**Supplementary Information**

# **Asymmetrical response of summer rainfall in East Asia to CO2 forcing**

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**Supplementary Information**

Supplementary Figures 1-3

 

**Supplementary Figure 1.** Surface temperature anomalies (K) during the (a) ramp-up (2090-2139) and (b) ramp-down (2141-2190) periods during boreal summer. (c) Differences in surface temperature (shading, K) anomalies between the ramp-down and ramp-up periods. Black contours in (c) indicate the climatological surface temperature patterns obtained from the PD simulation. Black dots denote that the regions are significant at a 95% confidence level.



**Supplementary Figure 2.** Difference of composited rainfall anomalies between El Niño and La Niña years during boreal summer in a PD simulation. The El Niño (La Niña) years are selected when the SST anomaly averaged over the eastern tropical Pacific (5$°$S-5$°$N, 190$°$-250$°$E) during boreal summer is higher (less) than (-) 0.5 standard deviation. Black dots denote that the regions are significant at a 95% confidence level. The black box indicates the East Asia (28°-42°N, 105°-150°E) region.



**Supplementary Figure 3.** Time series of the SST anomalies averaged over the eastern tropical Pacific (purple, 5$°$S-5$°$N, 190$°$-250$°$E) and western North Pacific (green, 15$°$-25$°$N, 120$°$-150$°$E) during boreal summer. Grey vertical dotted line denotes the CO2 peak and stabilization start year.