

Evaluation of Interannual Variability in CESM1.5: Results from the Climate Variability Diagnostics Package

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CESM Joint WG Meeting
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Mean and standard deviation maps for SST and precipitation

ENSO

Atmospheric Modes

CESM1.5 Historical Run #28
(results similar for #31 and for controls)



Climate Variability Diagnostics Package

Phillips et al., 2014

NCAR
UCAR

CGD's Climate Analysis Section

Climate Variability Diagnostics Package

<http://www2.cesm.ucar.edu/working-groups/cvcwg/cvdp>

Part of ESMValTool for CMIP6



Climate Variability Diagnostics Package

Phillips et al., 2014

NCAR
UCAR

CGD's Climate Analysis Section

Climate Variability Diagnostics Package

<http://www2.cesm.ucar.edu/working-groups/cvcwg/cvdp>

Observations (*Schneider et al., 2013*)

NCAR
UCAR

ClimateDataGuide

inform • compare • discover

CLIMATE DATA

ANALYSIS TOOLS

MODEL EVALUATION

EXPERT CONTRIBUTORS

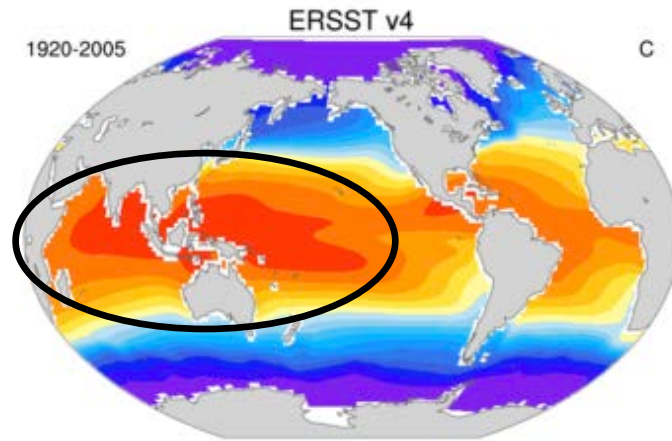
ABOUT

Site-wide Search

>>

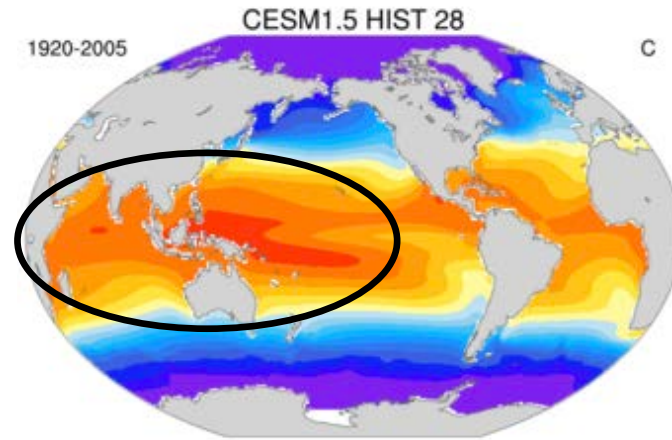
Concise and reliable expert guidance on the strengths, limitations and applications of climate data...

OBS

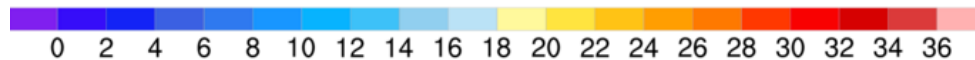


Annual Mean SST
1920-2005

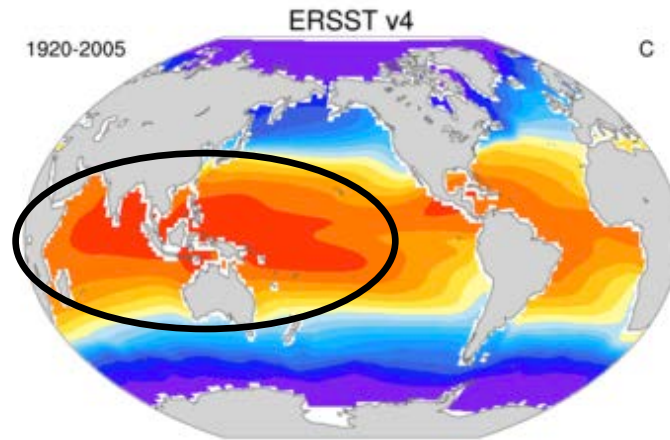
CESM1.5
#28



Cold Bias

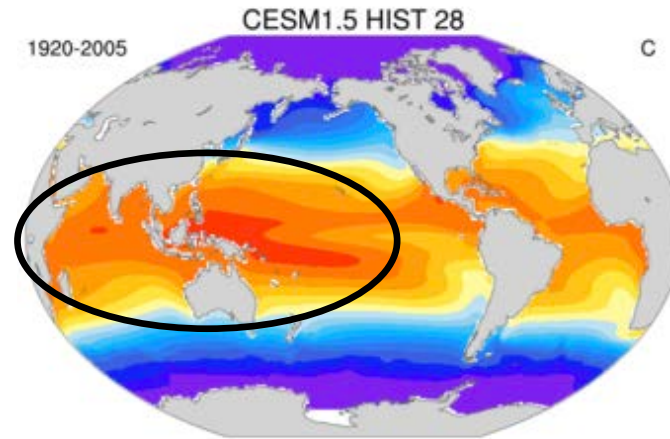


OBS



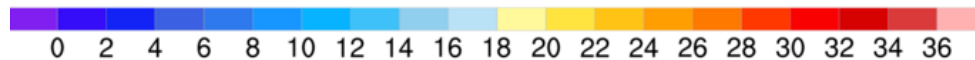
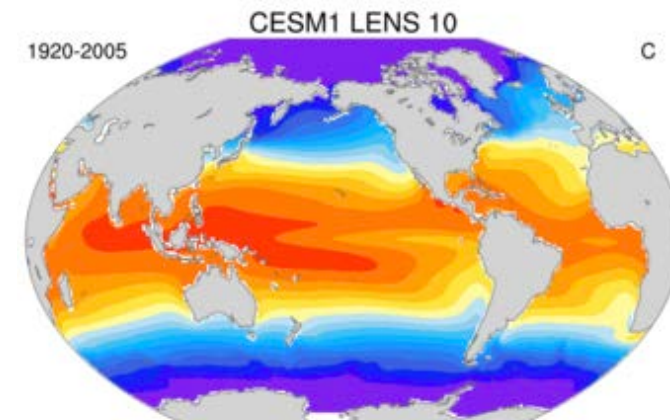
Annual Mean SST
1920-2005

CESM1.5
#28

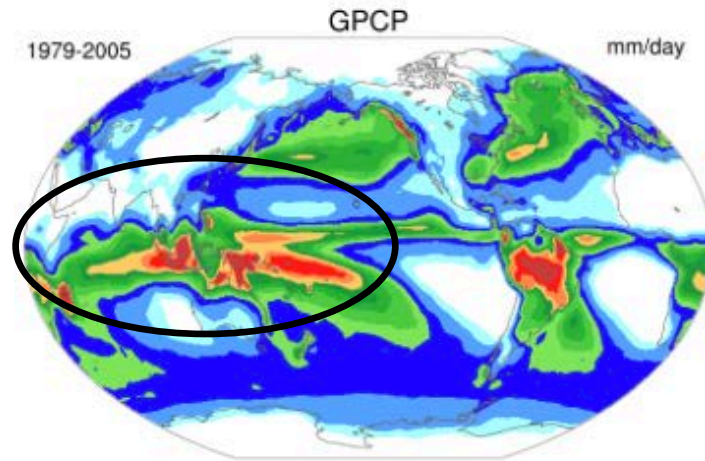


Cold Bias

CESM1
Large Ensemble
#10

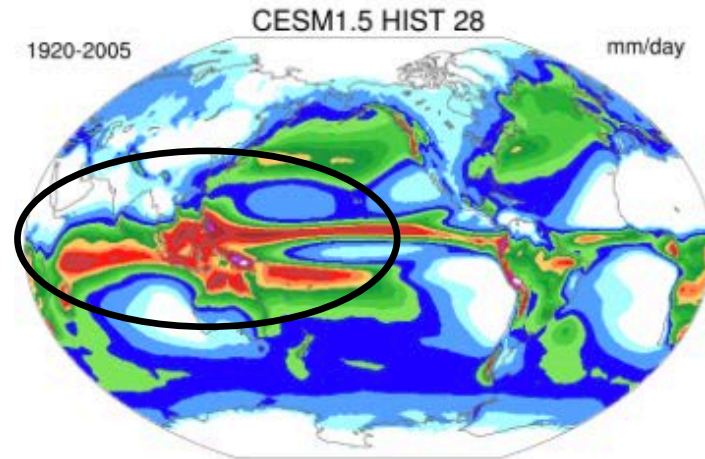


OBS
(GPCP 1979-2005)

