Biogeosciences Discuss., 12, C9588–C9589, 2016
www.biogeosciences-discuss.net/12/C9588/2016/

Biogeosciences Discussions
Open Access
EGU

Interactive comment on "Amazon forest structure generates diurnal and seasonal variability in light utilization" *by* D. C. Morton et al.

Anonymous Referee #2

Received and published: 5 February 2016

The manuscript by Morton et al parameterizes the 3D DART model to evaluate diurnal and seasonal changes in APAR for a tropical site. They find that DART is able to reproduce changes in APAR at diurnal and seasonal scales throughout the forest canopy and that these temporal and vertical dynamics are not reproduced with simple big leaf and Beer's Law approximations. In addition to making a useful contribution to further understanding the attenuation of radiation in tropical canopies over varying timescales, the authors provide useful estimates of likely APAR values that could serve as a constrain for ecosystem models.

Main comment reflects the use of ED. When the authors make the sensitivity test of 1, 25, and 2500 patches, what exactly is varying in ED? My understanding would be that this test is modifying the age-structure component of ED, and so each patch would

have a different age, introducing more heterogeneity in the spatial distribution of vertical light gradients. Please specify.

Also, its not entirely accurate to say that with 1 patch, ED is using a 'big-leaf' approximation. The representation of the forest canopy would be the same in ED for 1 patch, 25, or 2500 patches. The sensitivity test carried out here is introducing heterogeneity in the vertical gradient. Please clarify in the description and analysis.

For the 1 m3 voxel size, is this a standard size to use in DART? It seems this is a critical assumption, should some sensitivity test be carried out?

In Figure 3, it would be helpful to add the dry season shading to see which phase of the seasonal cycle corresponds to wet/dry cycles.

Interactive comment on Biogeosciences Discuss., 12, 19043, 2015.