Geoscientific
Model Development
Discussions

Interactive comment on "The biophysics, ecology, and biogeochemistry of functionally diverse, vertically- and horizontally-heterogeneous ecosystems: the Ecosystem Demography Model, version 2.2 – Part 1: Model description" by Marcos Longo et al.

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The model description did not leave out any details, which is a very good thing and it is not very common for many of the existing model description papers. The downside of that is of course that the manuscript is rather long, too long in my opinon. One thing I miss from the very thorough walkthrough of vegetation models in the introduction are references to the DGVMs that are closer to ED such as LPJ-GUESS (for disclosure, I

am an LPJ-GUESS developer).

The text is easy to read, and the refernces to equations, sections and tables are good. One comment regarding the referencing to equations is that it should be concistent, for example on line 14, page 7. In my opinon it should read: Eq. 2-3 cannot ... . Another comment I have regarding the equations (or symbols) is the sometimes odd choice of symbols. Like Eq. 36-38, why choose the same symbol for a variable that you are using as an operator?, that is very confusing. The same goes for the use of exp instead of e, and on the note of the letter e, you are using it as pool (e_j) and as a scaling factor (e_Hot), I'd say that it is better to use the letter e as the mathematical constant it is, and then use some other symbol to denote your pools. And for your factors, use q or f. On the same topic of mathematical operators as variables, in Eq. 76, maybe something went wrong, there is a definition character instead of an equal sign. And again, why use operators as super scripts, just adds confusion. And likewise, in Eq. 56, is that an equal sign as a superscript or do you have an assignment within the equation? Or is it a pre-request? Either way, that equation is confusing.

With such an explicit formulation of the exchange of heat and water I find it rather strange that the incoming water does not have an explicit energy level specified. If 15 deg. C water lands on a surface that is 25 deg. C, there would be a cooling taking place. Maybe this is of minor importance in the Amazon, but in colder places this would matter. Or did I totally misread what is written in the beginning of Sect. 4.2, if so, I suggest you clarify this.

In the first paragraph of the discussion you are writing that you have demonstrated a functional diverse canopy, from the supplements I get that you have three PFTs along one functional trait axis.

Results are not really discussed nor shown, but one result that there is much focus on is the closed energy budget. Is it really closed if there is a 0.01 deviation? Is there not a great risk of error propagation if the bar is set that low? In LPJ-GUESS we are

concerned if the mass balance is off by 10^{-12}.

Some specific comments in addition to those spotted by Ian Baker: Line 3, page 41: remove the 'a'. Line 3, page 21: intercepted instead of intercept. Line 1, page 33: What is a decay rate due to respiration? Do you mean turnover? Page 34: GYF is not defined, comes later.

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