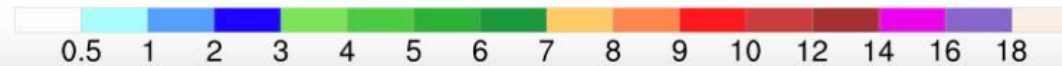


DJF Precipitation
1920-2005

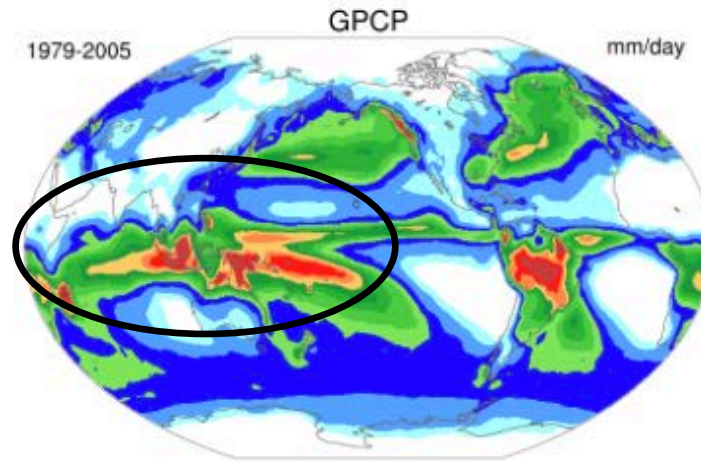
CESM1.5
#28



*Excessive
Rainfall*

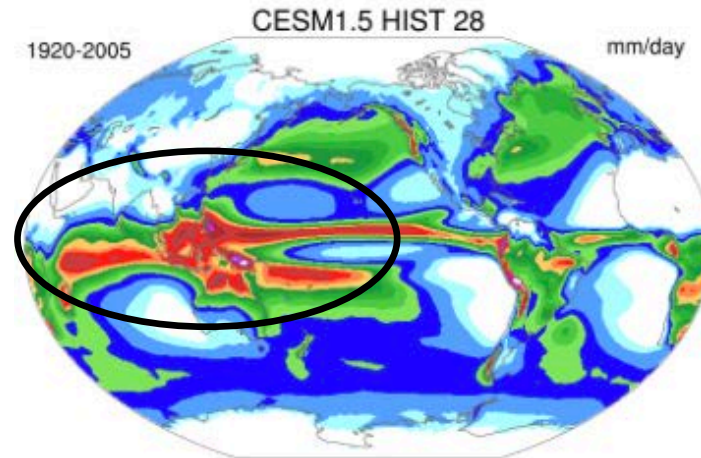


OBS
(GPCP 1979-2005)



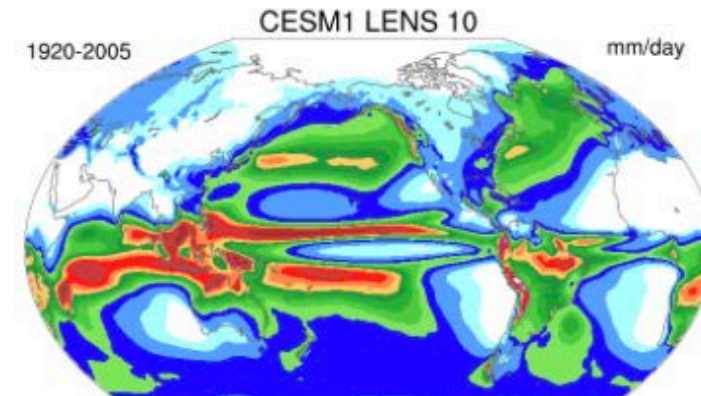
DJF Precipitation
1920-2005

CESM1.5
#28

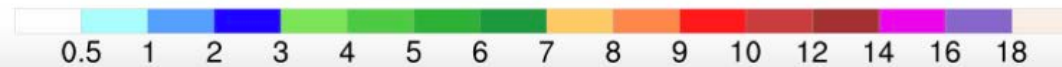


*Excessive
Rainfall*

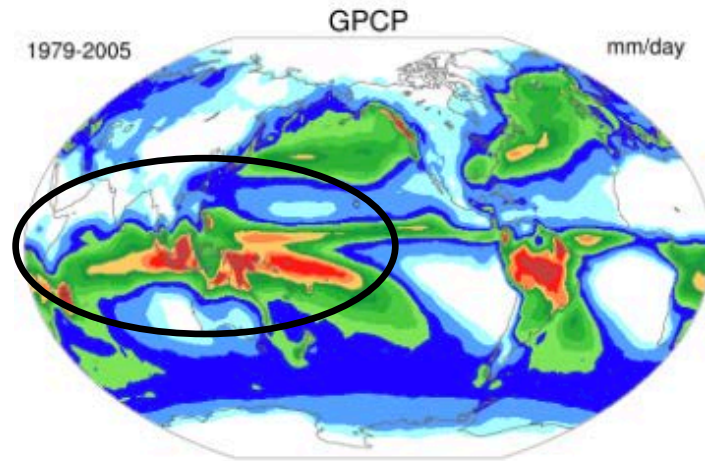
CESM1
Large Ensemble
#10



*Similar bias
in other
seasons*

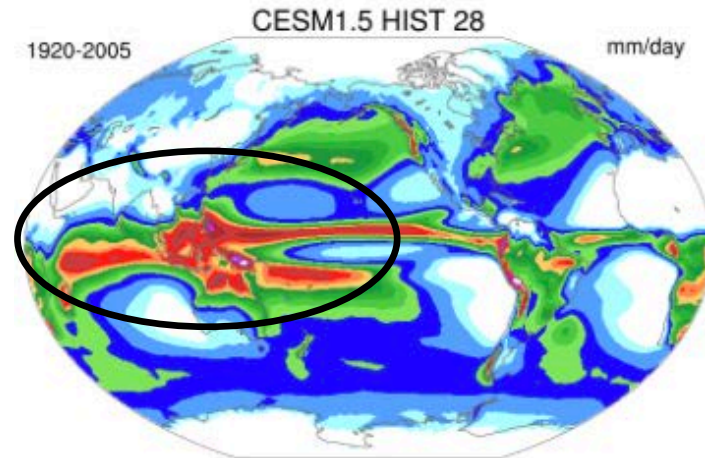


OBS
(GPCP 1979-2005)



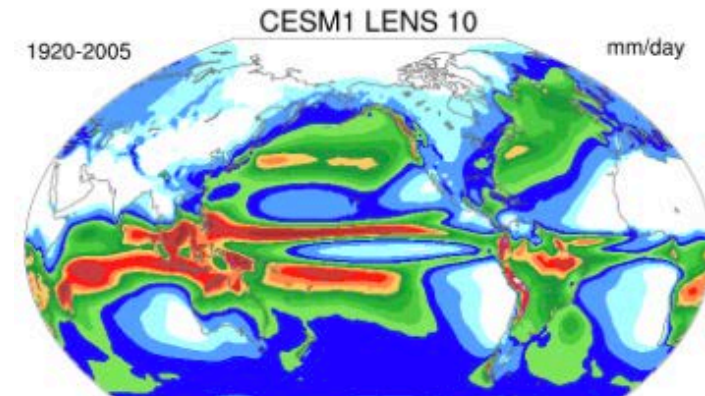
DJF Precipitation
1920-2005

CESM1.5
#28



*Excessive
Rainfall*

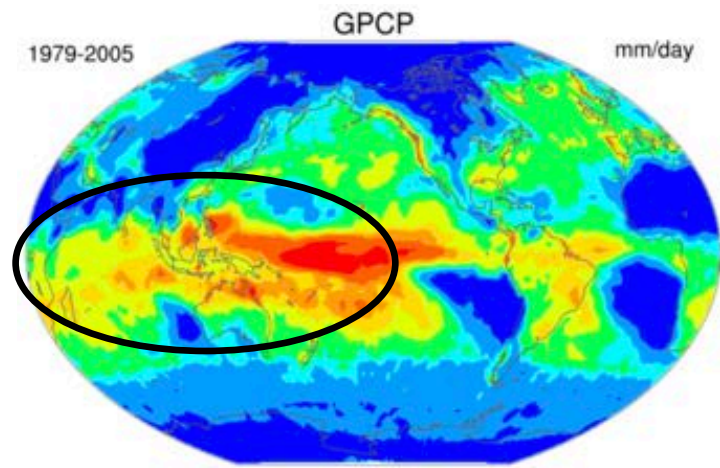
CESM1
Large Ensemble
#10



*Similar bias
in other
seasons*

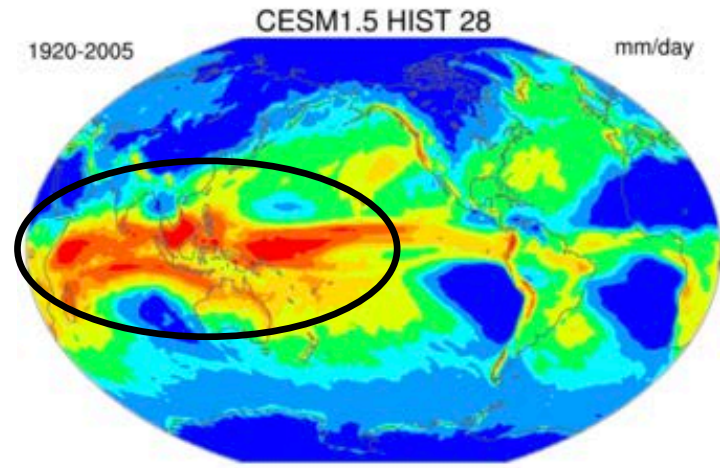


OBS
(GPCP 1979-2005)



