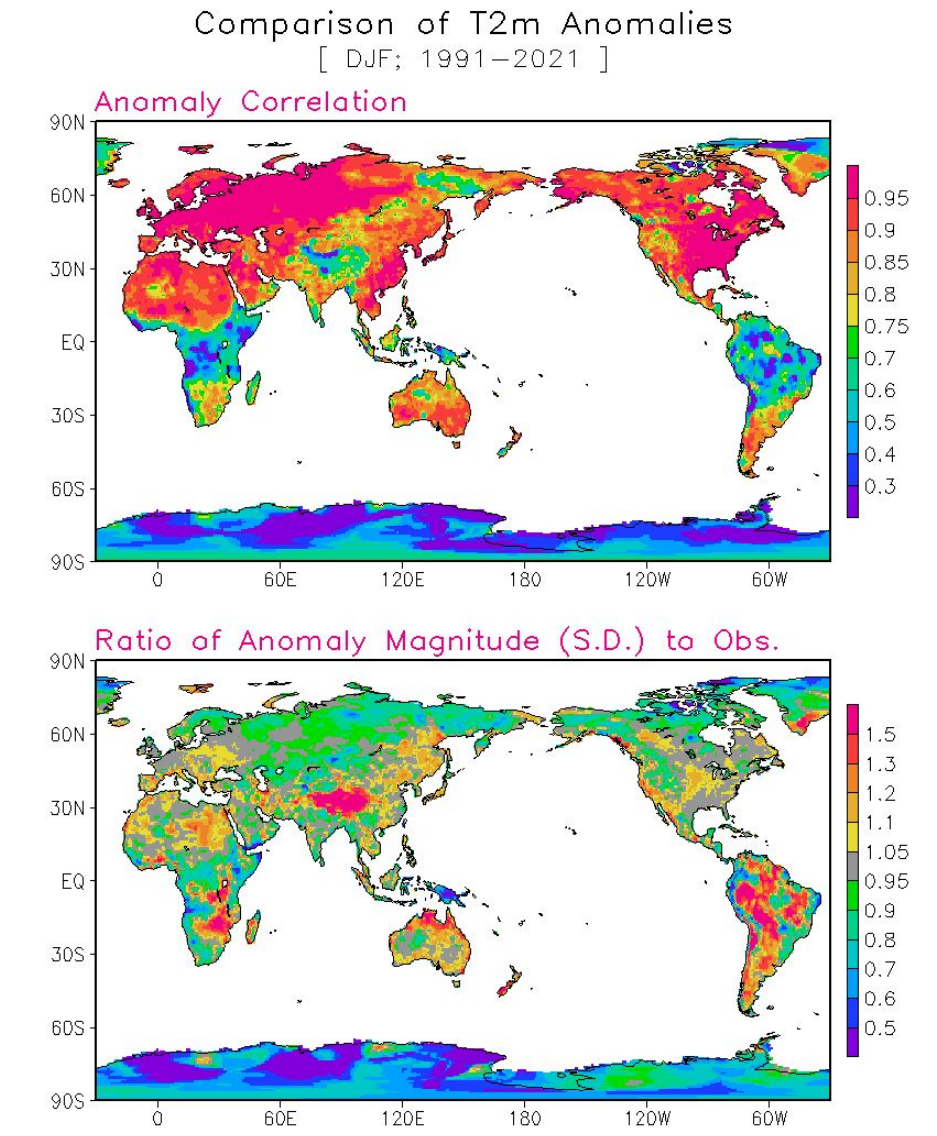


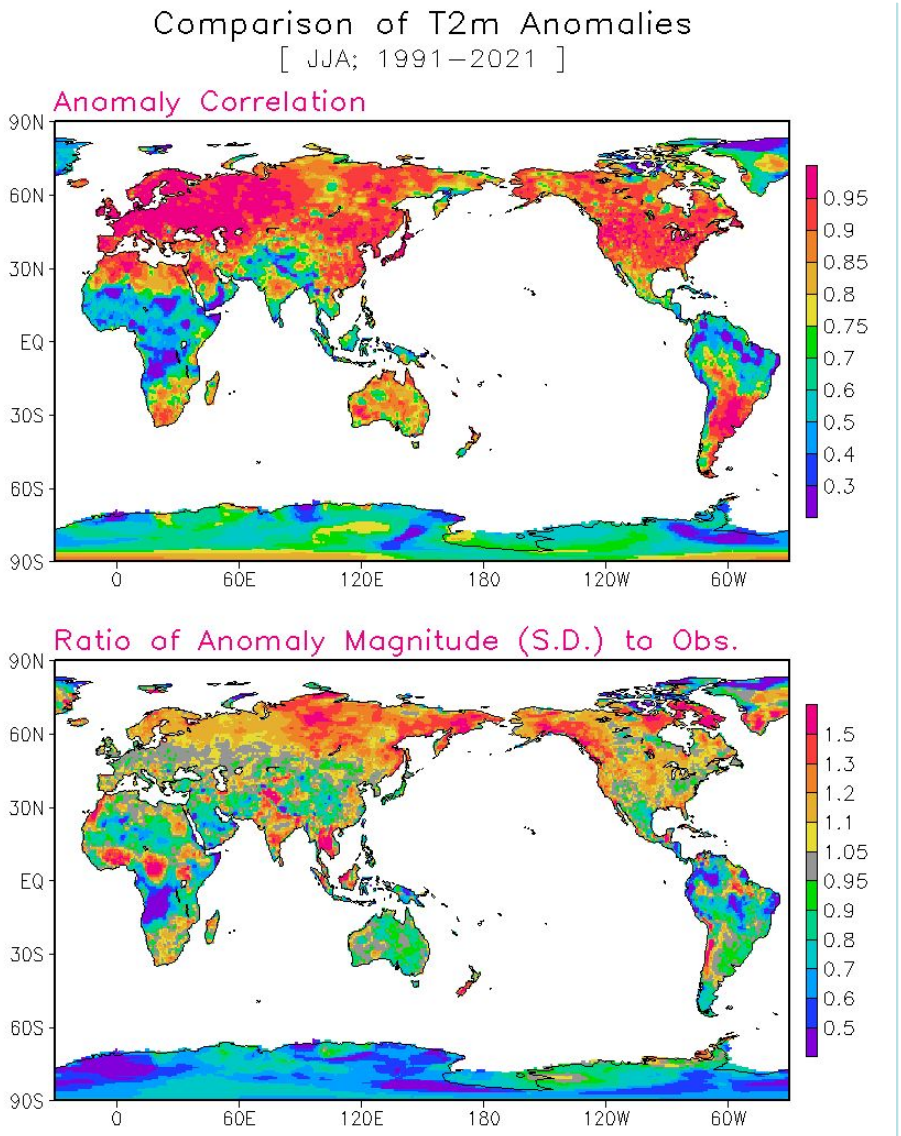




Verifying T_{2m} in the CORe

