Land use emissions:

The magnitude of the residual flux is directly tied to the land use emissions. The low land use emissions case (CLM), as shown in Fig. 4B, yields a residual flux which stays much closer to zero than the high land use emissions case, but the pattern of multidecadal variability is largely unchanged

Temperature-independent model:

-no difference if only one of two land boxes responds to fertilization

-Doesn’t match decadal variability

-high vs. low land use accomplish different things in terms of matching fit (see box C of figure 4)

-compares it to the land temp anomaly record in grey bar (area interesting because land temp anomaly decreases during that period)- can see that high land use fits worse during that period

Temperature-dependent model

* Same analysis, allowing for T-dependent respiration (relaxing requirement that Q10 = 1), driven by changes in global land air temp record
* Fit epsilon and q10
* Find that allowing T-dependent respiration in large land box doesn’t affect fit
* Q10 only influences long-term flux, which is already optimized by fitting epsilon
* Avoid redundancy between q10 and epsilon in long term by only allowing T-dependence in small box (and set Q10 = 1 in large box), then fit q10 for small box
* Find that temp-dependent model does a better job than temp-independent model of reproducing atmospheric co2 record from 1920-present

Sensitivity analyses

* For ten temp-dependent cases, consistently find improvement compared to corresponding temp-independent cases
* Temp-dependent is better than temp-independent
* Allowing ocean warming reduces Q10 values
* For temp-dependent, get better fits for low land use cases than high land use – does this apply to temp-independent??

Turnover time

* Fitting decadal variability is not strongly dependent on turnover time in this range (1-20 years)
* Best fits obtained with turnover times in range of 5-10 years, but modest improvements
* Time constants longer than 5 years yields seemingly unrealistic values of q10

Alternate temperature records

* Apply these across temp-dependent model cases
* NPP-weighted temp records and global SST yield slightly worse fits across most cases, but differences are small
* Some exceptions
* Temp-dependent photosynthesis?

Issue: I can’t compare the output from the current LR model to the fitted parameters listed in the paper because the model includes extended data, so the fits will be different. I tried to get the model from LR in the state it was in at the time of publishing, but it doesn’t seem to be available

Also not using temp-dependent because we won’t have a temp record for the future (function of co2, which we’re solving for)