DJF Precipitation
Std. Dev.
1920-2005

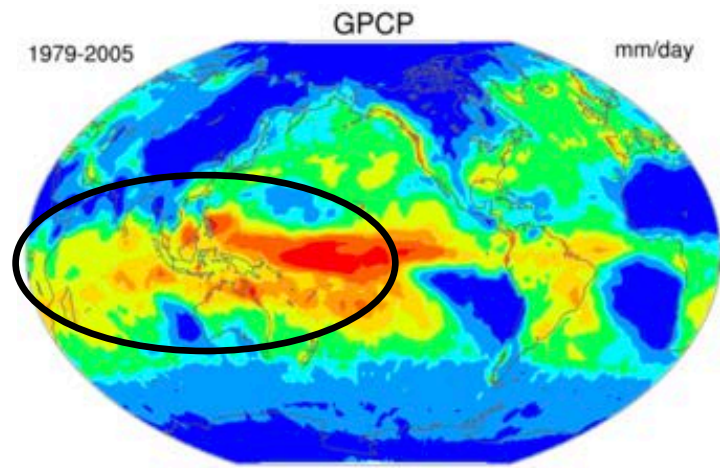
CESM1.5
#28



*Excessive
Variability*

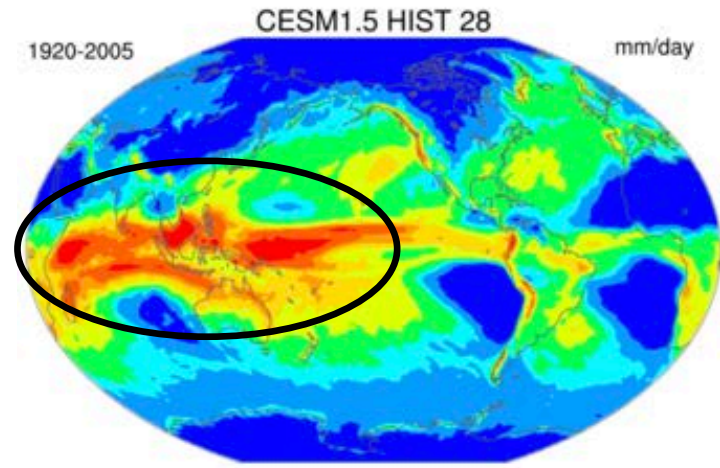


OBS
(GPCP 1979-2005)



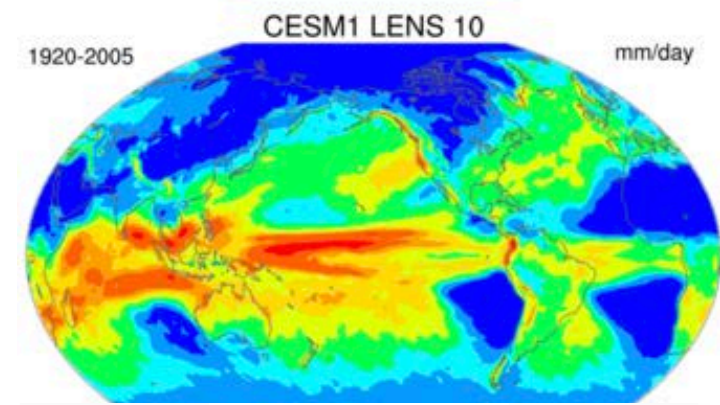
DJF Precipitation
Std. Dev.
1920-2005

**CESM1.5
#28**



*Excessive
Variability*

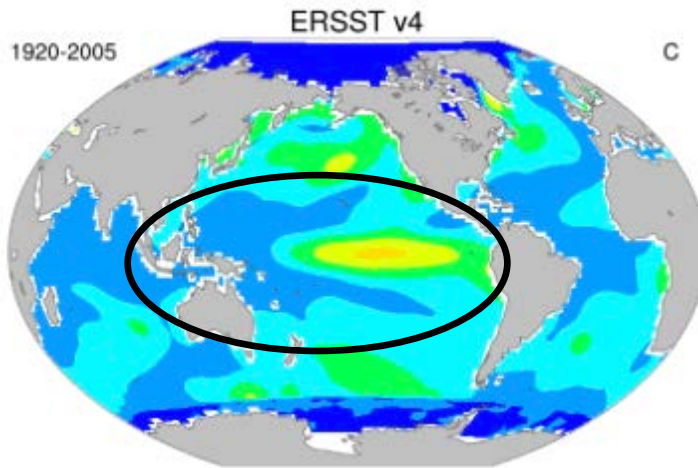
CESM1
Large Ensemble
#10



*Similar bias
in other
seasons*

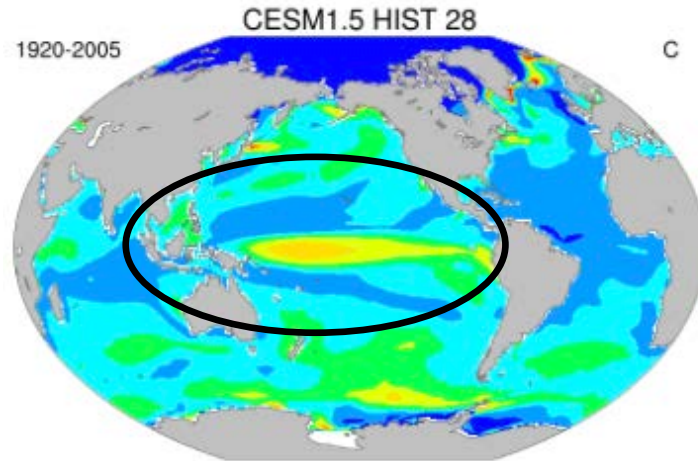


OBS
(GPCP 1979-2005)



DJF SST
Std. Dev.
1920-2005

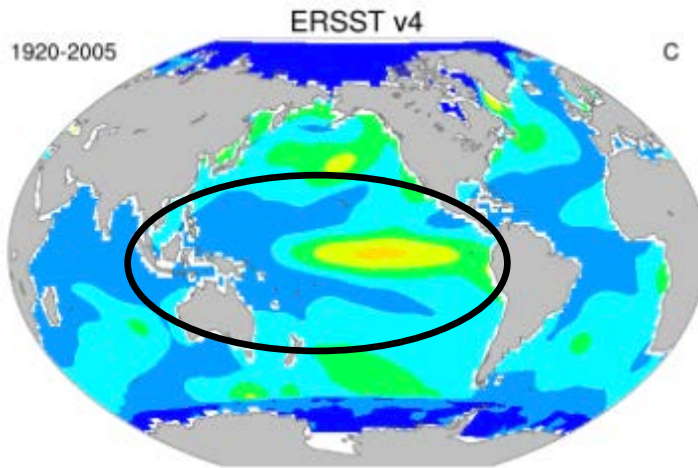
CESM1.5
#28



*Good amplitude,
biased westward
(same in #31)*

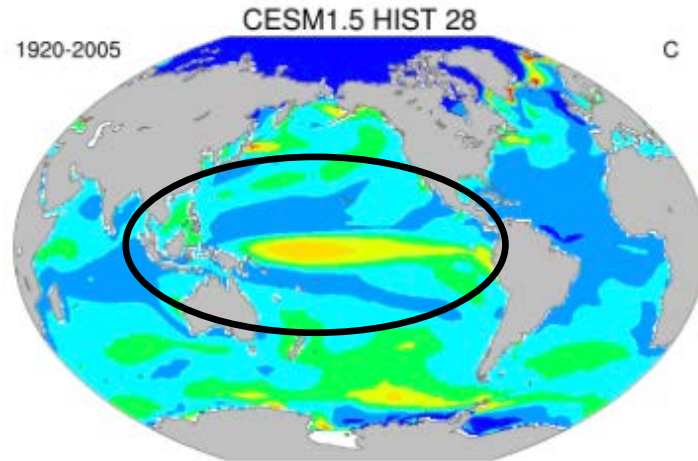


OBS
(GPCP 1979-2005)



