

# Preliminary Results from the Coupled 4xCO<sub>2</sub> run

Cristiana Stan

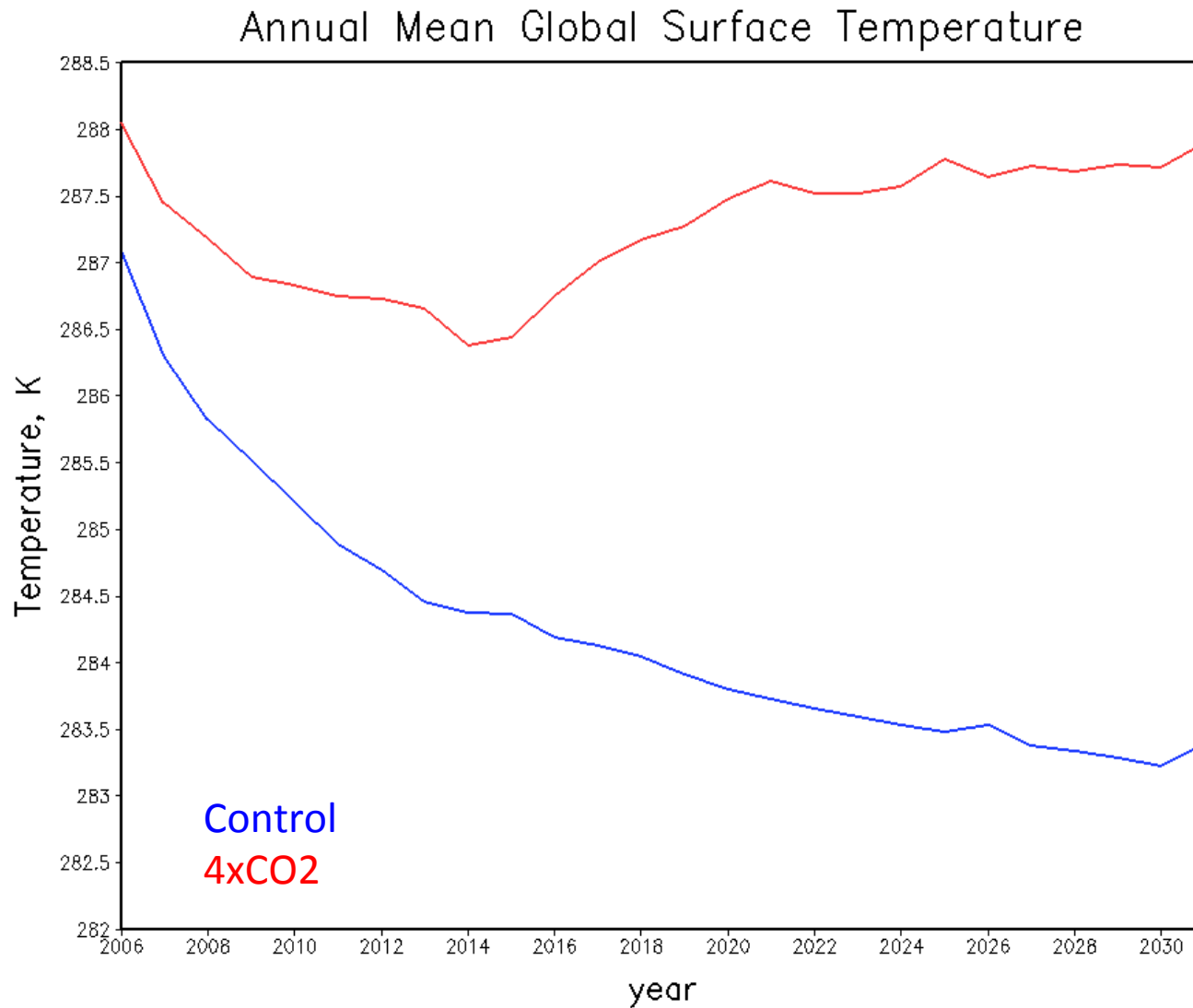
Department of AOES

George Mason University

# Experimental Setup

	Control	4xCO2
ATM/LND resol.	fv1.9x2.5°/30levs	fv1.9x2.5°/30levs
OCN/ICE resol	1°	1°
CO2 concentration	368.9ppmv	1475.6ppmv
Initial Conditions	CCSM4 2° 20th Century/ b40.20 <sup>th</sup> .track1.2deg 001.2005-01-01-00000	CCSM4 2° 20th Century/ b40.20 <sup>th</sup> .track1.2deg. 001.2005-01-01-00000
CRM resol.	4km	4km
CRM microphysics	SAM1MOM	SAM1MOM

