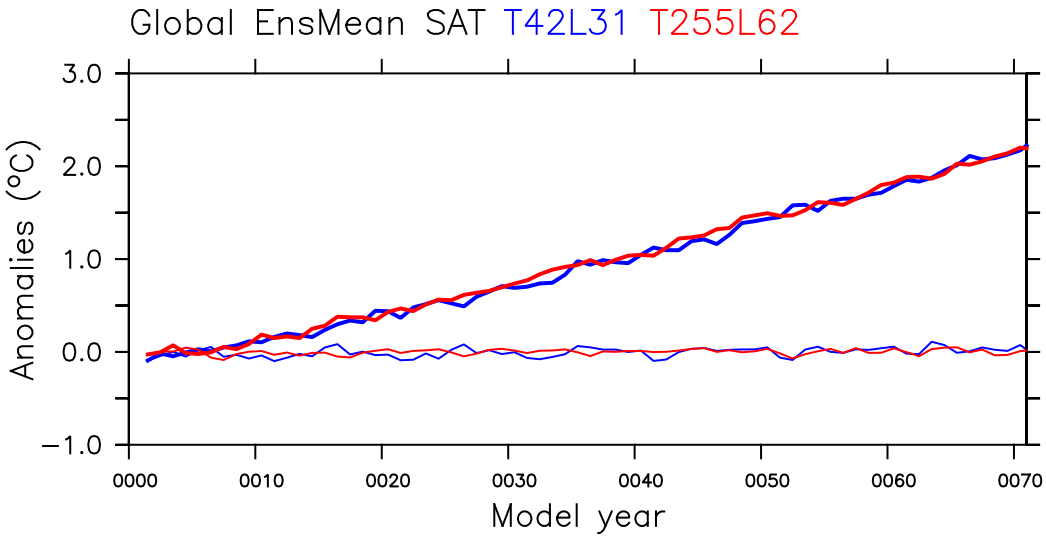
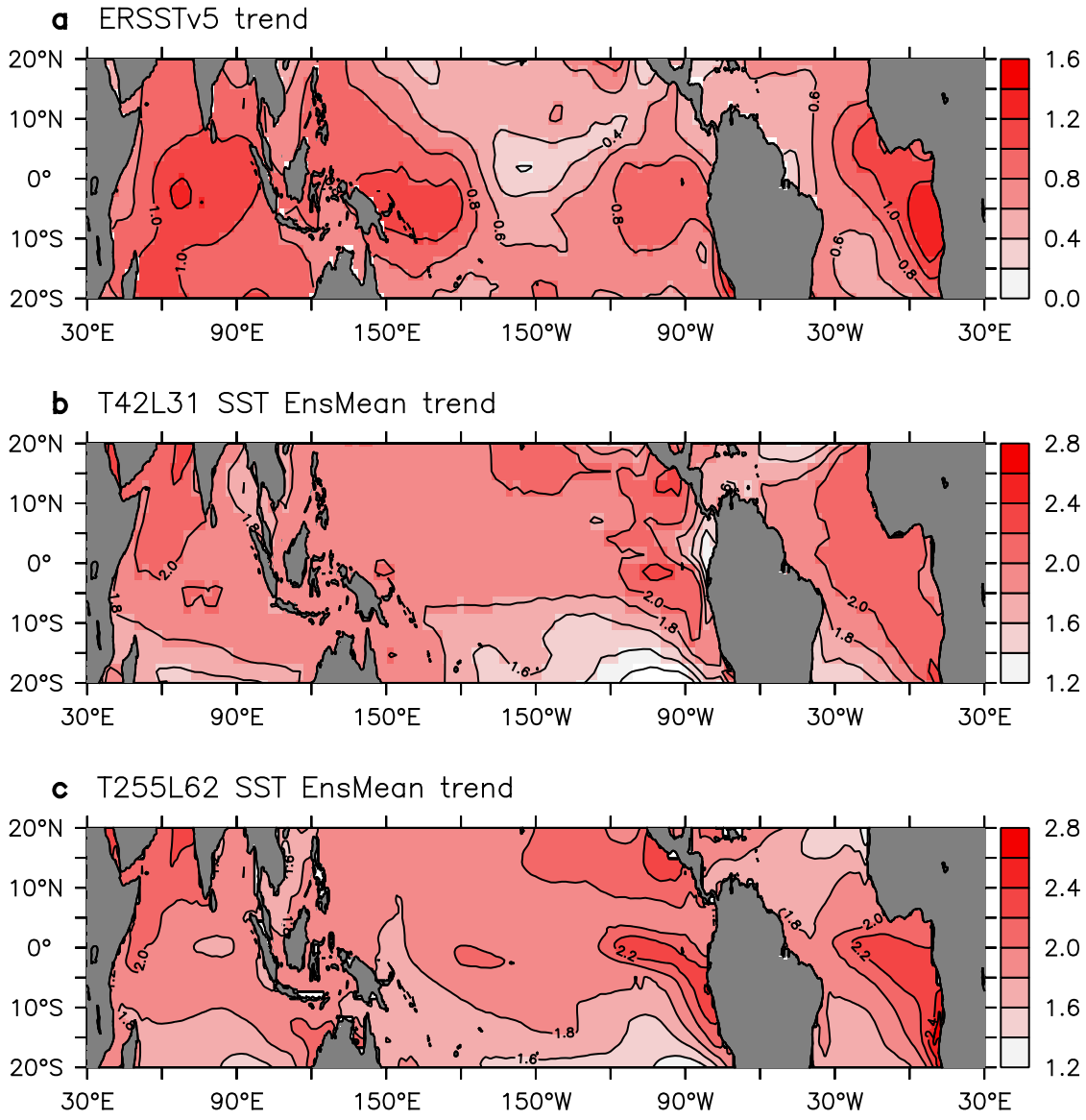
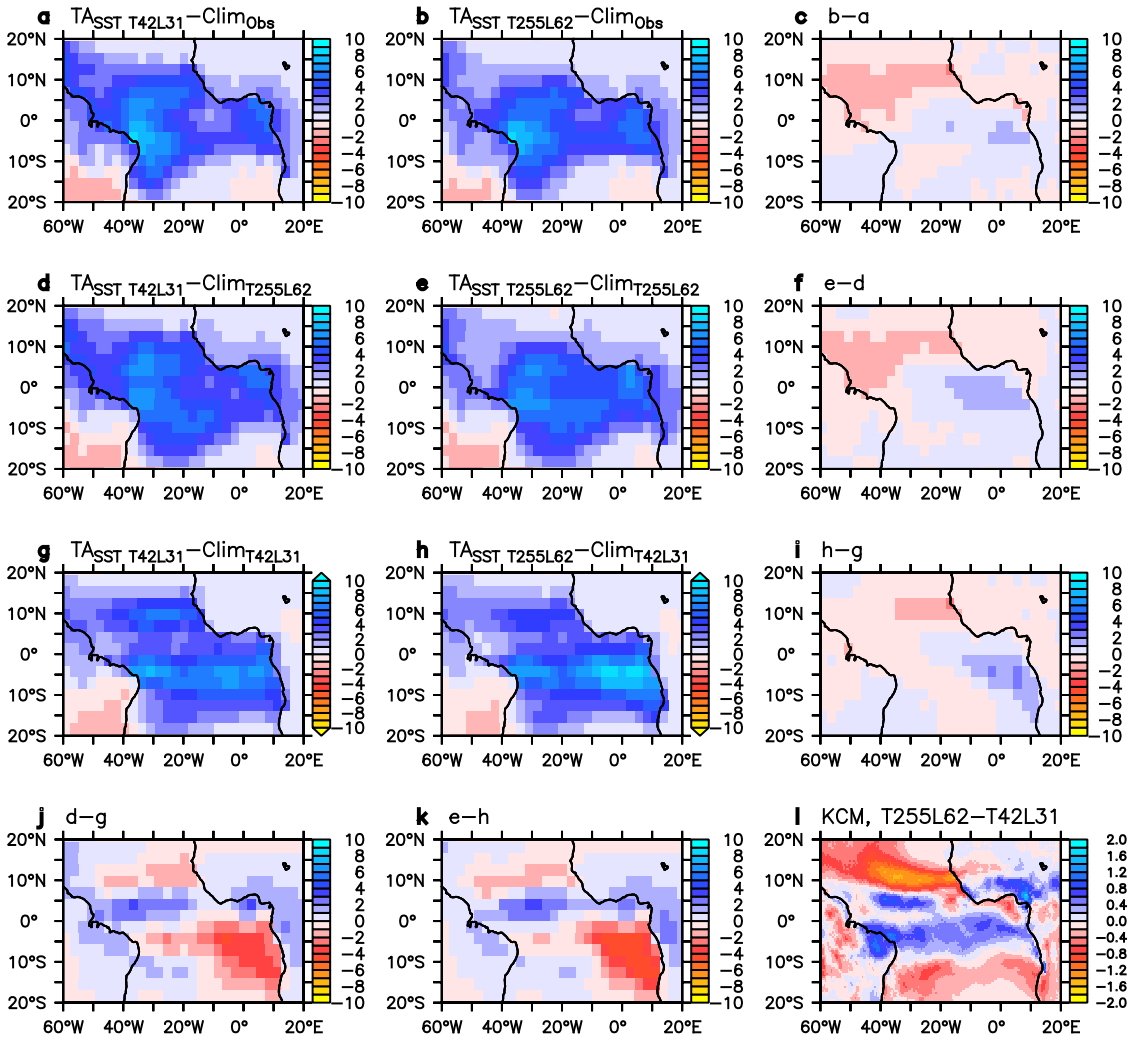
Supplementary Figures