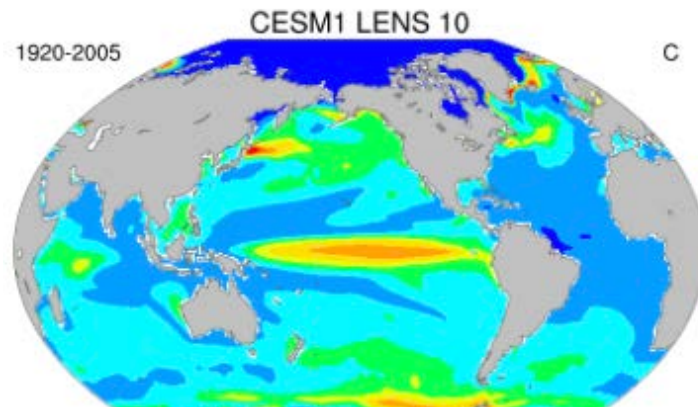
DJF SST
Std. Dev.
1920-2005

CEM1.5
#28

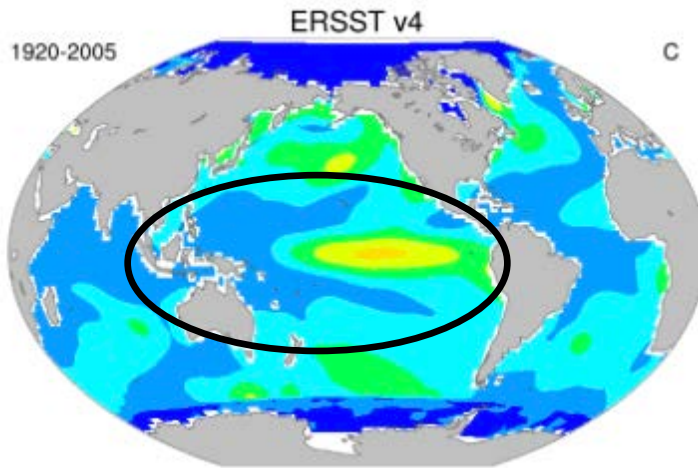


*Good amplitude,
biased westward
(same in #31)*

CEM1
Large Ensemble
#10

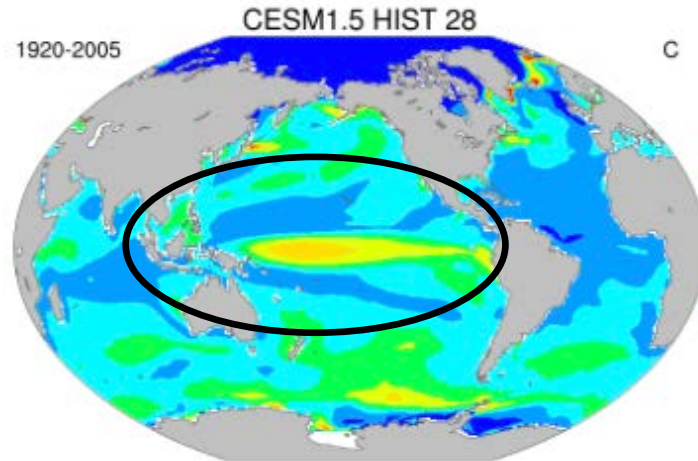


OBS
(GPCP 1979-2005)



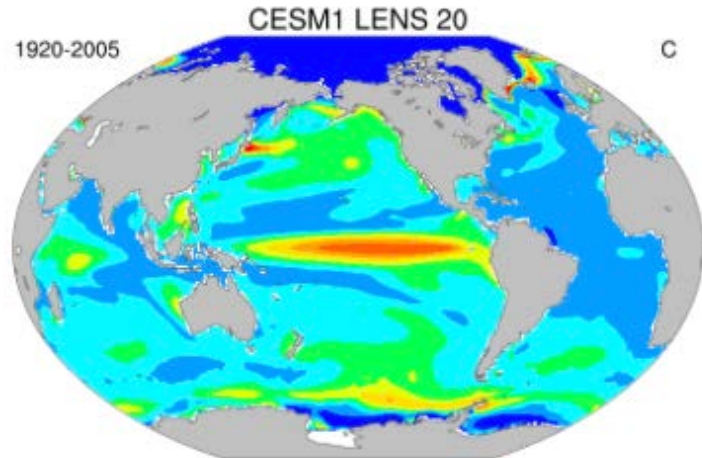
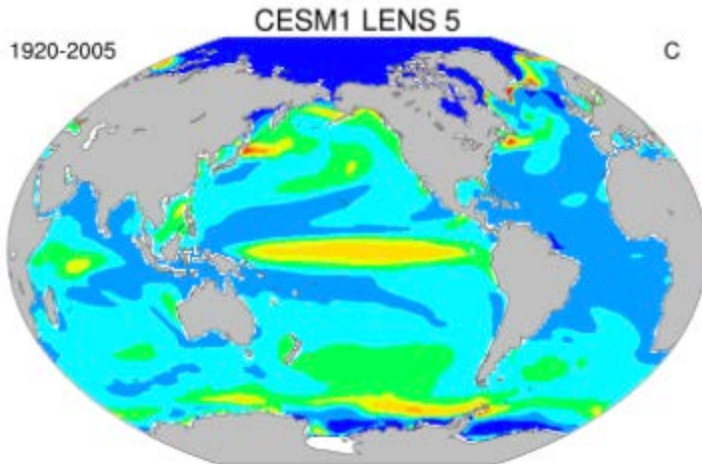
DJF SST
Std. Dev.
1920-2005

