Review of paper: "Modelling Mediterranean agro-ecosystems by including agricultural trees in the LPJmL model" by Fader et al.

This is an especially well written paper, presented in a very thoughtful way, and should be published with little change. It carefully combines together model projections, tests them against comprehensive data, and illustrates the implications geographically. The reference list is long and well-considered, and in that context, serves to bring papers to the debate of environmental change that might otherwise be missed.

Thank you very much for your comments and suggestions. We will address them point by point below.

Much of the Methods is devoted to determining accurate known patterns of land use for the contemporary period. In a changing climate, these areas can be expected to change geographically. Maybe the authors could add a couple more sentences in Discussion, as to how an interactive assessment of future land-use can be calculated (rather than relying on its prescription).

It is a good idea and will be done in the revised manuscript.

An especially interesting feature of this paper is that it introduces so many other aspects of environmental consideration, besides the climate change angle. This includes matters of biodiversity, pest-control and irrigation. Would the authors be willing to write a little more in the Discussion section as to how knowledge of some of these factors could aid stabilisation of food provision in a changing climate? In other words, better knowledge of crop response to other drivers – as this paper presents – might aid adaptation planning.

Yes, it is a good point and will be included in the revised manuscript.

Where there remains large uncertainties in parameter settings, it might be appropriate to re-iterate these in the Discussion. So for example, lines 24, 25, p5007, where the time-before-harvest is difficult to predict due to issues of fertilisation and available water use. And for other similar examples through the paper, as this will enable the Discussion to highlight what is next required to improve models further.

Yes, it will be added.

This paper may have relevance regarding refugee movements, which clearly is an issue at the moment, with many attempting to leave the Southern shores of the Mediterranean. Although the current movement of people is mainly due to other reasons, it is not inconceivable that future levels of climate change could trigger similar events, should it aggravate food scarcity issues. In that context, this paper has particular importance by creating a model capable of projecting different crop yields. So a sentence, in general terms, about better predictive modelling of food security aids global planning for potential matters of migration (i.e. its possible prevention, if due to well considered avoidance of poor food levels) may make this paper also highly relevant in socio-economic discussions?

Yes, that would help to complete the context of the paper, so it will be added.

A line in the Conclusions about feasibility of routinely seeing LPJmL, and with these new agricultural crops, either directly at the bottom of a GCM or forced with CMIP5 diagnostics, would be helpful. Is interactive prescription of land use possible, and maybe the next step in LPJmL development? (i.e. where climate is projected to change, new/lost areas for the crops of this paper can be determined). I realise the paper is predominantly about the contemporary period, but much of it has multiple direct implications for impacts of different scenarios (e.g. RCP85 vs RCP60: : :.)

Thanks for this comment. As you already noticed, land use and climate change applications are the two next steps of this research chain. Thus, a line about these perspectives will be added. Meanwhile a follow-up paper on climate change is under discussion here: http://www.hydrol-earth-syst-sci-discuss.net/12/8459/2015/hessd-12-8459-2015.pdf

Minor points: There are a few very small typos in places, so another read of the manuscript before publication (or by the editors) would be beneficial. Just very small things e.g. "paves" not "pave" line 19, p4998.
Some of the paragraphs are very long, and might just be easier for the reader if they are split up a bit e.g. paragraph starting "In this context the need to perform Mediterranean-wider assessments...".

Good points, we will consider this in the revision and will give the revised manuscript to a native speaker for correction.

The use references is impressive, but is there a single reference that lists the majority of the Equations? Hence as a temporary measure until the documentation (as mentioned in Section 5) is available?

Unfortunately, there is no single publication that lists all the features, modules and function of the model at this moment. This is why we decided to include a bit of the development history in the introduction (P5001 L23) to allow the reader to know the publications related to every part of the model. At present we are working not only on the model documentation but also on a new LPJmL-paper that should include all developments until present.

Line 28, p5002. Maybe to help the reader, state what "a new input dataset" contains, i.e. what is need to drive the model. Obviously meteorological conditions, but what else. This is important should anyone be considering potential application of this model in an Earth System Model. [OK, can see this is given beginning of Section "Methods"]

We will clarify there that the methods also include details on the model inputs.

Section 2.3. Give units for all quantities (or if dimensionless, then say that or show units as [.]). I assume it is standard for this area of science to give variable names as acronyms e.g. WHC. As opposed to a Greek character in equations, with "WHC" as a subscript for instance?

Thanks, we will add the units. And yes, it is standard for this area to use acronyms.

Some of the outliers in Fig 1 are explained in the main text (p5012). Is there anything from this that might also be appropriate in Discussion i.e. what is needed to get predictions for contemporary periods even more accurate, especially where the model currently fails?

Good, idea, we will add a couple of sentences about this.

Fig 1, is there some way of showing which countries the circles refer to.
We do show the country names for the outliers. We tried to put them in every bubble but the overlap avoids understanding almost all names and decreases the overview of the positions of the bubbles. So we prefer to keep it like it is, i.e. country names only for outliers.

Also, is the size of yields relative to the radius, or the area of the "bubbles"?
We are not sure about the meaning of this question. As indicated in the caption of the figure "The bubbles indicate the relative size of the harvested area in the respective country." As for the yields, they are expressed in tons per hectare, as indicated in the title of the axes. We will add the info from the caption in the main text.

Only if the authors have time, but is it possible to tidy up the maps so they are on a similar projection? For instance, Figure 6, looks "squashed" in the latitude direction. Fig 3 looks on a slightly different projection to Fig 5.

We will try to improve this (actually the projection in the plotting program is the same, the inclusion or exclusion of broader and thinner legends and the cutting of the edges might have squeezed some figures).