

# The relative influences of Tropical Pacific SSTs and atmospheric internal variability on the recent global surface warming hiatus

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# Tropical Pacific “Pacemaker” Simulations

## CESM1 and GFDL CM2.1

10 members

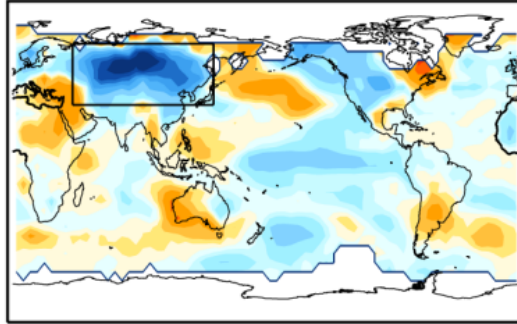
Nino3.4 SST anomalies nudged to  
observed evolution 1920-2013

+ historical radiative forcing

°C / 12 years

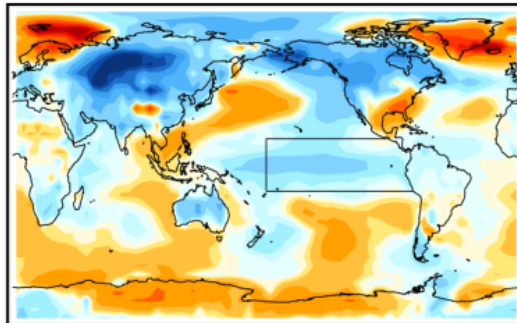


OBS (MLOST)



Observed  
 $-0.20^{\circ}\text{C}$

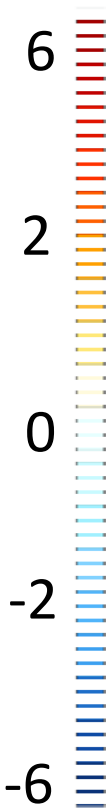
CESM 2



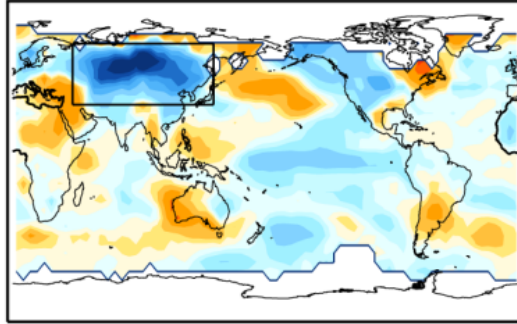
CESM #2  
 $-0.24^{\circ}\text{C}$   
 $r = 0.64$

Air T trends  
2002-2013  
(DJF)

°C / 12 years

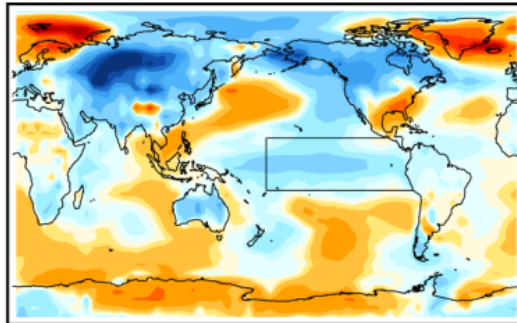


OBS (MLOST)