CESM1.5
#28



*Good amplitude,
biased westward
(same in #31)*

5



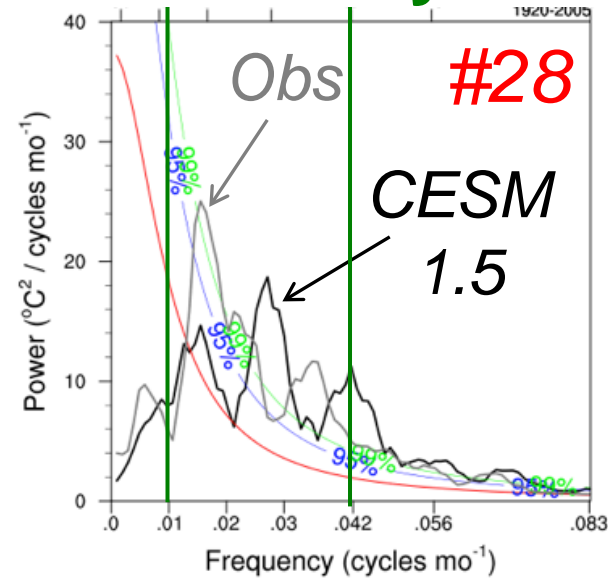
20

ENSO



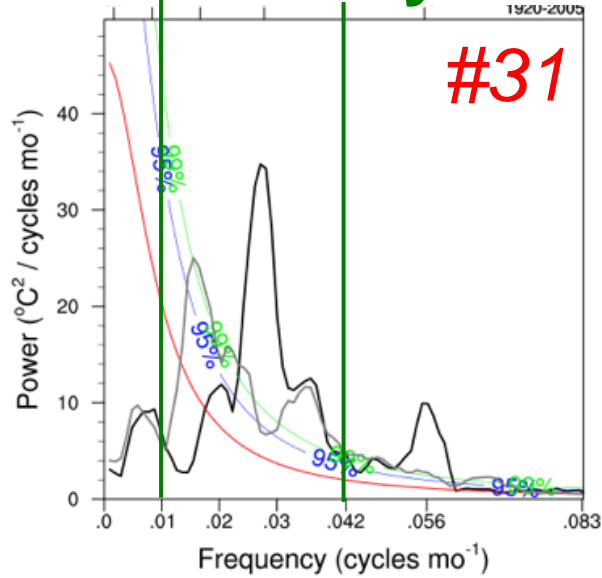
Nino3.4 SST Power Spectrum 1900-2005

8 3 2 years

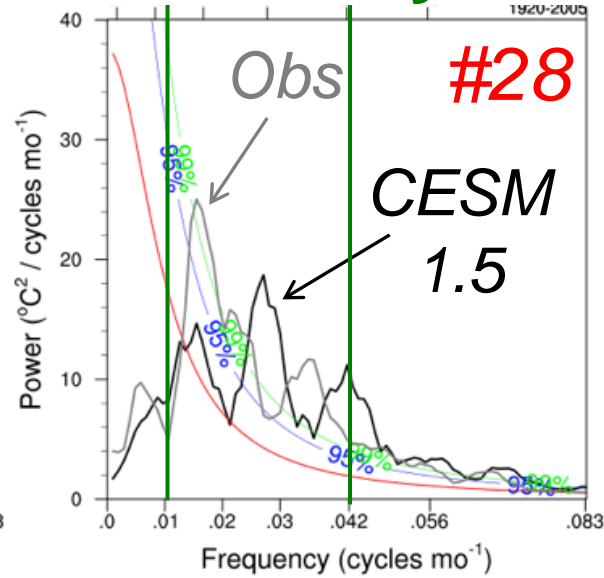


Nino3.4 SST Power Spectrum 1900-2005

8 3 2 years



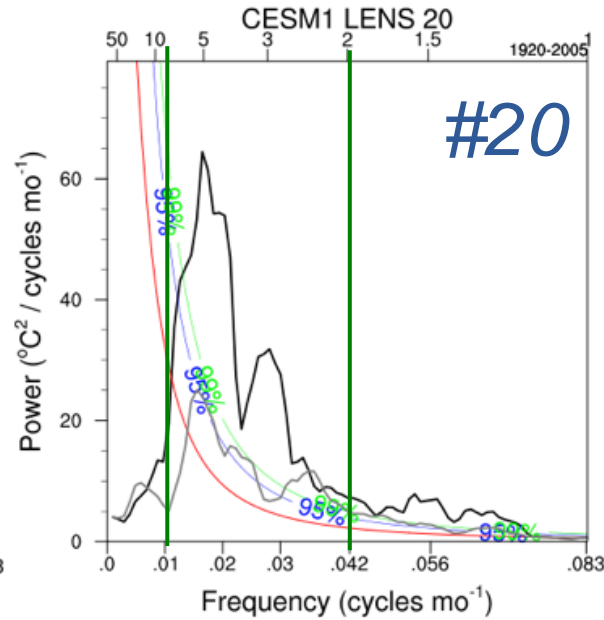
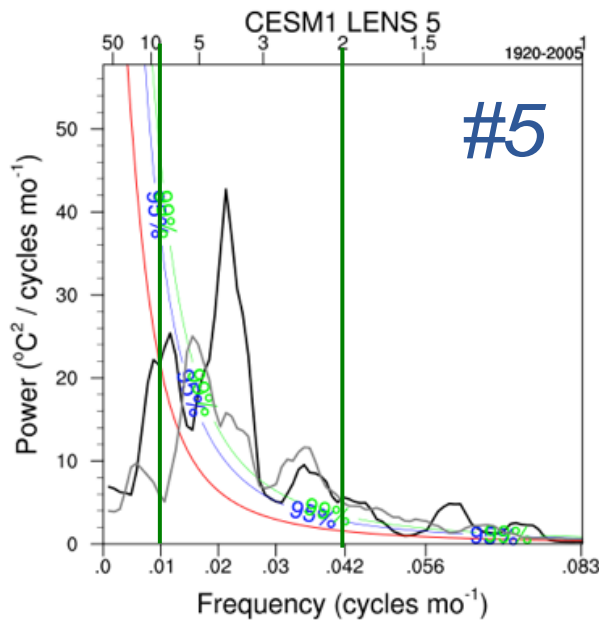
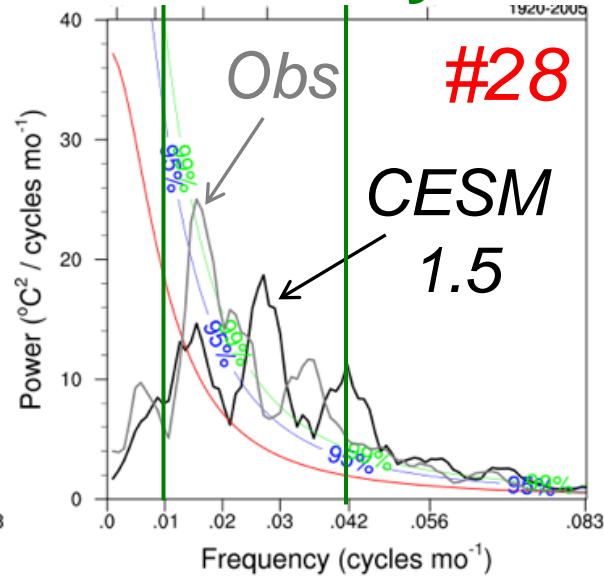
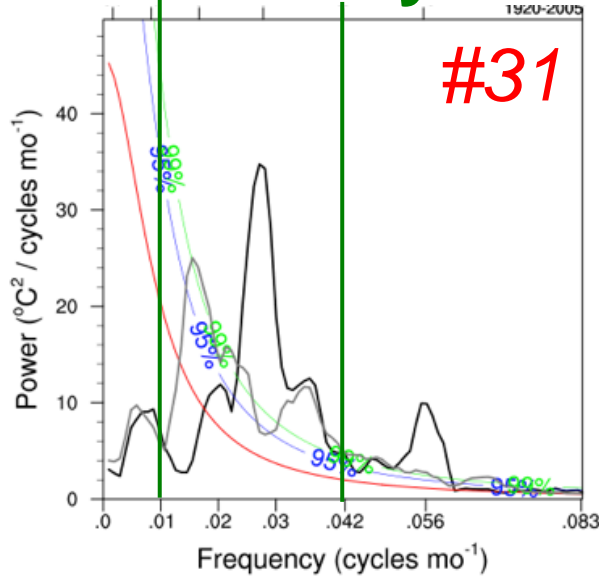
8 3 2 years



Nino3.4 SST Power Spectrum 1900-2005

8 3 2 years

8 3 2 years

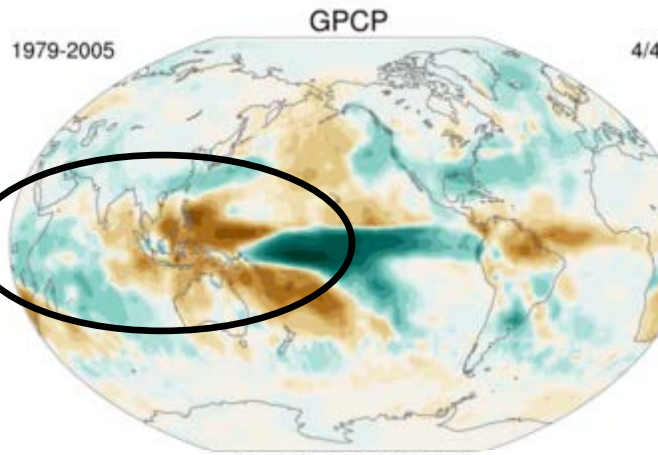


CESM1
Large
Ensemble

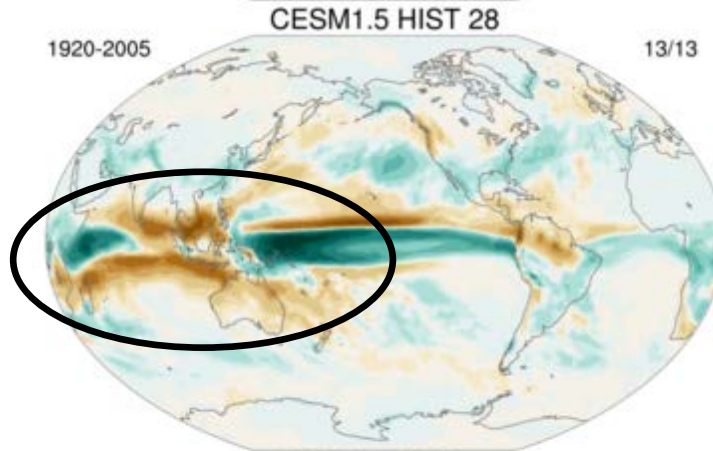
ENSO Composite

DJF Precipitation
1920-2005

OBS
(GPCP 1979-2005)



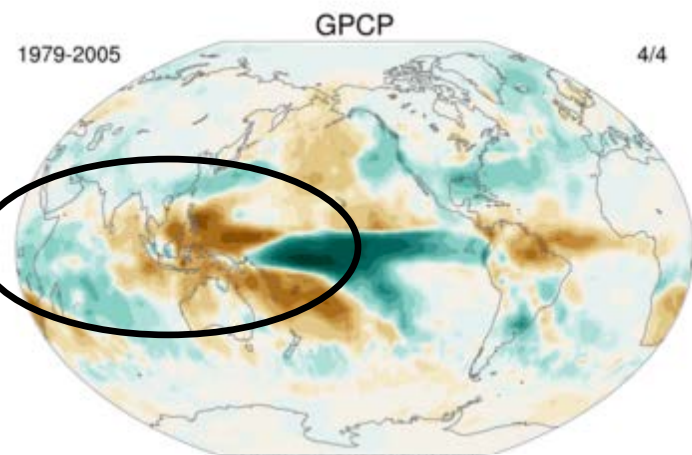
CESM1.5
#28



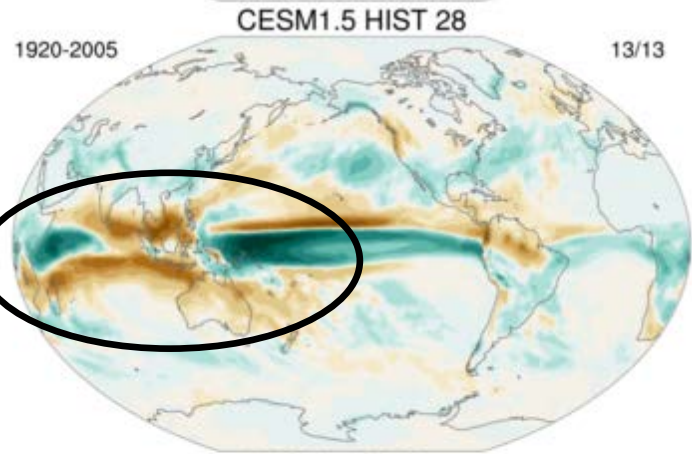
ENSO Composite

DJF Precipitation
1920-2005

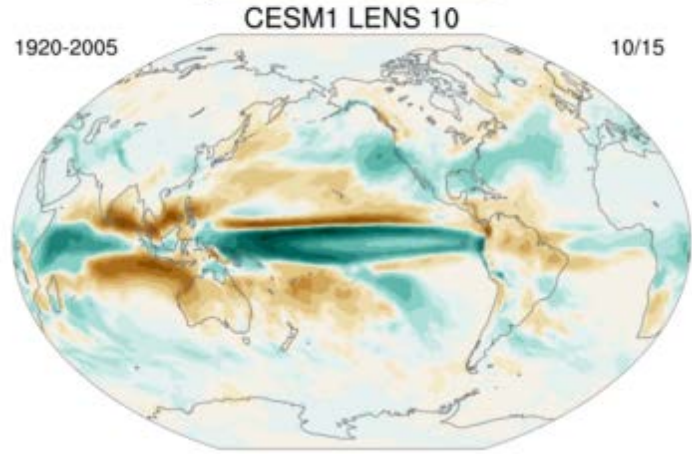
OBS
(GPCP 1979-2005)