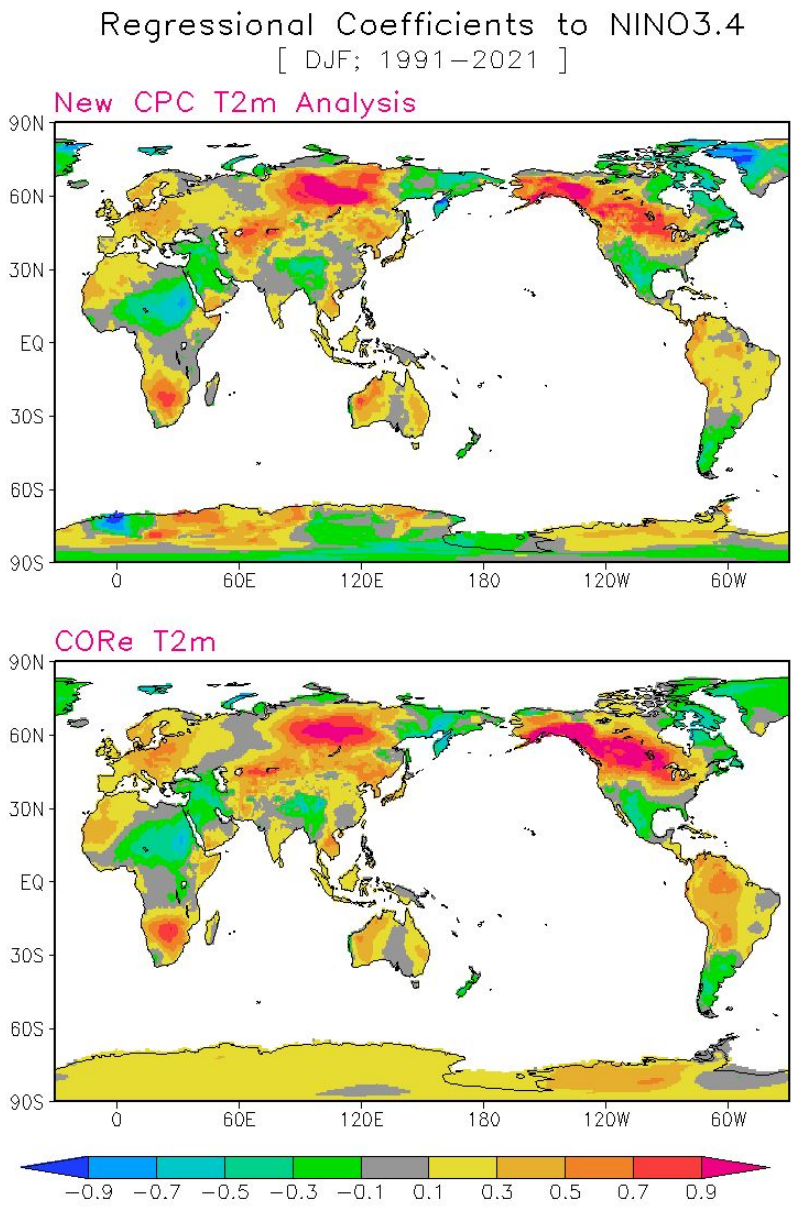
3) Anom Corr and Ratio of Anom Magnitude to the CPC Analysis