# Global Mean Surface Temperature



Transient (Short Term) Response  
March 2005 – February 2007

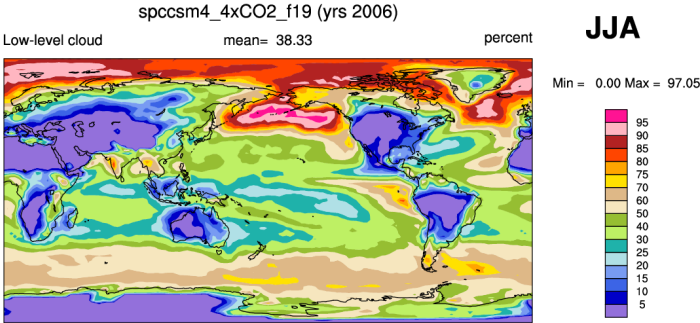
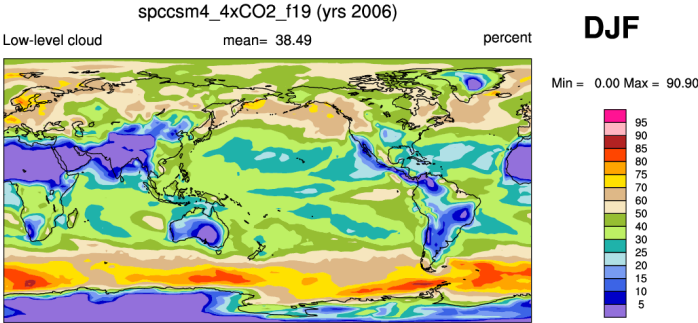


# Low Cloud

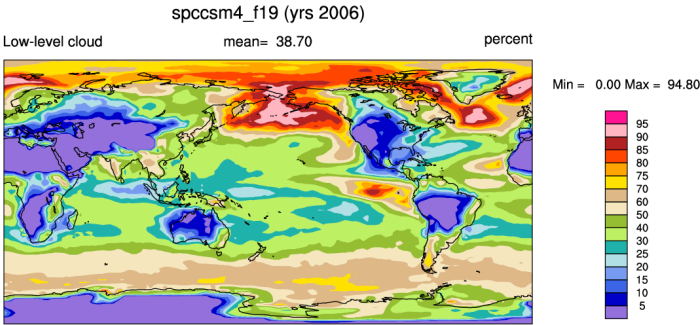
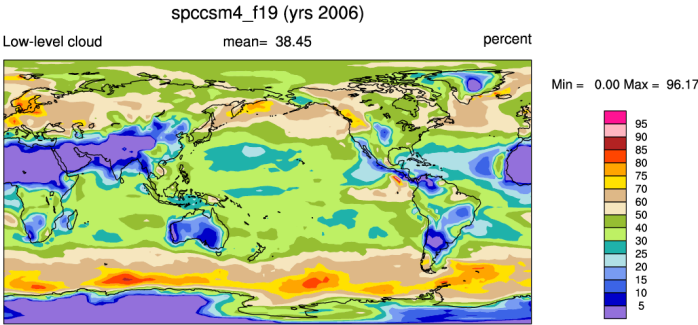
DJF

JJA

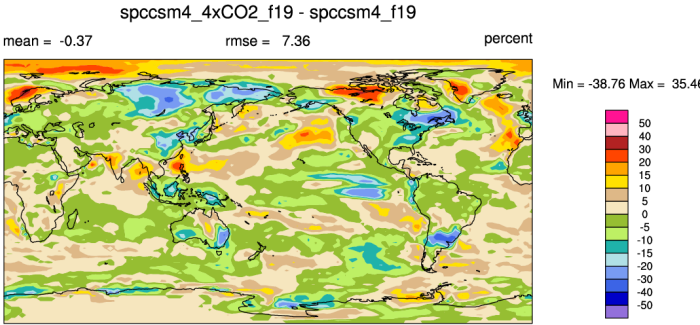
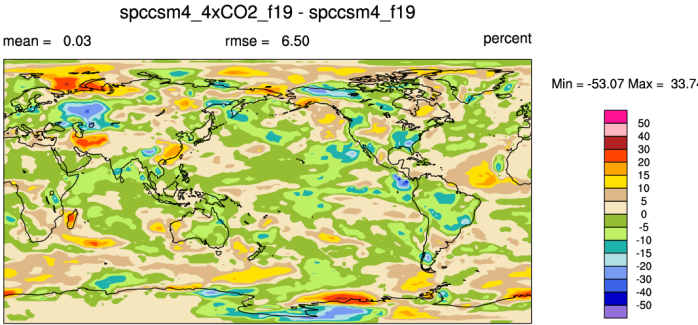
4xCO2



Control



4xCO2 - CTL



slight increase

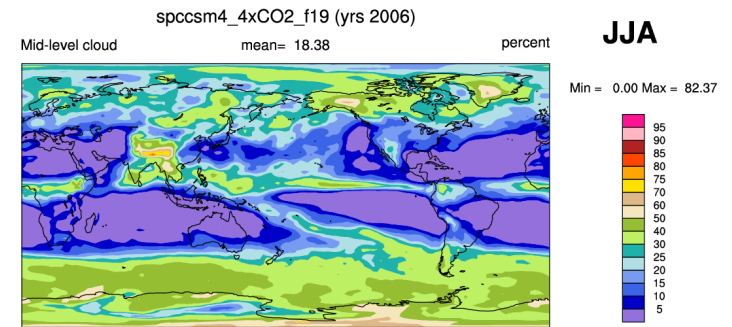
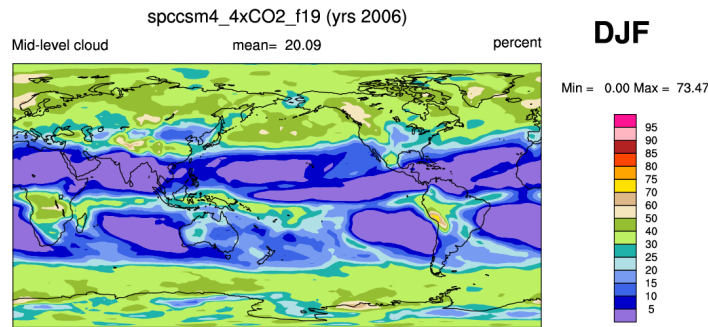
slight decrease

