

Clim. Past Discuss., referee comment RC1
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Comment on cp-2022-13

Anonymous Referee #1

Referee comment on "Ring-width and blue-light chronologies of *Podocarpus lawrencei* from southeastern mainland Australia reveal a regional climate signal" by Jacinda A. O'Connor et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2022-13-RC1>, 2022

This is an exploratory study on the dendrochronological potential of the tree species *Podocarpus lawrencei* in Australia mainlands. Due to its exploratory nature, I consider that this study address relevant scientific questions within the scope of a more specific journal such as Dendrochonologia or Tree-ring Research but not for Climate of the Past.

There are previous studies with this species that demonstrate the possibility of developing ring width chronologies and the relationship between growth and climate. However, the novelty of this study comes from the use of the blue intensity technique, that can provide different information associated with tree growth and climate. Also, the study is novel for being developed in an area without dendrochronological and paleoclimatic information, such as the Australian mainland region. This study shows that this species has the potential to extend the dendrochronological records for more than 300 years.

My main concern about this study relates to the low number of individuals used to develop the ring width and blue intensity chronologies. Throughout the manuscript the authors highlight this deficiency and adequately justify it through the high value of the EPS statistic during the period of the chronology with the largest number of samples and with a good relationship to another well-replicated chronology of the same species located relatively close to that of the present study.

The sample size of nine trees could be adequate for an explorative purpose but not robust to reach relevant conclusions to deserve publication in CP, as my personal point of view.

The methods related to the cross-dating process, the climatic characterization of the region and the criteria used in the BI technique are missing or not clearly outlined.

The discussion on the results of the correlations between growth, BI and climatic variables needs further development, especially in the explanation of the contrasting growth response between consecutive years. An integrated discussion of the climatic influence on growth and BI values is also lacking. Basic information on what is meant by high or low BI values is not expressly described in the text.

Some of the figures need improvement (see specific comments).

The title is adequate, the abstract and introduction are well structured. The description of some of the methods and results should be improved. The Discussion needs better development. The references used are correct and up to date.

Specific comments

L 122-124. Please, explain the reason you don't follow this previous experience and takes less time in the extraction process.

L 129-130. I understand that delta BI is used to correct the differences between heartwood and sapwood but not to correct stains. Please, specify what was the reason for calculating delta BI in this study. To correct color differences between heartwood and sapwood or to correct stains?

Moreover, this sentence interrupts the continuity of the writing about the acetone

treatment. Please, check it.

L 133-134 Two treatments were applied? 1- 120 h acetone and 2- 168 h acetone? If what you wanted to evaluate is treatment efficacy, why not also evaluate the option acetone x 48 h and 72 h following the methodology applied by Rydval et al. (2014) and Frith, (2009)?

It seems appropriate to mention briefly in this methods section, what was the optimal time you detected in this experimentation. Necessary information to continue with the treatment of the remaining 6 samples.

L 148. I assume that prior to developing the ring width and BI chronology, the series were crossdated. This is not explained in the manuscript so it is necessary to describe the crossdate process and report the statistics such as the mean series intercorrelation and mean sensitivity.

L 148. Please explain some where in method section the criteria used in the BI series. Which BI measurement is being considered? reflectance or absorbance?

L 160-161. I suggest to plot the standard chronology also with its statistics (EPS, RBar, Mean sensitivity). Perhaps it can be included as supplementary material.

L 162. I suggest to report also the RBar statistic to complement the EPS.

L 173-174. Please, clarify if the correlation values represent a particular monthly time series, a season or if it is the annual average of max and min monthly temperature. Also, indicate the common period between both weather stations.

L 176-177. Please explain how the chronology sensitivity to rainfall was evaluated. Which rainfall data were used? Did you consider months corresponding to previous years? how many?

L 191. One of the advantages that dendrochronology has over other climatic proxies is the high replicability. In this case the number of trees sampled is nine (13 individual series), which seems to me to be very poor for a representative chronology of the population growth. With such a low sample size it is highly probably that a lot of non-climatic noise will be introduced in the ring width chronology, especially if it is a species with lobular growth.

L 208. Is winter part of the growth season of this species? normally, growth season occur since spring to autumn. Please, check.

L 211. Significant positive correlations are also observed in October of the current period and in September of the previous period. Please, describe these results.

L 212-214. Please, improve the wording of this sentence.

example:

The ability of our *P. lawrencei* RW chronology to capture temperature signals during some months of the growing season is consistent with previous dendroclimatological analysis of this species, demonstrating the air temperature as a dominant limiting growth factor.

L 220-221. It is not clear enough to me the explanation why the species presents these antagonistic relationships between two consecutive years. During the current year it seems that it likes high winter temperatures to grow in spring-summer(?), while in the previous year the maximum winter temperatures negatively affect growth. Isn't the precipitation in June, November and autumn of the previous year also an important factor controlling tree growth?

L 246. October is negatively correlated but not significant. Please, check.

L 246-248. I suggest to plot in fig. 6 the time series of max. temperature averaged for the months of Oct-Dec together with the delta BI series.

L 250-251. What about the positive relationship between delta BI and minimum temperatures during the previous growing season? This relationship is even stronger than the one found during the current growing season.

L 255. Please explain in methods what it means that BI is positive or negative. In results section, explain what it means that it correlates positively or negatively with temperature...what it would be indicating in physiological terms?

L 284. I suggest to use the total monthly precipitation value instead of the monthly mean value. The average is not totally representative of the monthly precipitation.

Figures: Be consistent in the font size of the labels of all figures.

Fig. 1 and 2. I suggest to combine figure 1 with figure 2, placing the map on the left and the two photos vertically on the right.

Fig. 3 and 4. I suggest to combine Figure 3 with Figure 4. Placing the three figures in a vertical order since they share the same X-axis.

Fig. 6a. Please, indicate in the figure the correlation coefficient between the two ring width chronologies.

Fig. 6b. The EWBI and LWBI show a strong positive trend. Any comments on this pattern? Does it have a climatic or biological explanation? Or is it a methodological artifact?

Fig. 7. Please, add the letters a,b,c,d corresponding to each of the 4 panels.

Please indicate in the figure in a generalized way the vegetation growth period. I suggest to add in the panels the lines indicating the significance level, so that the reader can identify whether the correlation is highly or marginally significant.

Fig. 9. From a physiological point of view, it makes more sense to use the monthly total value instead of the monthly mean. The results can be very different if you use the monthly rainfall total instead of the monthly mean. I suggest that you perform the correlation analysis again using the monthly rainfall total.