Supplementary Figure 1. Global mean surface air temperature evolution. Ensemble-mean response of globally averaged surface air temperature (°C) to increasing atmospheric CO_2-concentration simulated with the two versions of the climate model (KCM), KCM-LR (blue) and KCM-HR (red). The atmospheric CO_2-concentration increases at a rate of 1 % per year, starting from present-day levels (348 ppm), until the CO_2-concentration doubles at year 70. Thick lines indicate the climate change simulations, the thin lines the control simulations with constant present-day atmospheric CO_2-concentration. Each global warming ensemble consists of 5 realizations starting from different oceanic and atmospheric conditions taken from the respective control run. The subsequent 70 years are used to calculate the control-run mean, to which the global warming simulations are compared.



Supplementary Figure 2. Tropical SST trend in observations and models. (a) Linear SST trends (°C per 68 yrs) during 1951-2018 from ERSSTv5 (CI=0.2°C). (b, c) Ensemble-mean trends (°C per 70 yrs) of SST, calculated over all 70 years, from the global warming simulations with KCM-LR (b) and KCM-HR (c). Annual-mean data are used.



Supplementary Figure 3. Rainfall response in low-resolution AGCM. (a-k) Same as Fig. 6a-k except that AGCM ECHAM5 with T42L31 resolution (ECHAM5-LR) is used here. (l) Rainfall trend difference (mm day^{-1} per 70 yrs) between KCM-HR (Fig. 3b) and KCM-LR (Fig. 3a). Note that the difference is calculated on the ECHAM5-HR grid in this case.