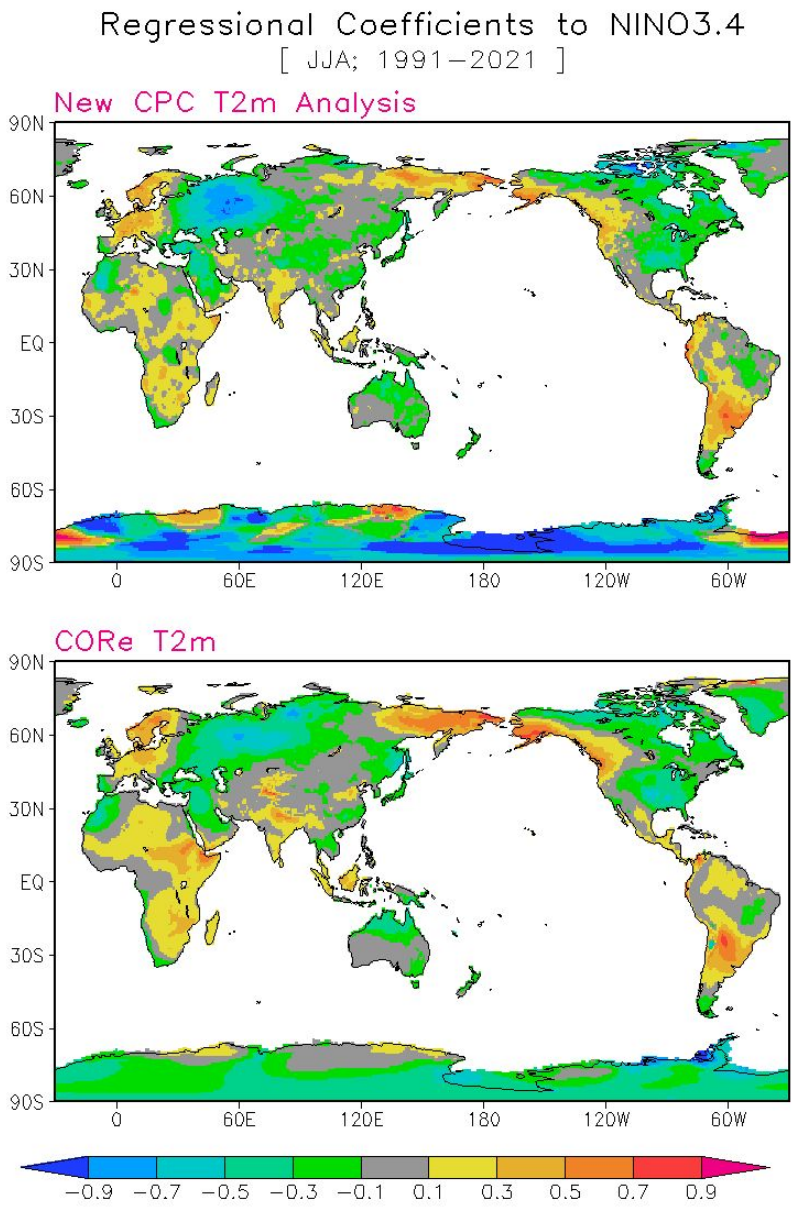




Verifying T_{2m} in the CORe

4) Regressional Coef of the T2m Anom to NINO3.4



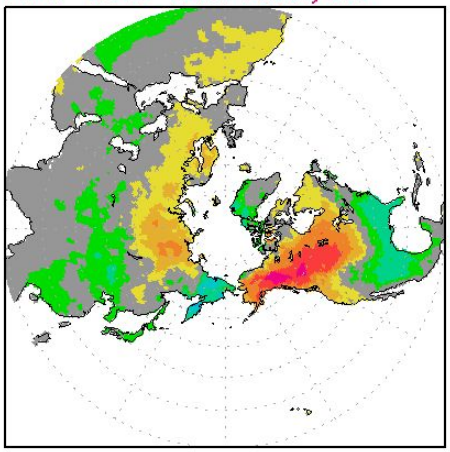


Verifying T_{2m} in the CORe

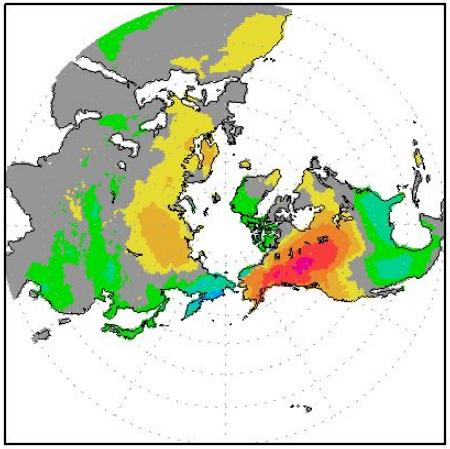
5) Regressional Coef of the T2m Ano to PNA & NAO Indices

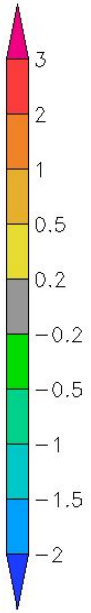
Regressional Coefficients to PNA Index
[DJF; 1991–2021]