# Mid-Level Cloud

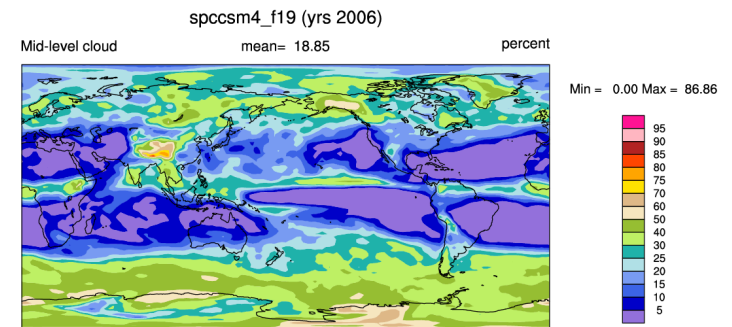
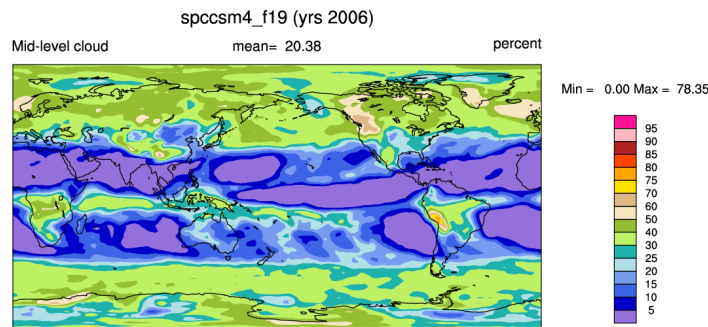
DJF

JJA

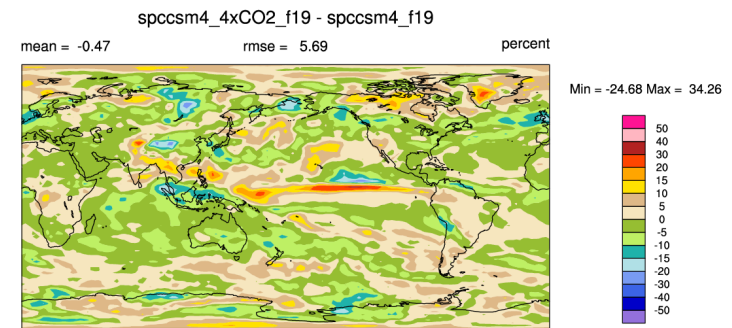
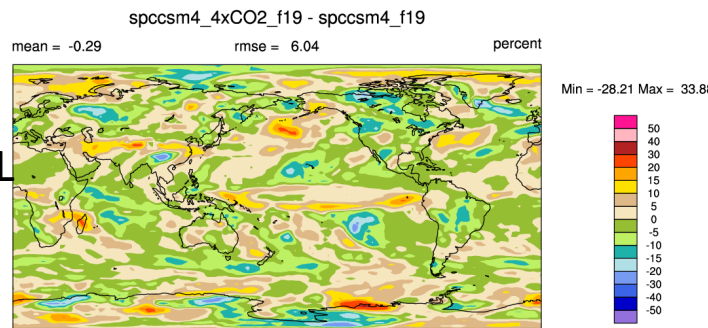
4xCO2



Control



4xCO2 - CTL



slight decrease

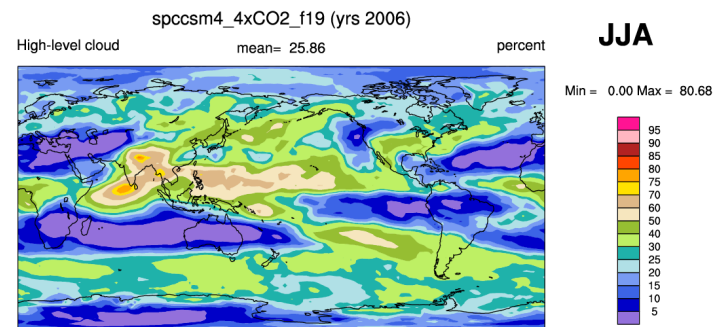
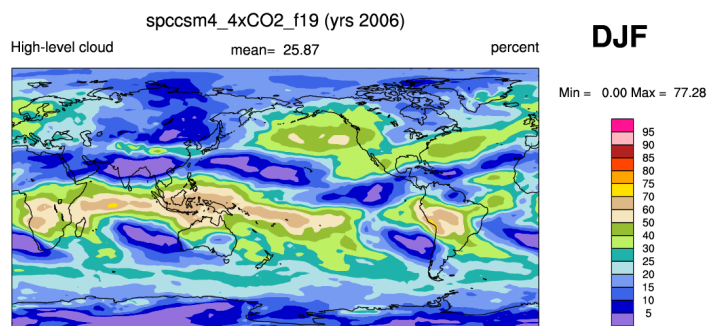
slight decrease

