Response to the Reviewers Comments

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Manuscript title: A comparison of the climate and carbon cycle effects of carbon removal by Afforestation and an equivalent reduction in Fossil fuel emissions

Authors: K. U. Jayakrishnan and Govindasamy Bala

Associate Editor Comments

Comment 1

Thank you for your revised manuscript. There seems to be a misunderstanding though. In my previous report, I asked to remove all interpretation and references from the Results section. I then indicated several places, but not all. Please carefully check the text and avoid the use of references in the Results section. There are also still a few sentences that would better fit in the discussion because they provide interpretation of the results instead of merely a description.

Please do a thorough check of you text so that the manuscript can be accepted for publication after the next iteration.

Response to Comment 1

We are thankful to the editor for these important comments. We agree there was misunderstanding of the comments in the previous round. We have now addressed the comments of the editor in the latest revision as below.

We have moved all the sentences with citations from the Results section to the Discussion section. (Please see page 10, lines 291-302)

In addition, the following sentences in the Results section which interpret the data are now are moved to the discussion section.

1) In the SSP 5-8.5 and SSP3-7.0 scenarios, the carbon stored in land during 2006-2500 is larger than that of the SSP 2-4.5 scenario (Figure 3a), because of CO_2 fertilization effect at elevated atmospheric CO_2 concentrations. However, carbon stored in land after the year

2005 is more in the SSP3-7.0 scenario than the SSP5-8.5 scenario, though SSP5-8.5 has a larger atmospheric CO_2 concentration. This is due to larger warming in the SSP5-8.5 scenario, which causes a larger increase in soil respiration than the increase in net primary productivity (NPP) due to CO_2 fertilization (Figure S21). (Please see page 10-11, lines 305-310)

2) The decrease in atmospheric CO_2 because of afforestation or reduced fossil fuel emissions is almost twice in SSP3-7.0 and SSP5-8.5 compared to SSP2-4.5 due to two reasons: i) amount of carbon uptake by land is larger in the SSP3-7.0 and SSP5-8.5 scenarios because of larger CO_2-fertilization effect as discussed in Sect 3.1 ii)) larger ocean carbon uptake in the FIXED_AGR case relative to the AFFOREST and REDUCED_FF cases in the SSP2-4.5 compared to SSP3-7.0 and SSP5-8.5 scenarios (Table 2). (Please see page 11, lines 313-317)

3) The cooling effect of reduced fossil fuel emissions are comparable in SSP2-4.5 and SSP3-7.0 (Table 2) though the reduction in fossil fuel emissions (the REDUCED_FF simulations) is smaller for the SSP2-4.5 scenario compared to SSP3-7.0. This is because the effect of removal of the same amount of carbon is higher in SSP2-4.5 due to the lower background atmospheric CO_2 concentration (CO_2 radiative forcing magnitude for a fixed CO_2 change is larger for lower background CO_2 concentration). The cooling effect of reduced fossil fuel emissions is lowest in SSP5-8.5 (Table 2) because the amount of carbon removed is similar to SSP3-7.0, but SSP5-8.5 has a larger background CO_2 concentration than SSP3-7.0. (Please see page 11, lines 320-326)

Note: We have moved Figure S11 to Figure S21, and all the other figure numbers have changed accordingly.