New CPC T2m Analysis



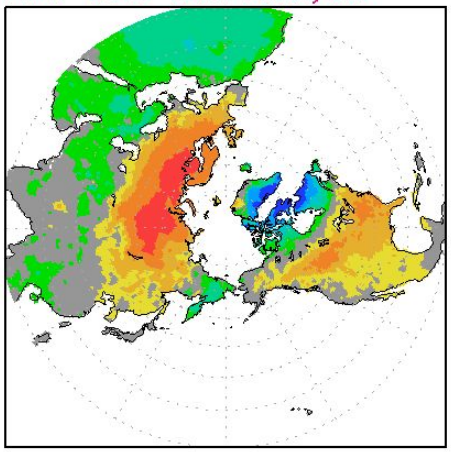
CORe T2m



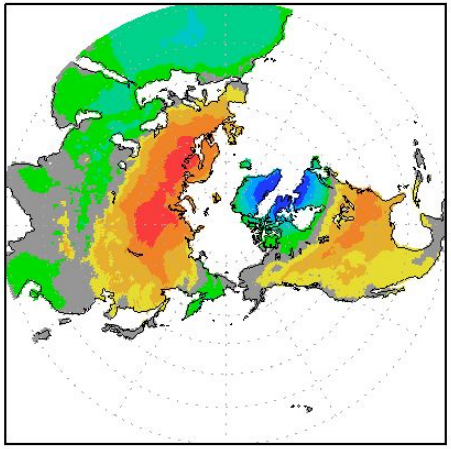


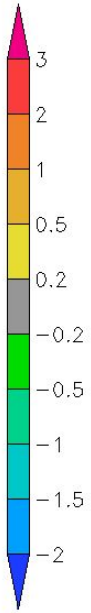
Regressional Coefficients to NAO Index
[DJF; 1991–2021]