# High-Level Cloud

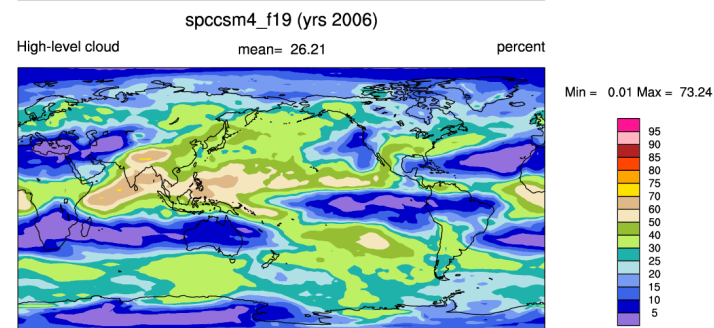
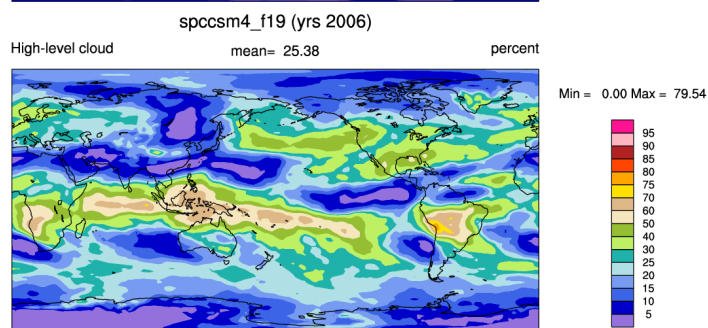
DJF

JJA

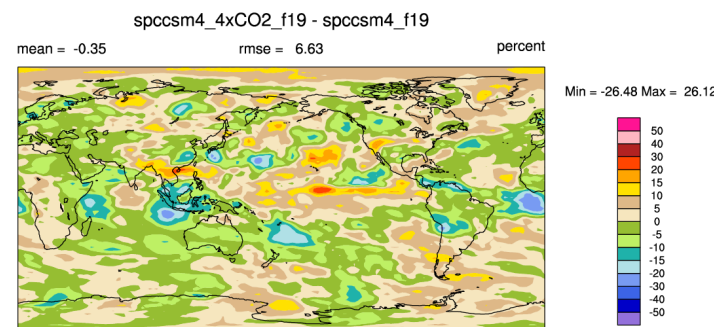
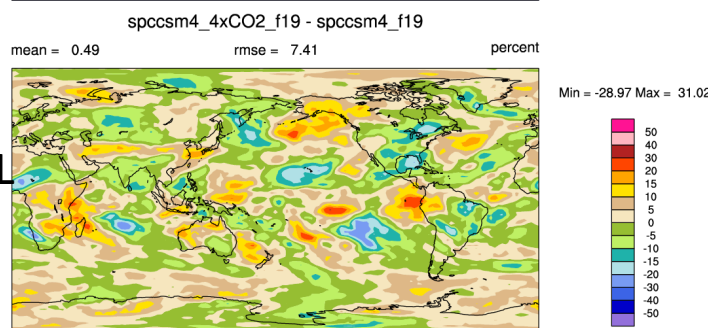
4xCO2



Control



4xCO2 - CTL



slight increase

small decrease

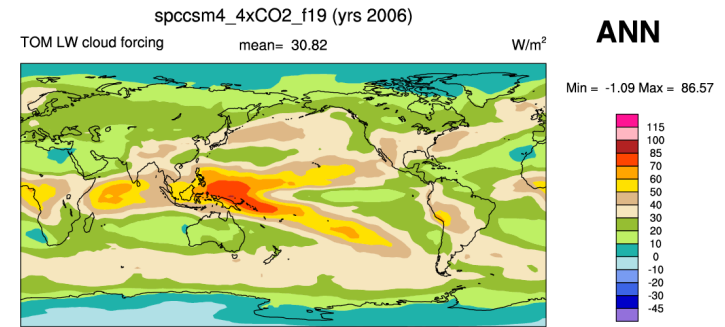
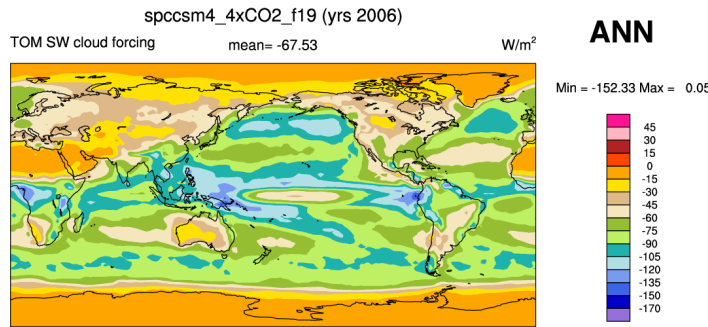


