

Review: “Simulating the drought response of European tree species with the dynamic vegetation model LPJ-GUESS (v4.1, 97c552c5)”

In this manuscript, the authors introduce, describe, and assess a new representation of plant drought response in the LPJ-GUESS DGVM. Specifically, the new work focuses on plant hydraulic architecture. The authors do not go so far as to mechanistically model xylem cavitation etc., but the empirical effects introduced here—designed in part to represent plant hydraulic *strategies*—are a good first step.

The manuscript has already received two peer reviews, and as the editor suggested, I focused mainly on the authors’ responses to the previous reviewers. The authors have mostly addressed the requests from the first reviews and/or clarified why reviewers’ suggestions were unnecessary in ways I agree with. I do have some follow-up points and new suggestions, however.

- L128: Authors’ suggested revision in response to Reviewer 2’s Comment 19 did not make it into the updated manuscript.
- L172 (Reviewer 2’s Comment 26): “VDP” typo.
- L189 (Reviewer 2’s Comment 27): Equations should be given, probably in the Appendix, for *A* and *B*. This is much more appropriate in a *GMD* paper than referring interested readers somewhere else.
- L230-248 (Sect. 2.2.3): The authors did not add an equation here explaining “how the canopy conductance for plant hydraulic processes determines whether trees in LPJ-GUESS-HYD experience water limitation” as they said they would in their reply to Reviewer 2’s Comment 2.
- Table 1 caption (L 274): “models” should be “model’s.”
- L 304-312 (Reviewer 2 comments 6, 8, and 34): I suggest adding a sentence here explicitly assuring readers that the Sobol’ analysis accounts for potential collinearity.
- Fig. 5 (L 399):
 - “Monthly” isn’t really a standard unit, since the number of days in a month can vary. It would be best (and consistent with Sect. 3.2) to use daily values instead (i.e., daily average over each month). It’s fine for each point to still correspond to a calendar month.
 - Add model name to subplot titles.
- L 410-418 (Reviewer 2 Comment 33): I don’t see why it should be unsurprising for “downstream” variables to be sensitive to fewer variables than “upstream” variables. I can understand why downstream variables would be *less* sensitive to each parameter, but that’s not what you’re saying here. And my understanding is that the Sensitivity Index between e.g. Fig. 4 A and B can’t be compared, so my hypothesis can’t be tested—is that right?

- L 458-467: Discussion of Fig. A2 should clarify that it's not just *any* alternate parameterization, but rather probably a *better* one (as discussed at L 325-330).
- L 542-548 (Reviewer 2 Comment 42): Please state explicitly that no mechanistic or empirical representation of this process is present in LPJ-GUESS or LPJ-GUESS-HYD.

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