

## ***Interactive comment on “Multi-model analysis of terrestrial carbon cycles in Japan: reducing uncertainties in model outputs among different terrestrial biosphere models using flux observations” by K. Ichii et al.***

**Anonymous Referee #1**

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This study shows that uncertainty in simulated carbon budgets can be significantly reduced when the models are calibrated with flux observations in East Asia. I think that this study is helpful to identify current status and improvement strategy of the model for simulation of carbon budget in East Asia. Some explanation and description are missing in the text, which gives some confusion in understanding paper. Therefore, I suggest authors to revise manuscript according to following comments.

1. Clarify the method which has been used for parameter calibration at each site? That is, what is cost function for parameter calibration.

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2. Authors mentioned that Appendix A described the model initialization or spin-up processes. But Appendix A does not have any description about the model initialization or spin-up processes. Add description about the model initialization or spin-up processes.

3. On page 9, following sentence is obscure in meaning. “For point analysis, we used either observed data from each flux site or long-term climate analysis data (1948–2006) from NCEP/NCAR.” Does that mean that some site used observed data and other sites used reanalysis data? Or reanalysis data were used for gap-filling of observed data? Or Reanalysis data were used for spin up run? Clarify the sentence.

4. Explain why you used NCEP/NCAR reanalysis data for point analysis instead of climate dataset at a 4-km spatial resolution which has been used for spatial analysis.

5. Ecosystem respiration rate depends on carbon pool amounts. Do the used ecosystem models simulate carbon pool amount reasonably at each site? Mention about that in the text.

6. Large improvement of improved model is shown at FJY site. Table 1 indicates that dominant species at FJY site are pine and oak. But in model set up for FJY site, needle leaf forest has been used. Large improvement may be partly due that the site is misrepresented as evergreen needle leaf instead of mixed forest in model set up. Suggest possible reasons for large improvement of improved model at FJY site.

7. Fig. 1 shows that most land cover is mixed forest. But in this study, parameter calibration was made for ENF, DBF and DNF. For spatial simulation, how did you consider mixed forest? Describe it.

8. Vegetation type of both TKY and TSE sites are DBF. How did you calibrate parameters at these sites, separately or together? If you have done calibration at each site separately, are the calibrated parameters from two sites similar each other and how did you make calibrated parameters for DBF for spatial simulation? Describe it.

9. Some models used satellite-based LAI while others predicted LAI. LAI is very impor-

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tant variable for GPP calculation. Difference of GPP among models can be partly due to the difference of LAI among models. Did you compare LAI distribution of models? Mention comparison results in the text.

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