# Cloud Forcing

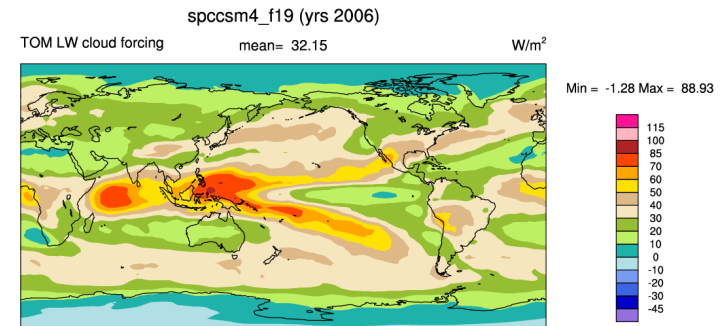
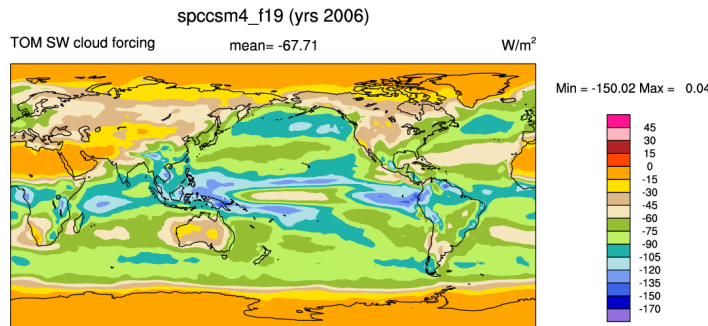
## Short Wave

## Long Wave

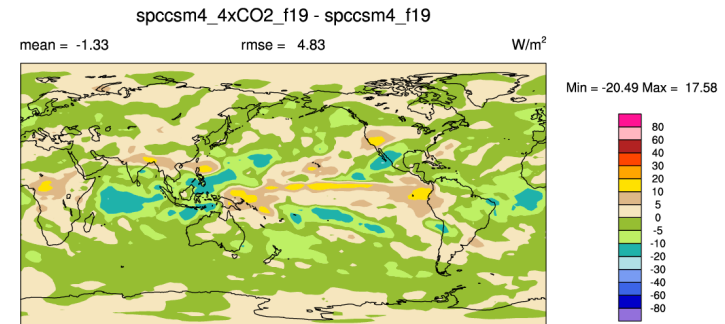
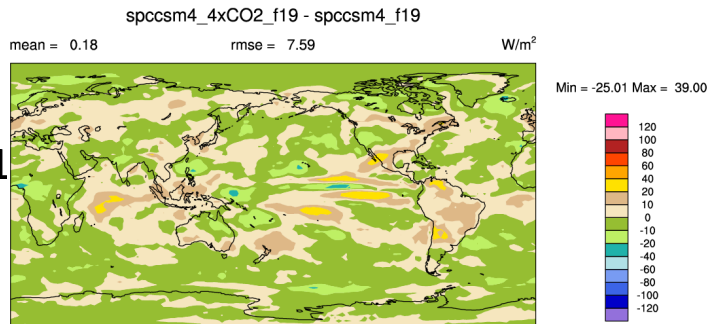
4xCO2



Control



4xCO2 - CTL



slight decrease

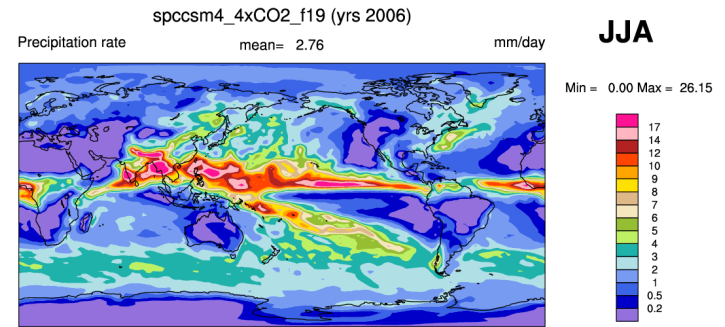
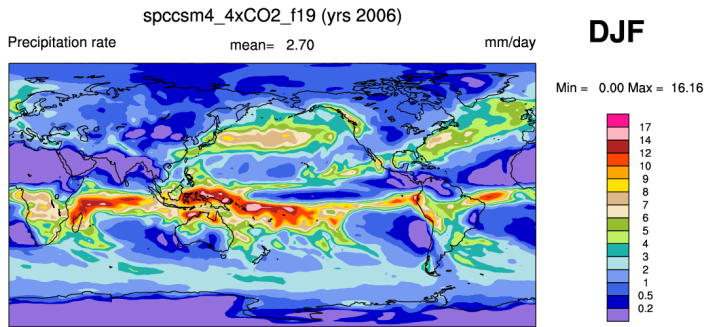
small decrease