CEM1.5
#28



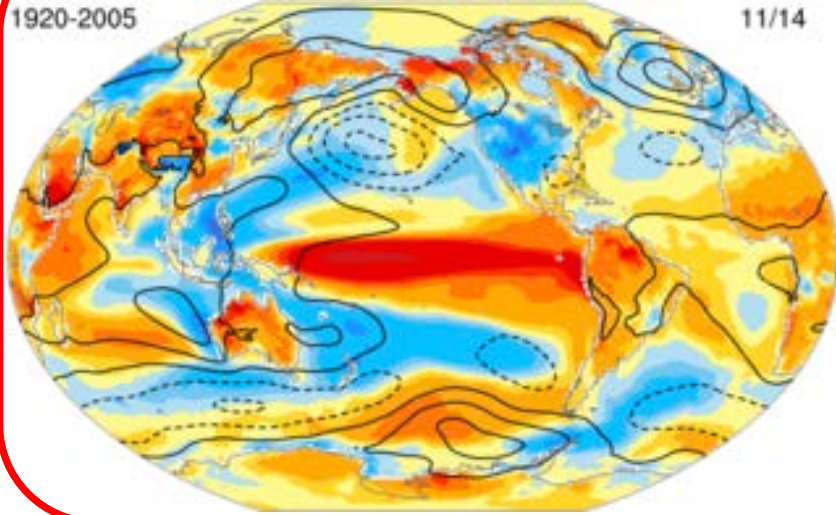
CEM1
Large Ensemble
#10



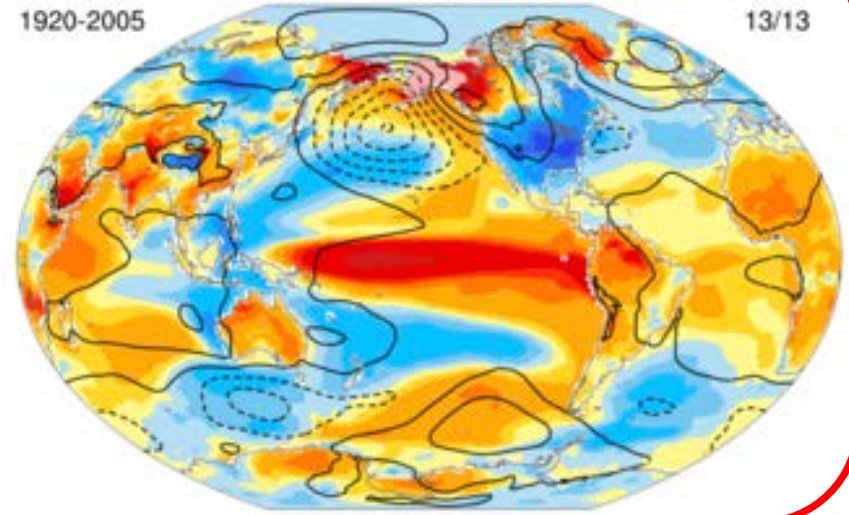
ENSO Composites (SLP, T)

DJF 1920-2005

#31



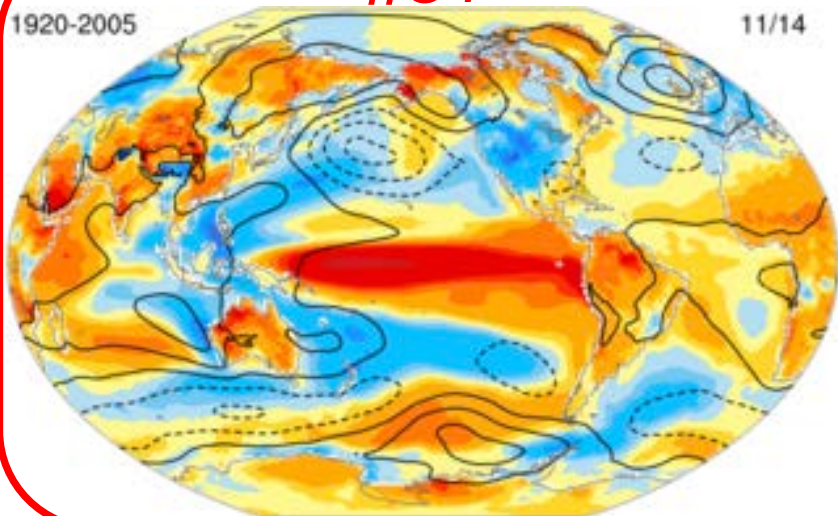
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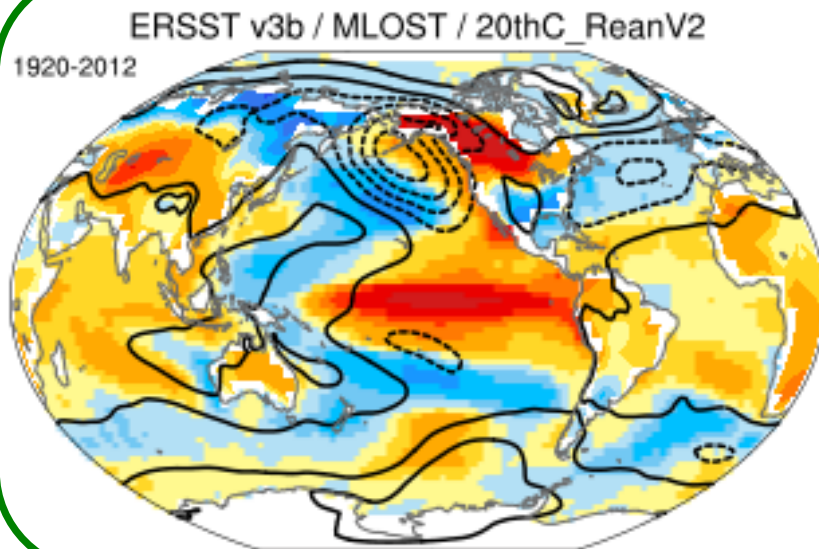
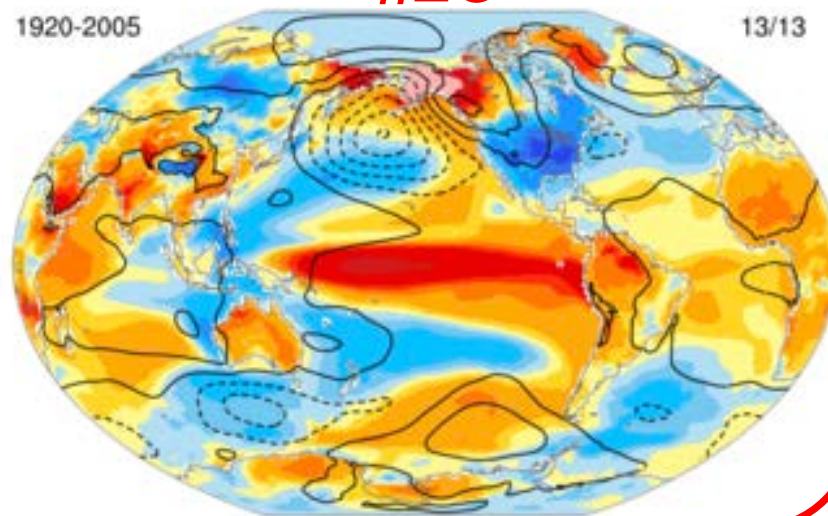
ENSO Composites (SLP, T)

DJF 1920-2005

#31



#28

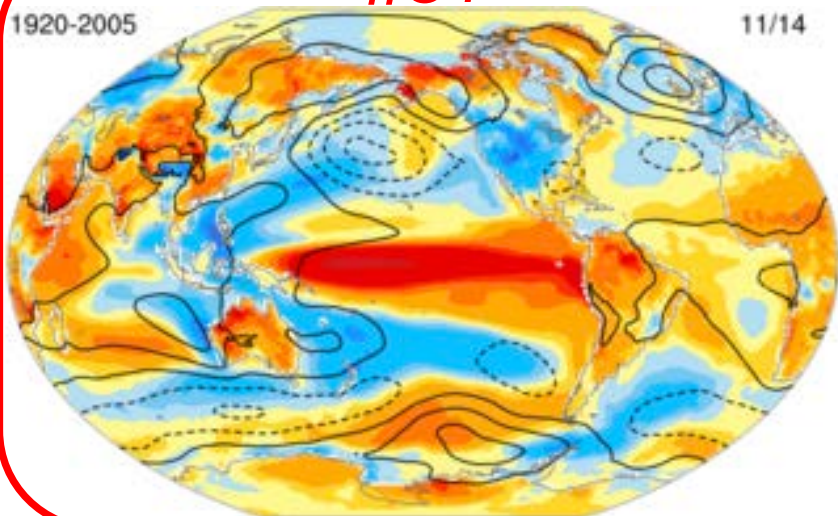


OBS

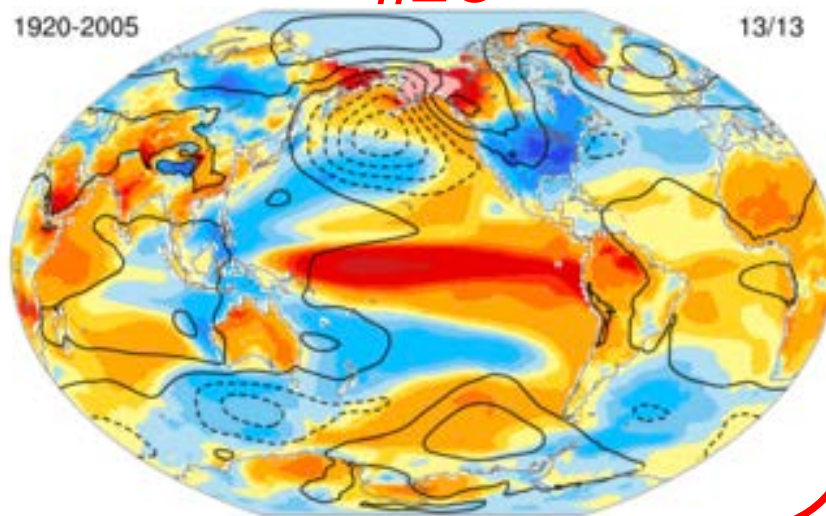
ENSO Composites (SLP, T)

