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Interactive comment on "One-dimensional models of radiation transfer in heterogeneous canopies: A review, re-evaluation, and improved model" *by* Brian N. Bailey et al.

Anonymous Referee #1

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General comments

This work provides a review and comparison of radiation interception models applied to heterogeneous canopies. The authors compare results from models of varying complexity to data simulated using 3D leaf-resolving model. Though limited to having no scattering, and no diffuse radiation, through the comparison, the authors provide better understand of the effects of model assumptions and inputs. A generalized model is also proposed and shown to perform well compared to other models considered.

Specific comments

This work mainly focuses on between crown heterogeneity. Cases simulated mainly

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explores densely clumped vegetation with open canopies. Cases 1 and 2 especially focuses on isolating the effects of crown scale clumping. However, heterogeneity with in the crown warrants more discussion. While case 5 using realistic canopy structure includes sub-crown scale clumping, its effects seems overshadowed by the significant crown scale clumping. For example, how will the models behave for a not very dense forest (LAI<2.5) but with mostly closed canopy?

The Leaf angle distribution function (G) is also an important canopy structural characteristic. All cases presented (except 6 perhaps?) use G=0.5. How will other G functions affect results?

Technical corrections

Line 76: should be I(r;s') to be consistent

At Line 94, ah=L. While L is listed in Table 1, please include the physical representation of L (LAI) here for clarification.

Figure 8 caption: Error in legend label for Ni10_P. Document shows 'Ni10_P ((eLine),'.

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