New CPC T2m Analysis



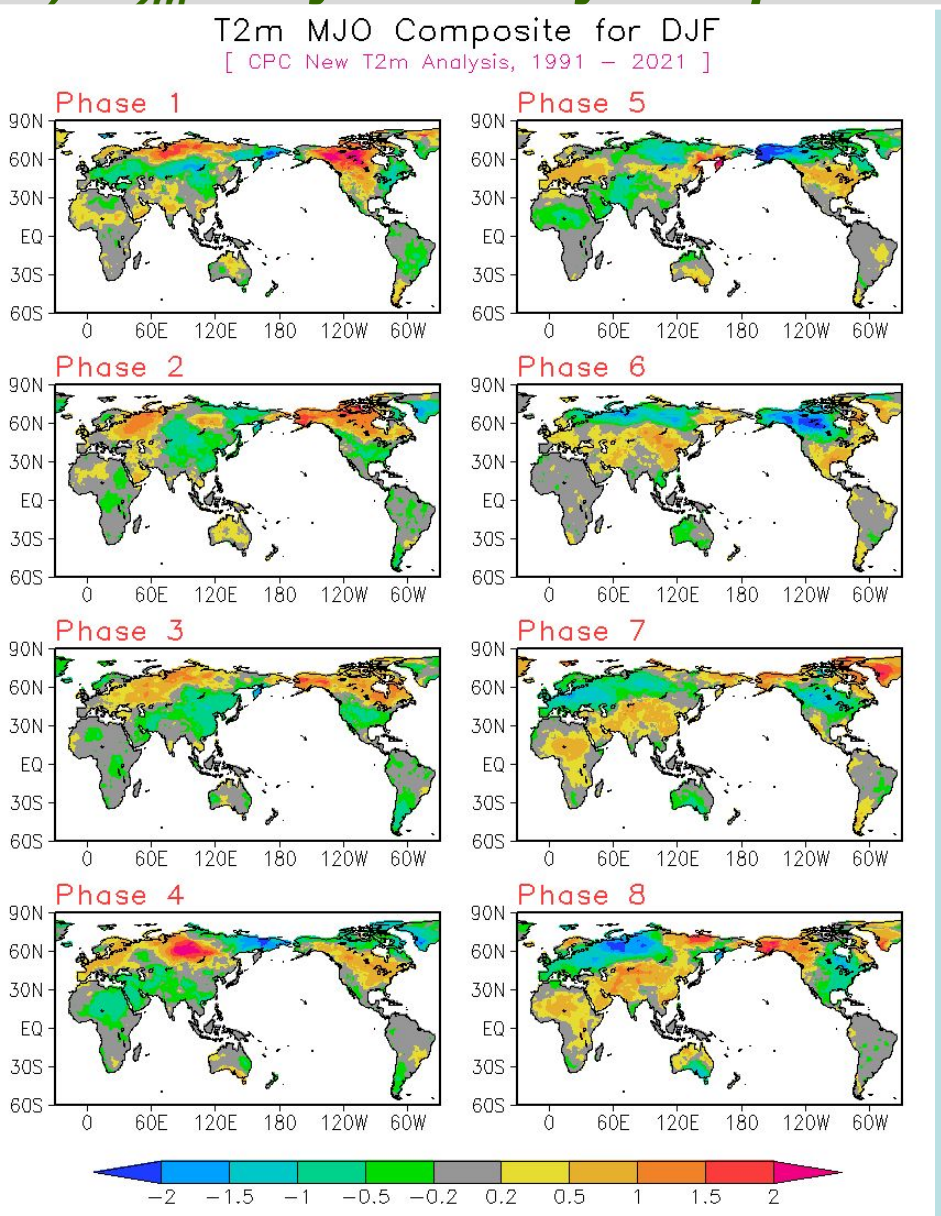
CORe T2m