# Precipitation

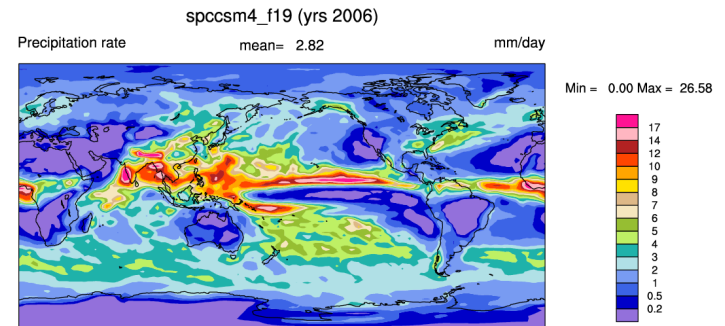
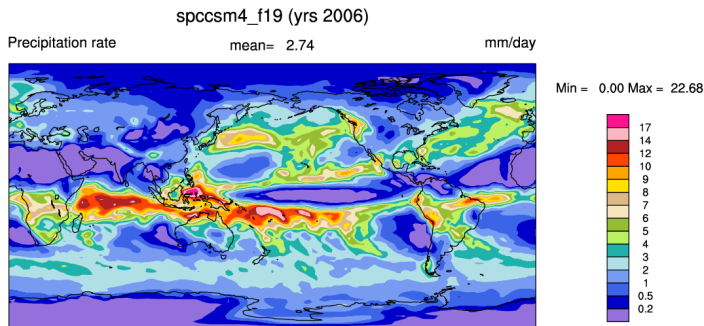
DJF

JJA

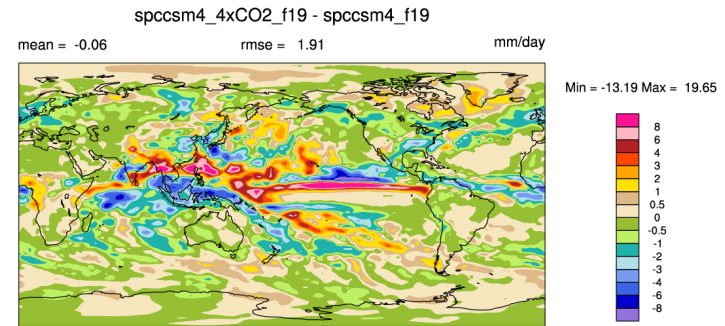
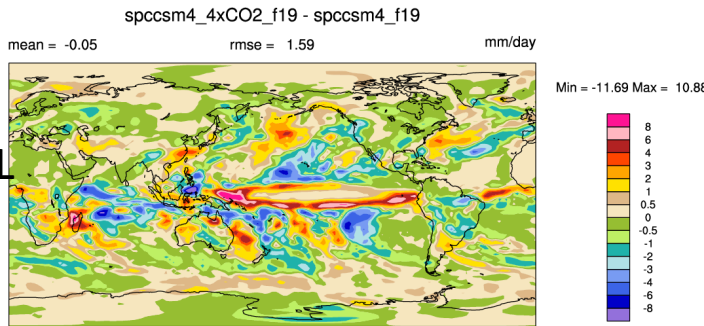
Control