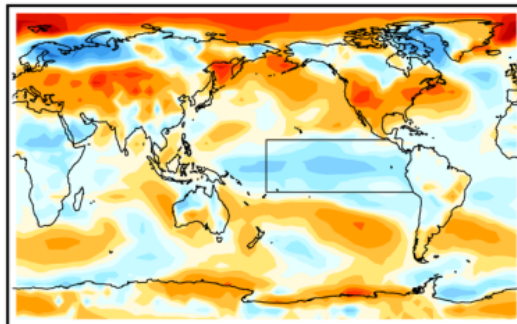
Observed  
 $-0.20^{\circ}\text{C}$

CESM 2



CESM #2  
 $-0.24^{\circ}\text{C}$   
 $r = 0.64$

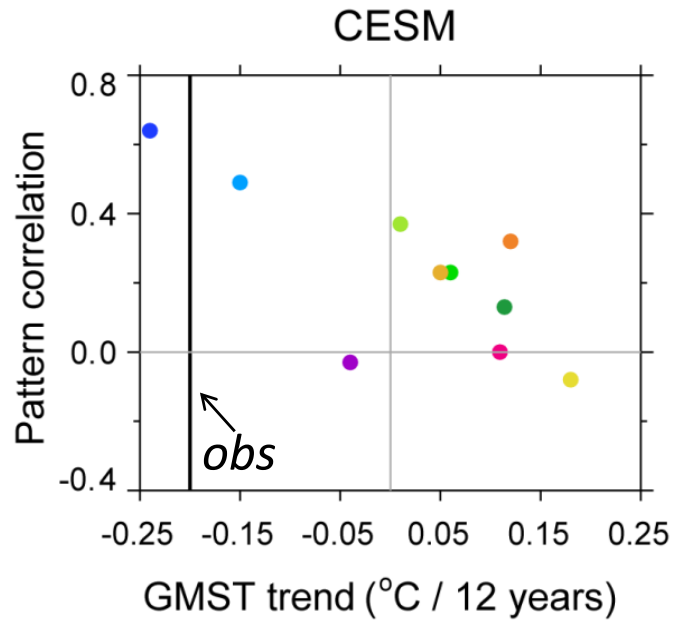
CESM 5



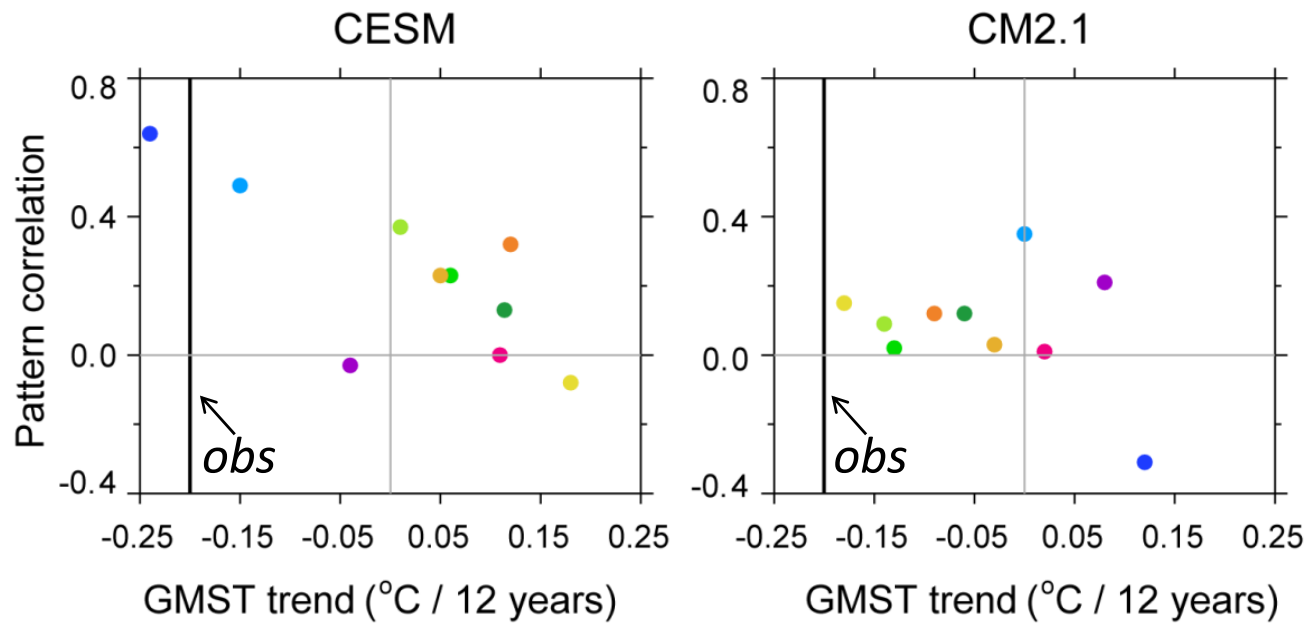
CESM #5  
 $+0.18^{\circ}\text{C}$   
 $r = -0.08$

Air T trends  
2002-2013  
(DJF)