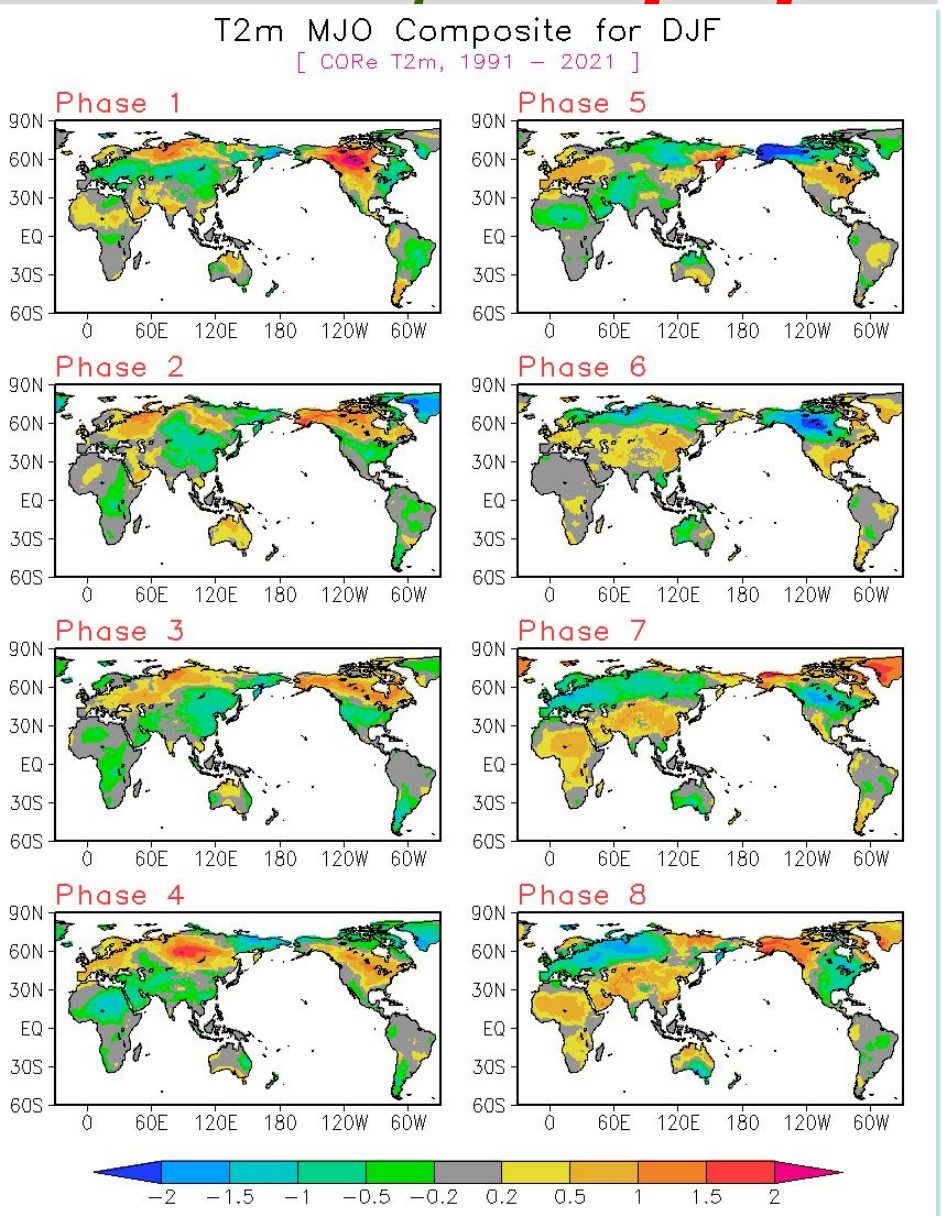




Verifying T_{2m} in the CORe