4xCO2



4xCO2 - CTL



slight decrease

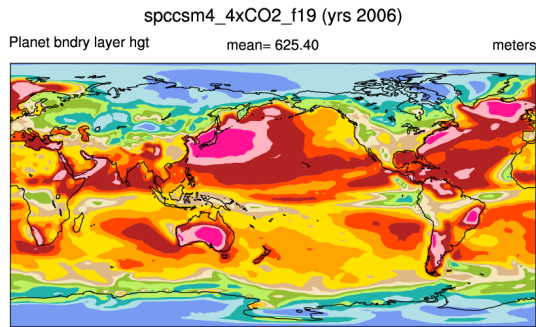
small decrease

# PBL Height

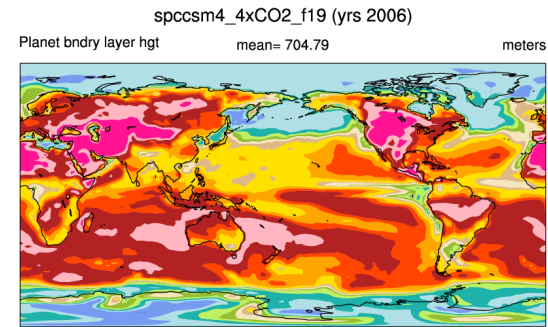
## DJF

## JJA

Control

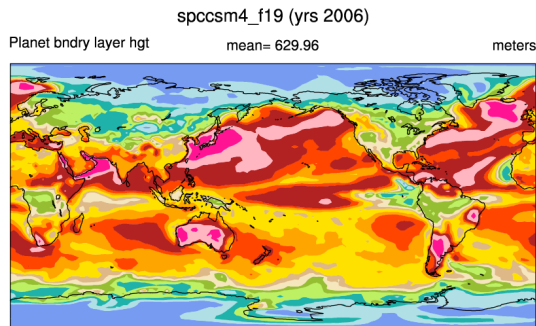


### DJF

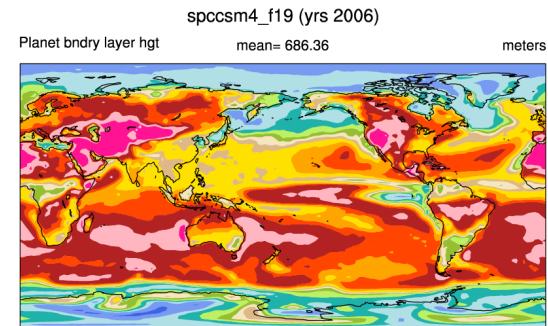


### JJA

4xCO2

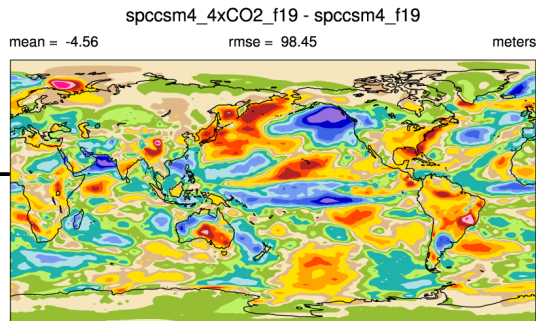


Min = 153.92 Max = 1589.06

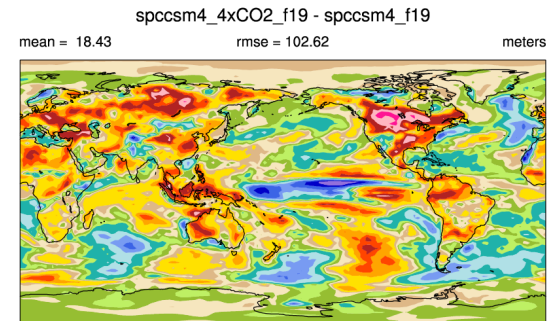


Min = 143.36 Max = 1707.51

4xCO2 - CTL



Min = -521.56 Max = 549.53



Min = -494.64 Max = 480.19

small decrease

significant increase

Equilibrium (Long Term) Response

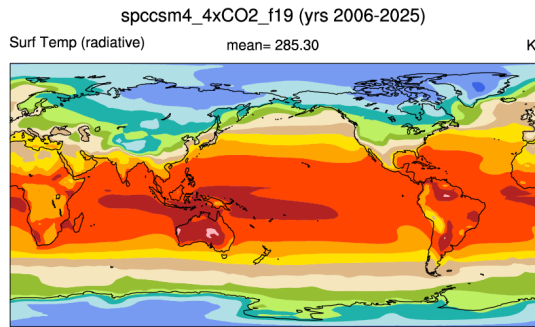


# Surface Temperature

DJF

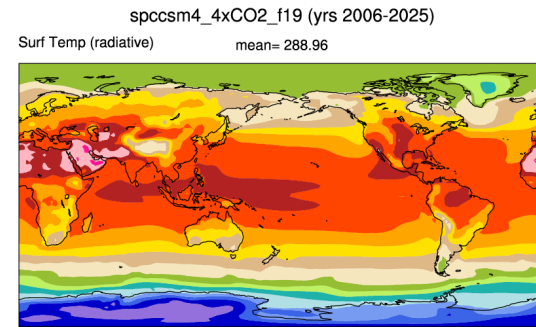
JJA

4xCO2



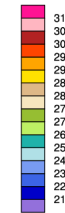