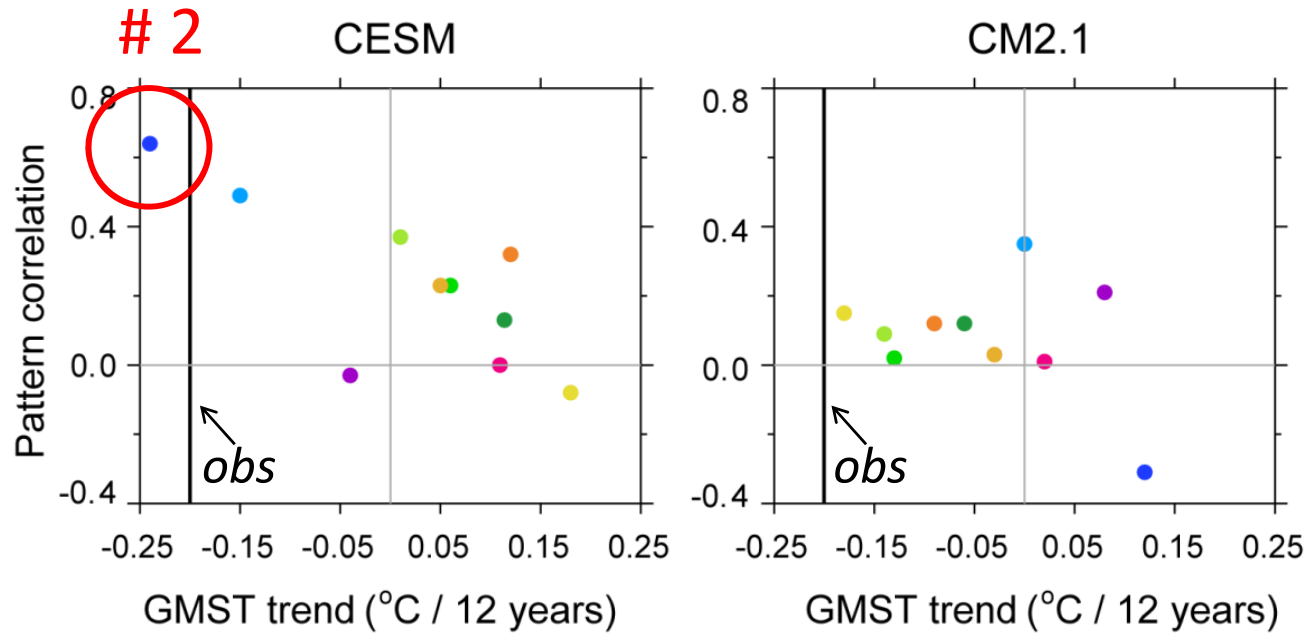
# Realism of Global Mean Trend vs. Pattern of Trends



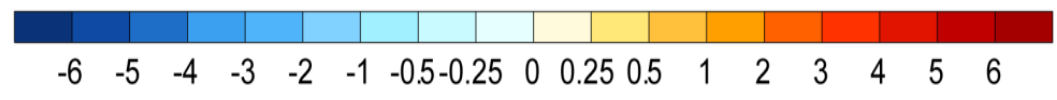
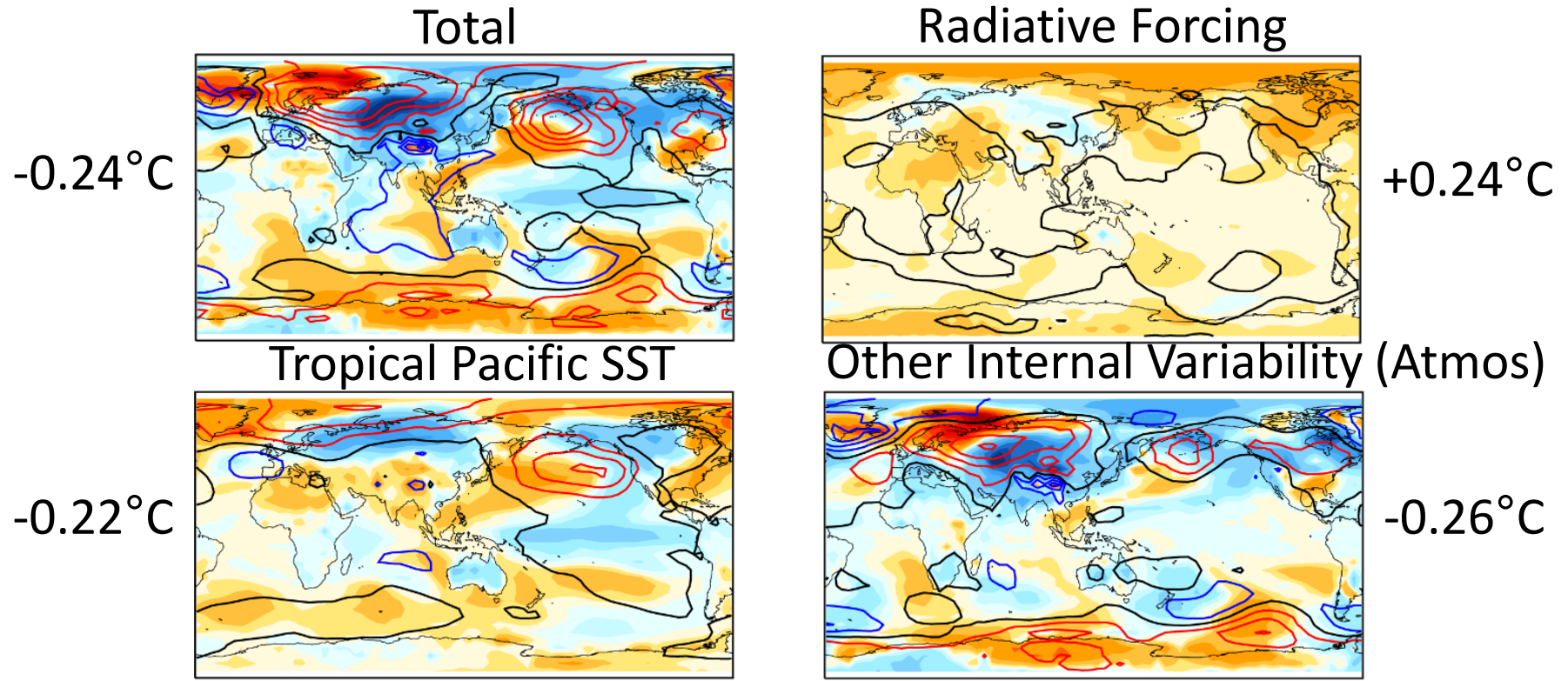
# Realism of Global Mean Trend vs. Pattern of Trends



