	Catchment-CN with MERRA-2 meteorology (This study)	Catchment-CN with Princeton meteorology	Bonan et al. (2011)		
Meteorology	MERRA-2	Sheffield et al. (2006)	NCEP/NCAR reanalysis		
Model	Catchment-CN	Catchment-CN	CLM4		
Average over	1982-2004	1982-2004	1982-2004		
	Increasing CO ₂ with diurnal	Increasing CO ₂ with diurnal	Spatially uniform, annually		
CO2	variability applied	variability applied	increasing CO ₂		
GPP	127 PgC/yr	162 PgC/yr	165 PgC/yr		

Table L1. Effects of meteorology vs. model implementation. The spin-up process of the Catchment-CN with the Princeton meteorology was done separately from the case using MERRA-2: both reaching to an equilibrium for year 1850 with the choice of the meteorology and then conducting a transient CO₂ simulation from 1850 onward.

Remove Remove Sub-daily variability Sub-monthly variabilit		ove Re variability Seasona	Remove Remove Seasonal variability Spatial variability		nove variability	Remove Inter-annual variability (trend remains)		ty Rer 14-yea	Remove 14-year trend	
3hCO2 (CTRL) 3 hourly (365x14x8 fields)	dCO2 Daily (365x14 fields)	mCO2 Monthly (12x14 fields)	Mean a (spatially-	o2 annual varying)	Mean glo	JCO2 annual obal	Mean globa (interp	annual l trend polated)	COO2 Constant (392.34 ppm)	

Figure L1: Revised schematic figure of the experimental design (revised Figure 1). The magCO2 indicates the common CO_2 forcing, "annually changing global CO_2 ". The additional simulations are highlighted in red for the reviewer's convenience.



Figure L2a. Figure 5a in Bonan et al. (2011) study.



Figure L2b. Annual zonal mean GPP of Catchment-CN (2002-2011)



Figure L3a. Landmask of Catchment-CN (previous)



Figure L3b. Landmask of Catchment-CN (regridded)



Figure L3c. Zonal GPP (previous Figure 2c)



Figure L3d. Zonal GPP with regridded landmask (revised Figure 2c).



Figure L4. Histograms of regional GPP (PgC/season) for DJF, MAM, JJA and SON