DJF

Min = 227.80 Max = 306.27

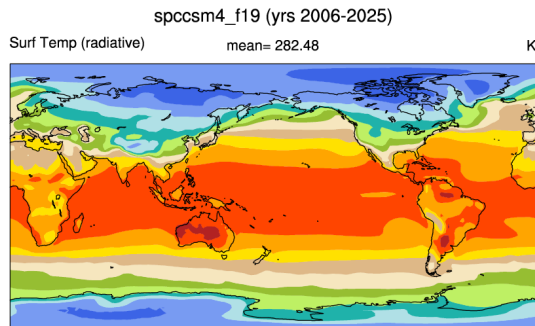


JJA

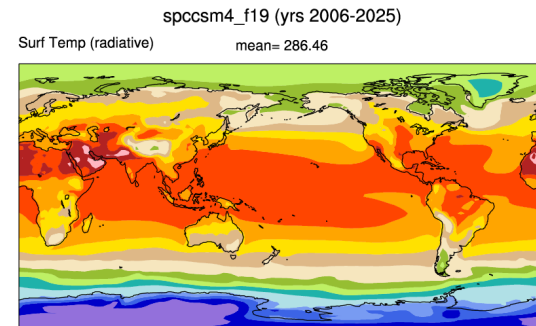
Min = 202.59 Max = 313.24



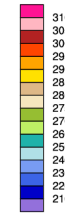
Control



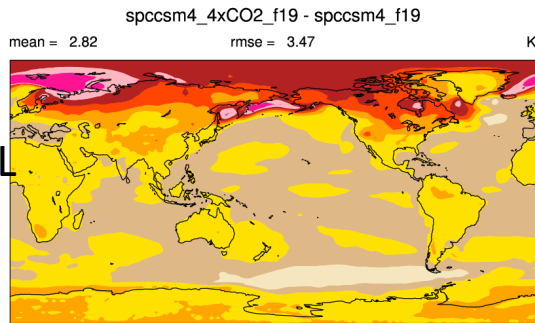
Min = 222.92 Max = 303.61



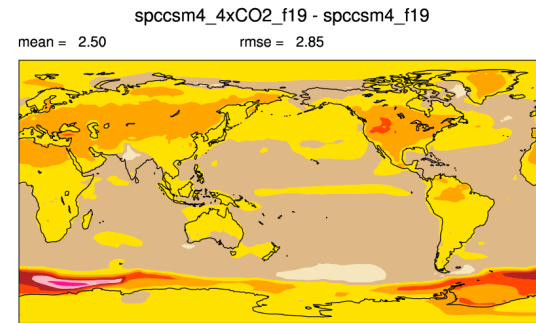
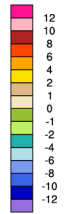
Min = 198.74 Max = 308.61



4xCO2 - CTL



Min = 0.27 Max = 21.89



Min = 0.03 Max = 13.12

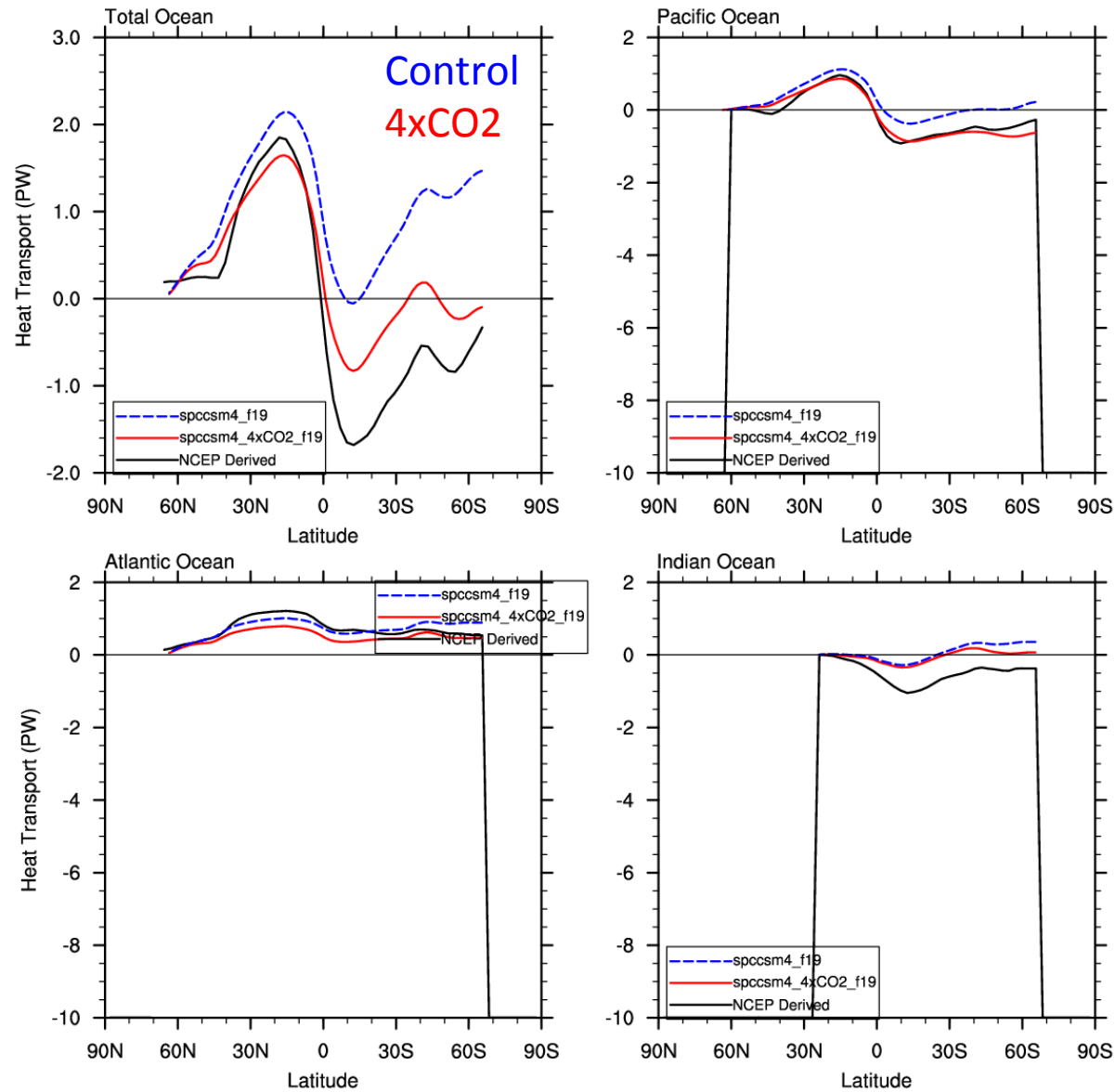


large increase in the NH polar region

significant increase in the SH polar region and NH midlatitudes over the land



# Implied Ocean Heat Transport



# Annual Cycle of Precipitation (Equatorial Pacific 5S-5N)

