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Interactive comment on “Quantification of terrestrial ecosystem carbon dynamics in the conterminous United States combining a process-based biogeochemical model and MODIS and AmeriFlux data” by M. Chen et al.

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Anonymous Referee #2 Received and published: 26 July 2011 General comments
The authors conducted a comprehensive modeling study to quantify carbon dynamics of conterminous United States by coupling a process based biogeochemical model (TEM) and remote sensing (MODIS-EVI and LSWI) data. They used Ameriflux data to parameterize and evaluate the process model. The modified model (SAT-TEM) shows an improvement in estimates of net ecosystem exchange and gross primary productivity as compared to the previous model (TEM). Overall, the manuscript is well struc-

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tured, and presents thorough background information. Methods are explained well and results are concise and well discussed.

Specific comments Abstract: The authors did not talk about compassion of TEM and SAT-TEM. They mentioned, “new version of TEM generally captured the expected temporal and spatial patterns of regional carbon dynamics”, but did not state if this is an improvement over the previous model. What does “generally” mean in comparison to the previous model?

We added statement of “improvement” in the abstract from Lines 31-32 in the revised manuscript. SAT-TEM’s estimates of carbon fluxes are more consistent with satellite observations of vegetation conditions and carbon estimates in comparison with TEM estimates. We thus conclude the SAT-TEM improves on TEM.

Methods: P2732-L18 and P2741-L8,9-numbers should be written as subscript in “C3 and C4”.

We corrected the mistake following the comment in the revised manuscript.

What was the time-step for model-yearly, monthly, daily, or half hourly?

The model is monthly. We expressed this more explicitly in the revised manuscript in Line 132.

The authors utilized only one site per ecosystem type (total 6 sites) for parameterization. It would be helpful to know why they only picked one site per ecosystem type. Why they didn’t use multiple sites within one ecosystem type for estimating parameters and addressing site-specific variability?

It will be good to use more sites to conduct model parameterization. We strived to use the best information and quality flux and satellite indexes data for each ecosystem type for model parameterization. Thus, “the best” site for each ecosystem type was used in this study. Given that the manuscript is already lengthy, in a future study, we could do a comparison and uncertainty study to examine how different parameterizations at

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different sites and ecosystems affect the regional quantification.

Technical corrections Equation 4: CA should be $f(\text{CA}, \text{GV})$

We have corrected the mistake in the revised manuscript.

Figure 4: Y-axis should be “Simulated or Predicted GPP” not “Similated GPP”. Regression lines are missing for TEM (solid blue line).

We corrected the spelling error. There was a mistake in the caption of Figure 4: the regression lines are not solid but are dashed red and blue lines. We corrected this in the revised caption.

Figure 6a: Use same color scheme as in 6b-c.

We revised the legend of Figure 6a following the comment.

Figure 7: It will be helpful if relative standard deviation is defined in the figure description.

We added the definition of the relative standard deviation in Figure 7 caption in the revised manuscript.

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/8/C2397/2011/bgd-8-C2397-2011-supplement.pdf>

Interactive comment on Biogeosciences Discuss., 8, 2721, 2011.

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