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Interactive comment on "Simulation of tree ring-widths with a model for primary production, carbon allocation and growth" *by* G. Li et al.

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The model explained and tested in this paper is very interesting. Nevertheless it is presented as not needing tuning while MAIDEN or MAIDENiso (Misson, 2004, Danis et al, 2012) needs. It is written that "T model parameter values were derived from measurements made at sampling site and from the literature (Table 1)". It is exactly what we did with MAIDEN for which parameters are based on literature values, when available, and calibration of the remaining ones is done eddy covariance stations fine measurements and tree-ring series. Finally tuning is mentioned as necessary in the discussion: "But, given the difficulty of measuring sapwood respiration and also the comparative lack of data on fine-root turnover rates, it is likely that some form of tuning will be required in order to specify these parameters". It is what we did with MAIDEN

which is tuned on daily respiration, soil moisture and throughfall data (Misson 2004).

Concerning the simulated CO2 effect on tree-growth, Fig. 6 shows interesting results in complete coherency with Boucher et al (published a few month ago in the same journal http://www.biogeosciences.net/11/3245/2014/bg-11-3245-2014.pdf). Fig. 9 of Boucher et al shows that the positive temperature trend, as reconstructed from tree-ring data, is explainable by CO2 concentration increases (black curve), but if we constrain the CO2 values to remain at the pre-industrial level (red curve), it is necessary to decrease temperature (and then evapotranspiration) to fit the tree-ring series. This shows the importance to use true CO2 values and a mechanistic model to avoid underestimation of temperature. The presentation of confidence intervals shows that red curve is significantly lower than black curve after 1980 (it is constantly below the lower confidence interval after that date). In this Fig. 6, we see an effect of 0.343 mm/yr for 80 ppmv CO2, which is lower than the effect of climate variability and ageing. It is true, but it is not negligible. Confidence intervals should be presented. Besides, one of the main interest of this paper is certainly to show the effect of age on the tree-growth in interaction with climate and CO2 factors.

Another point to mention: it is true that this model integrates previous calendar year in the growing season. In MAIDEN, it is also the case with the possibility for the tree to make reserve from the end of the previous year to the beginning of winter. This permits also to increase correlation with tree-growth series, which are very often autocorrelated.

I fully agree with "The availability of a robust model to investigate tree growth could help to provide better reconstructions of past climate changes as well as more plausible projections of the response of tree growth to continuing climate change in the future." and I advise the authors to look at the Boucher et al paper above mentioned.

In conclusion, the paper is an important step towards the use of mechanistic models in dendrochronology, but it suffers to insufficiently acknowledge the progresses made

during the last 10 years.

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