DJF 1920-2005

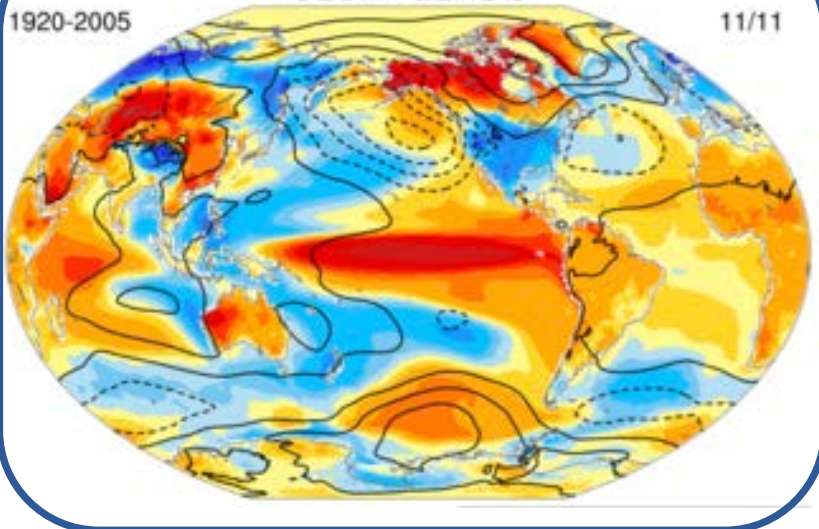
#31



#28

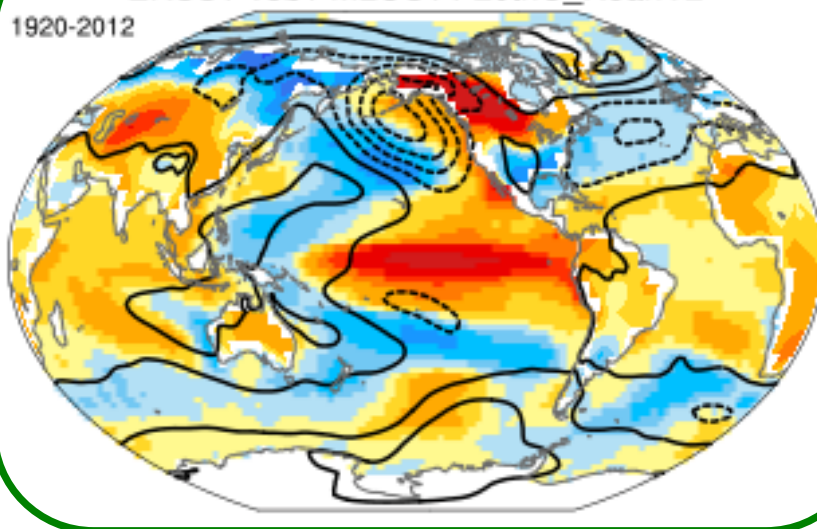


CESM1 LENS 5



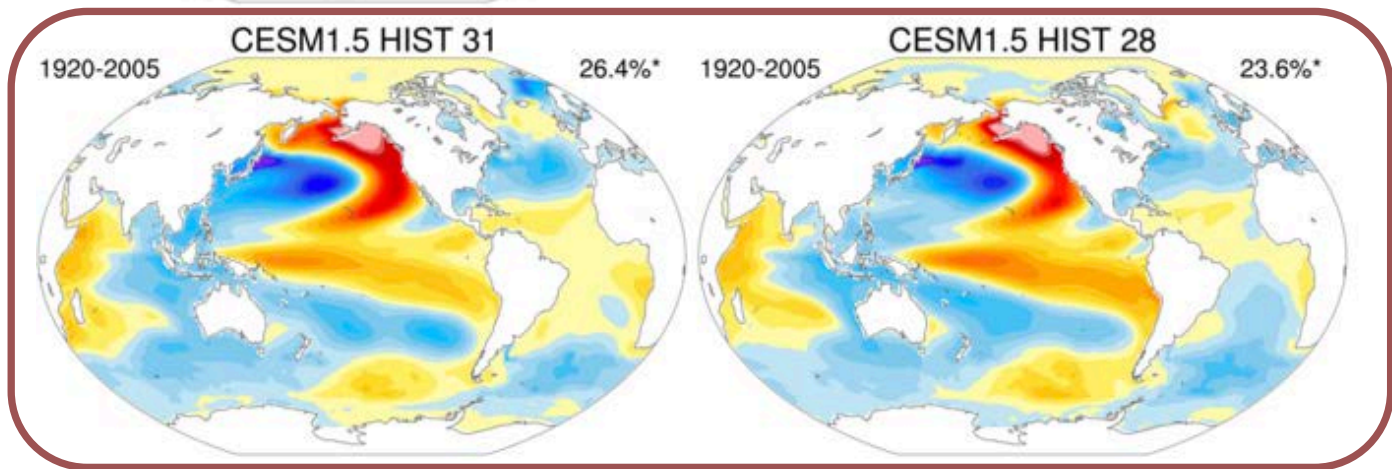
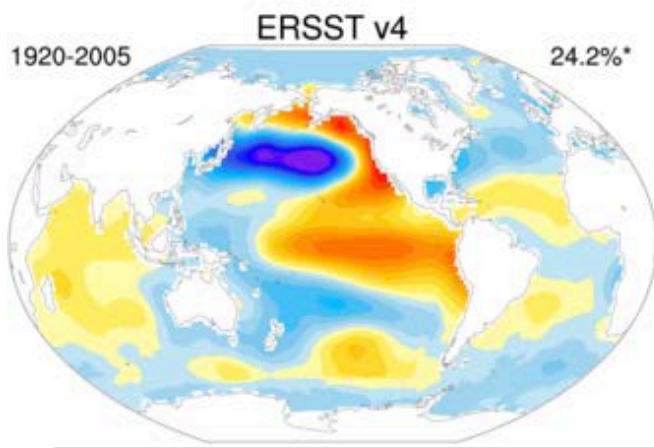
CESM Large Ensemble

ERSST v3b / MLOST / 20thC_ReanV2

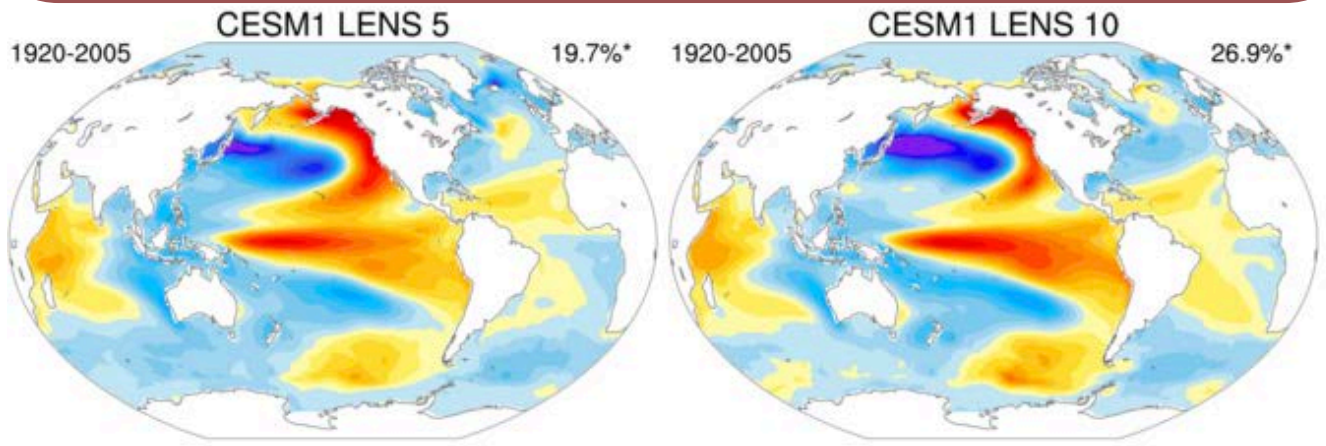


OBS

PDO 1920-2005



CSM1.5
HIST



CSM1
Large
Ensemble

Summary

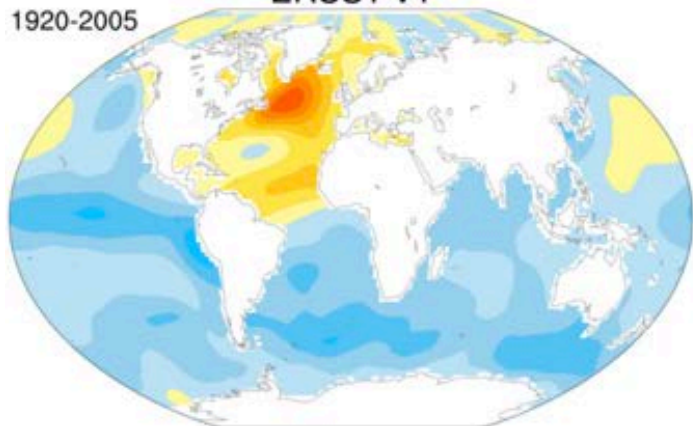
- Excessive precipitation (mean, variability and ENSO response) over Indian Ocean
- ENSO SST anomaly too far west
- ENSO amplitude and spectrum about right, but need longer record to assess.
- Atmospheric Modes (NAO, PNA, ...) about right.

