Biogeosciences
Discussions

Interactive comment on "Modeling photosynthesis of discontinuous plant canopies by linking Geometric Optical Radiative Transfer model with biochemical processes" *by* Q. Xin et al.

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General comments: This ms provided a useful study to model GPP of discontinuous plant canopies using GORT model. The analytical solutions are good and quite informative. The most interesting thing I think is that authors tries to separate the canopy into sunlit and shaded parts and integrated into GORT models. This is evidently an advance to current research and would be quite useful for future GPP modeling. I think the ms needs some moderate revision before final publication.

1. It is not clear that why authors selected two deciduous sites. The reason I have is that GPP of deciduous sites are much "easier" to simulate than evergreen forests. Also,

the GORT for evergreen sites might be quite different from deciduous ones. Second, even for these two sites, there are more data available in the flux database. Why only part of them was used? For example, for Harvard site, the data could be from 1994-2010. If the analytical solutions are the same, then I would guess the validation should be easy to implement.

2. The GORT model is suggested to be more accurate than empirical models in GPP simulation. Also, separating the whole canopy into sunlit and shaded parts is to improve the underestimation of GPP at upper ends. In figure 11, we still see clearly that the underestimation is not solved. I think authors may give some discussion on this issue.

3. Figure 10 showing the daily GPP simulation, and I like to see how it works at hourly time scale as shown for Harvard site.

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