Fader and co-authors improved the representation of Mediterranean crops or agricultural trees in a land surface model LPJmL. This makes the model better capable of simulating the crop activity, water cycle and other important environmental variables (such as soil organic carbon) for the Mediterranean region which has important environmental and economic linkages with the rest of the world. Generally I found that the paper is fairly easy to follow and the authors have done a good job in putting the current work in the context of existing crop/agronomic/biogeochemical models. I am convinced that this development is necessary as there is a lack of large-scale vegetation model that is able to simulate both natural vegetation and perennial crops in good detail for the Mediterranean region.

The authors went further to construct a new data set that's needed for their simulation and validated the model simulation in three respects: agricultural yield, irrigation requirement and soil organic carbon. The results section often includes not only the results by the authors themselves but also the comparison with other studies thus seems a little like being mixed with some discussion,but I feel this is a necessary way to organize the material and it facilitates the understanding by readers so quite reasonable. The paper represents a fair amount of work. Considering all these points, despite the fact the so-called development in this paper is essentially re-parameterization of existing agricultural trees in the LPJmL model, which differed from the traditional “development” that involves a large amount of coding work and inclusion of new processes, I suggest acceptance of this paper for publishing after the authors address the following (minor) comments.

One general comment on the language: The paper is generally easy to follow, however the language could still be improved. The authors could consider further careful polishing the language by themselves, or inviting a native speaker to improve the overall language quality (I believe the latter is better). For example, on page 5001, Lines 7-8: “Some models are very advanced in other processes, like it is the case of STICS for biochemical cycles”. I doubt the “other processes” should be “some processes”, because there are no processes being discussed before this sentence (When we say other, there must be something to be compared with). “like it is the case of ...” could be abbreviated to “like the case of ...” or “such as the case of ...”. There are other places that the texts could be understood and they don't read fluently.

Some other technical comments:
p4998-L19: pave → paves
p4999-L2: commonly → often
p4999-L3: strengthen → strengthened
p4999-L5: as well → as well as
p4999-L9: “is having already at present ...”, complex expression hard to understand, please rephrase.
p4999-L15: like → such as
p5000-L6: apples → apple
p5001-L4: revision → review?
p5005-L4: proportional → proportionally?
p5006-L11: Please define this “mean absolute percent error”.
p5011-L25: Again, please define “Willmott coefficient” and justify why the authors chose it.
p5015-L3: What's the source of this “independent data” and why we should trust it?
P5015-L17: Summarizing → To summarize
p5015-L24: “in a unit of area with natural and agricultural vegetation”, this is difficult to understand, do you mean “in an area mixed with natural and agricultural vegetations”?
p5016-L21: besides France → except France

p5018-L6: establishing → by establishing
p5019-L10: in this moment → at this moment
p5019-L28: will not be → are not?

P5003: Methods, the 2nd and 3rd paragraph. Maybe add one more paragraph to give more details on how the simulation is done. Did you do a spin-up run then followed by a full transient run? And also, after reconstructing the land use data by merging MMR with HYDE in 2.1, did you apply the land use change when doing the simulation?

P5019, section 4.2, first paragraph: many of the applications listed here could be achieved by other land surface models, though they cannot be done by agronomic models as pointed out by the authors. Also perhaps only the these applications are limited to Mediterranean regions, LPJmL has the advantage thanks to the developments presented in this paper. Please point out these two points, otherwise the claim “The inclusion of perennial crops in LPJmL presented in the current study opens up the possibility for a number of large-scale applications and research studies ...” is not completely correct.

Figure 1: I guess the unit “FM” for the yield means “fresh matter”, but please explain this explicitly.

Figure 3, Figure S3: Although the colorbars currently used have similar colors for small values around zero that facilitate the interpretation of the figure. However one cannot easily distinguish positive versus negative values. Please think to change to some contrasting colorbars that have different colors for positive and negative values (now they're both bluish or greenish).