Extra Slides



1920-2005

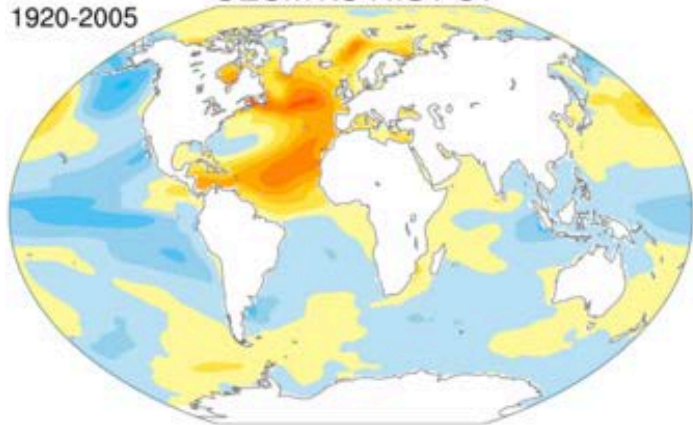
ERSST v4



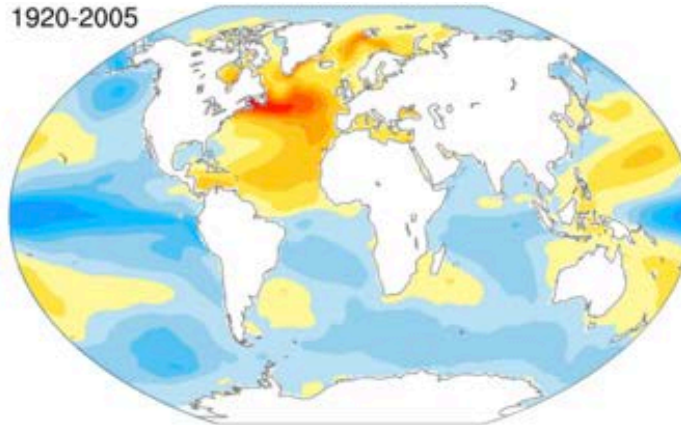
AMO 1920-2005

1920-2005

CESM1.5 HIST 31



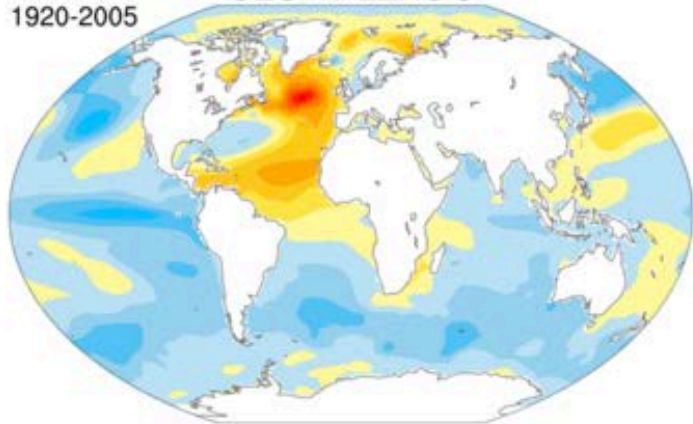
1920-2005



CESM1.5
HIST

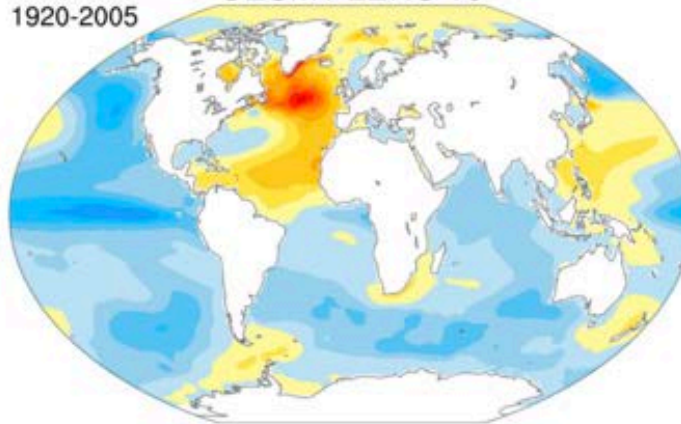
1920-2005

CESM1 LENS 5



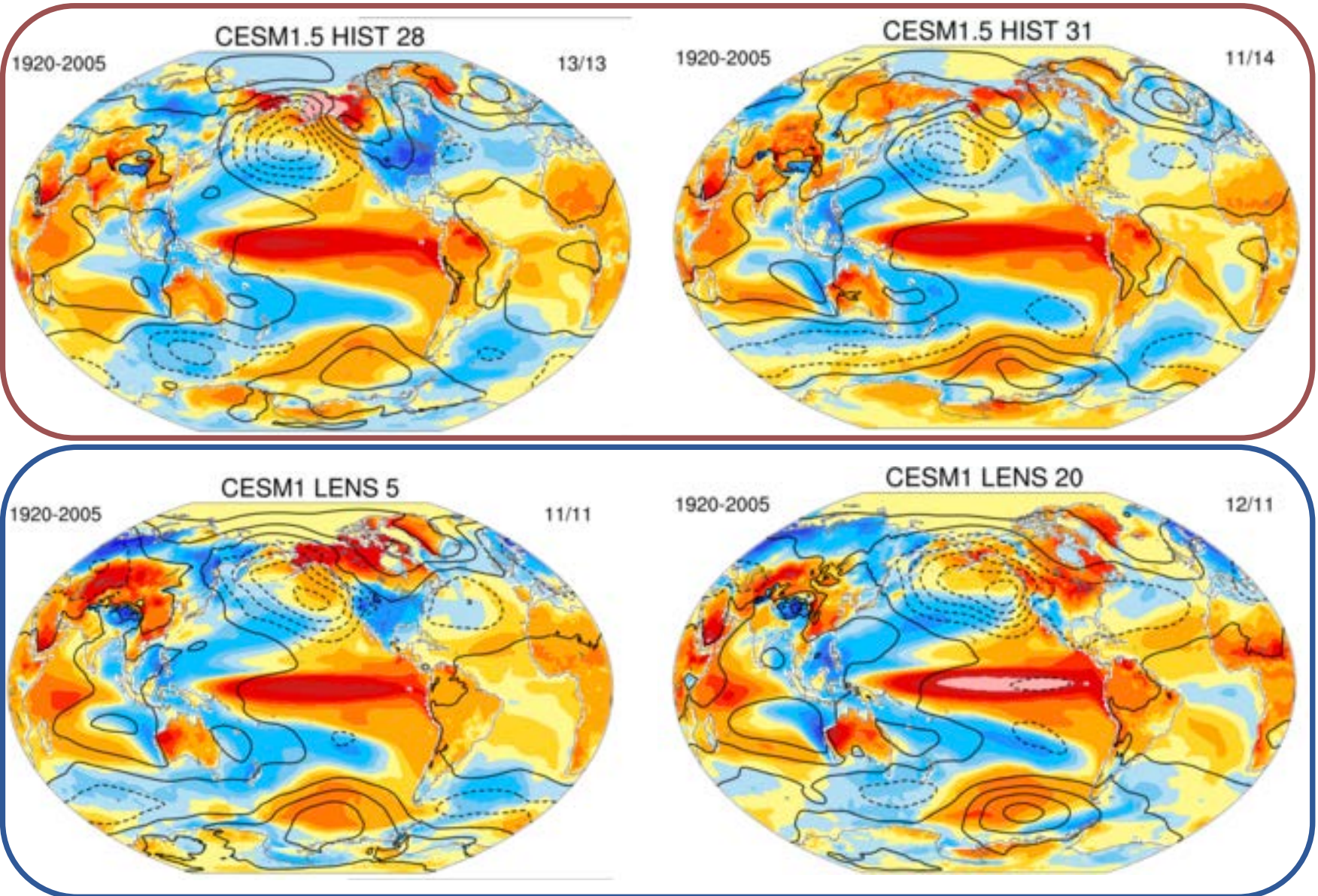
1920-2005

CESM1 LENS 10



CESM1
Large
Ensemble

DJF ENSO Composites (SLP, T) 1920-2005



CESM Large Ensemble