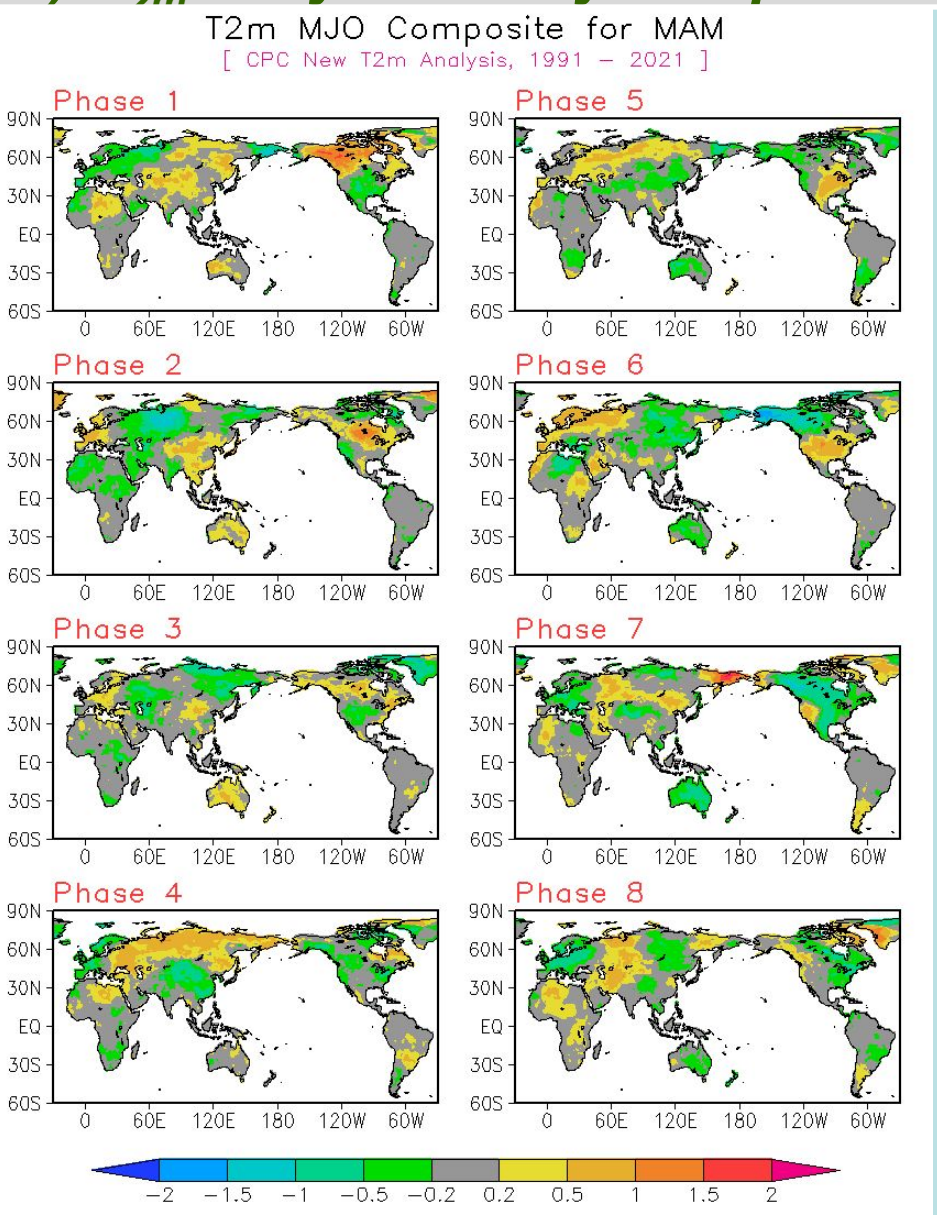
6) T_{2m} daily anomaly composites for the 8 MJO phases [DJF]