# Realism of Global Mean Trend vs. Pattern of Trends



# Contributions to Trends in CESM Pacemaker # 2



SLP trends in contours (1 hPa / 12 years)

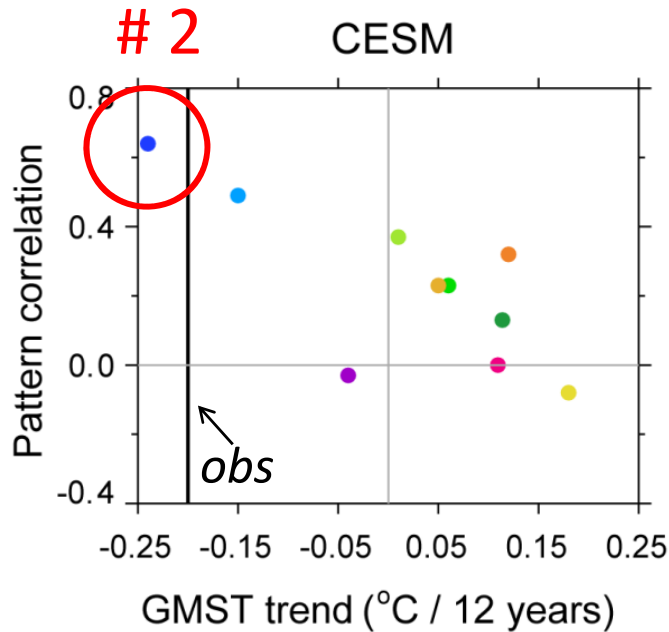


## Summary

1. Realistic simulation of global mean temperature trend is no guarantee that pattern of trends is correct.
2. CESM1 shows higher pattern correlations ( $r$ ) than CM2.1, and a positive correlation between  $r$  and GMST.
3. Tropical Pacific SSTs and internal atmospheric variability contribute equally to offset radiative forcing in CESM #2 (most realistic of the Pacemaker simulations).

Extra

# Realism of Global Mean Trend vs. Pattern of Trends



## CESM #2

-0.24°C GMST trend:

+0.24°C Radiative Forcing

-0.22°C Tropical Pacific SST (46%)

-0.26°C Atm. Internal Variability (54%)

## OBS

-0.20°C GMST trend:

+0.24°C Radiative Forcing

-0.22°C Tropical Pacific SST (50%)

-0.22°C Atm. Internal Variability (50%)

# Contributions to Trends in CESM Pacemaker # 2

