

Interactive comment on “Climate response due to carbonaceous aerosols and aerosol-induced SST effects in NCAR community atmospheric model CAM3.5” by W.-C. Hsieh et al.

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We would like to thank comments from the reviewer. Our reply is the following.

For the comment of presenting too much result, we have removed some of plots in 9 figure panels. Only several contrast figures are kept. The text for those figures was modified correspondingly and we have also added more discussion on explanation. Originally we presented all those figures as a reference for some readers who may want to see all relevant plots.

Figure 2 had been updated thus both default and 3x carbonaceous aerosol mass for atmospheric absorption were included in the plot. We have also included the text in
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our abstract that 3x carbonaceous aerosol mass were used in our simulations.

We would like to thank the reviewer's comment of subtropical jet. We had added some more discussions on this point in the updated paper. We found it is not easy to quantify widening of tropics based on Fig. 11 thus we also plot zonal mean near surface u wind. Only a slight increase of width on JJA can be seen. For question of increase of low clouds and decrease of mid- and high-level clouds, we think adding carbonaceous aerosols in the atmosphere has the effects to change the stability, which will affect simulation of clouds in the model. We have included more discussions on this aspect in section 4.6 for the next revision.

Indeed, we think SST response shown in Figure 3 is very interesting. As we mentioned in the paper, these simulated patterns from CAM based on the slab ocean model have pointed out the role of SST plays in climate system and understanding how treatment of ocean boundary conditions impacts aerosol climatic effect assessment is very important to study climate change.

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