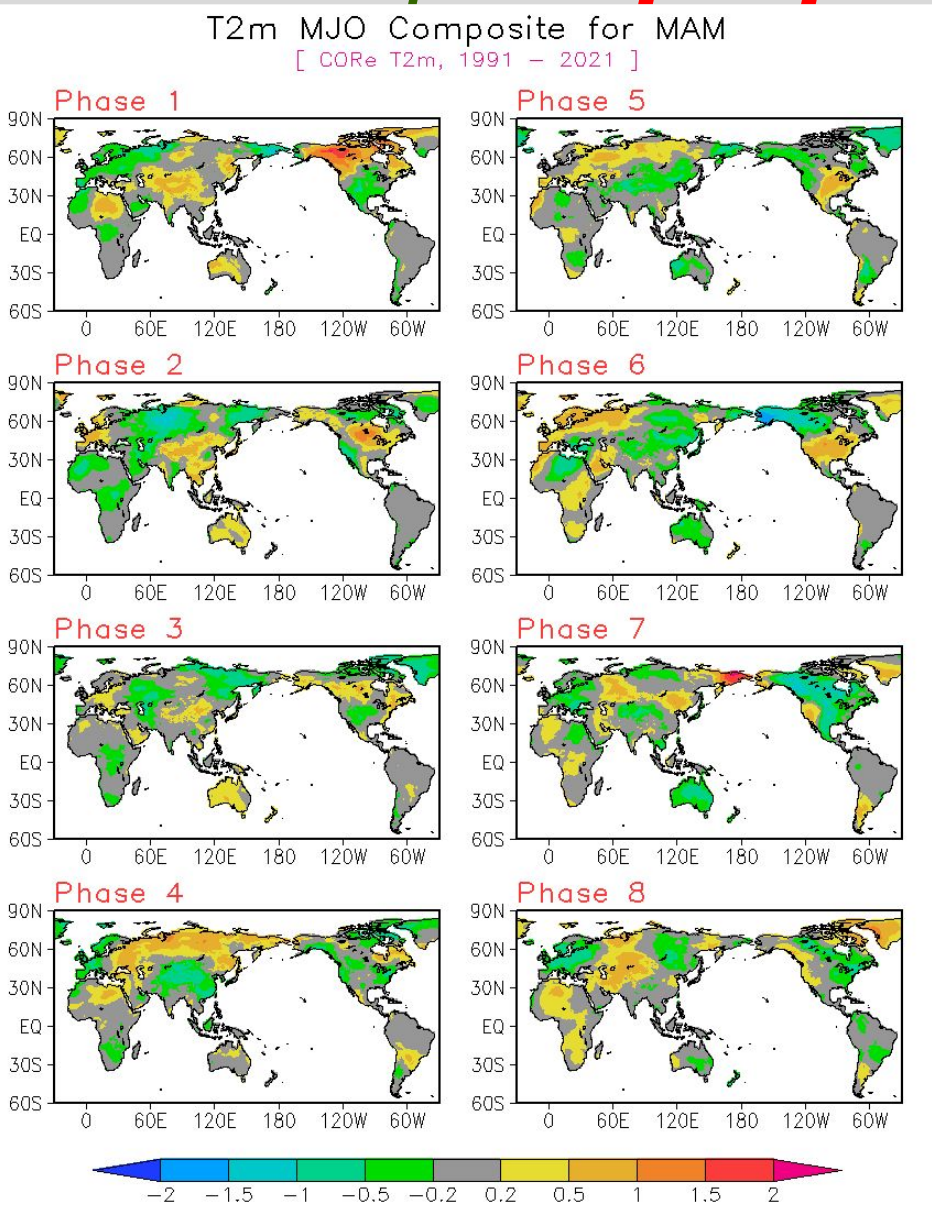




Verifying T_{2m} in the CORe

7) T_{2m} daily anomaly composites for the 8 MJO phases [MAM]





Verifying T_{2m} in the CORe

8) Summary

- The CPC new T_{2m} analysis is demonstrated a useful tool to verify Reanalyses and climate forecasts;

- The T_{2m} fields generated by the CORe reanalysis shows very good agreements in seasonal climatology as well as the spatial distribution and temporal variation patterns of the monthly anomalies;

- The CORe reanalysis captures very well the surface air temperature anomaly patterns associated with major large-scale climate variability (ENSO, MJO, PNA, NAO);