

Interactive comment on “LPJmL4 – a dynamic global vegetation model with managed land: Part I – Model description” by Sibyll Schaphoff et al.

Anonymous Referee #2

Received and published: 17 October 2017

The submitted manuscript provides a very comprehensive description of the Dynamic Global Vegetation Model (DGVM) LPJmL covering both, natural and agricultural vegetation. Besides recent development, the manuscript also provides an historic overview of the models core components since its origins, worth reading for scientists working with other LPJ derived models, too. Although all individual processes described here can be looked up in the respective papers, this manuscript provides an overview, combining all of these processes. Since the model source code will be made publicly available, this manuscript will be the reference for that code. After clarifying my comments below, I recommend the paper for publication.

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1. To my knowledge “Figure” should be abbreviated.
2. Abstract: Instead of mentioning the number of publications, I would prefer having a strong statement over what a broad range of research fields LPJmL was applied to, so far, summarizing the Discussion section in one or two sentences.
3. Line 134, 138 (Eq. 3, 5): In Prentice et al. (1993) the variables λ and γ were taken from tables, where do the equations now come from? Are they common knowledge, not needing a reference anymore?
4. Line 182 (Eq. 17):
 - Maybe rename F_{bare} to FPC_{bare} , otherwise it is confusing with F_{snow} . I guess FPC_{bare} should be:

$$FPC_{bare} = 1 - \sum_{PFT=1}^{n_{PFT}} FPC_{PFT} \quad (1)$$

since it is not mentioned explicitly.

- Isn't the index “PFT” missing for FPC ? I would prefer having the FPC_{bare} part in front of the sum, otherwise one could think it is part of the sum:

$$\beta = FPC_{bare} \cdot (\dots) + \sum_{PFT=1}^{n_{PFT}} \beta_{PFT} \cdot FPC_{PFT} \quad (2)$$

5. Line 194: Reorder the sentences, so that soil layer is explained before its first usage and/or refer to Fig. 1:

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[...] in LPJ (Beer et al., 2007). The soil column is divided into five hydrological active layers of 0.2 0.3, 0.5, 1 and 1 m depth (Δz) (see section 2.6.1). Soil temperatures (T_{soil}) for each layer are [...]

I guess the thermal and hydrological layers are identical, without the later mentioned thermal buffer.

6. line 202: Is it also possible to use another soil texture database, since in my experience HWSD is not as “harmonized” as the name implies?
7. Line 423ff: Is the index “*ind*” in these equations identical to “PFT” as in all previous equations, since LPJmL is a “big leaf” model and not a gap model? If so, please use the same indices throughout the manuscript. And in Eq. 52/53 isn't the index “PFT” missing for SLA?
8. Line 456: Where is the “mean PFT longevity”, I only see the growth efficiency mortality here.
9. Line 182ff, 423ff, 746, 823, 1090: Be consistent in how you name your indices in the equations if they have the identical meaning, please.

Technical and minor comments

- line 40: change “interferencces” to “interferences”
- Line 207/208 and 215: Replace the the second and third author by “et al.”
- Line 292/293 (Eq. 34): Display as fraction without “/” for better readability and to avoid the linebreak in the equation.
- Line 1228: Why is the ordering “b, a” in Zscheischler et al., 2014?
- Line 1234: Remove the second “)”.

Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2017-145>, 2017.

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