

## ***Interactive comment on “Chemical de-staining and the delta correction for blue intensity measurements of stained lake subfossil trees” by Feng Wang et al.***

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The manuscript by Wang et al presents a very interesting sample material for temperature reconstructions and examine how to best utilize this in conjunction with the popular and affordable BI technique. The paper is foremost dedicated to a very novel and clever de-staining experiment which I thoroughly enjoyed and have the potential to be highly cited in future BI studies. The second component was a careful comparison of LBI, DBI and MXD from parallel X-ray measurements to evaluate the performance of the chemical de-staining and LBI and DBI parameters with MXD as reference. Although the authors conclude that the simple DBI was more successful in replicating the

C1

low-frequency variance of the MXD, they have made some very important discoveries in terms of de-staining of relict wood material. The DBI parameter appears to be quite successful, but has documented problems as the authors also mention in the final sentences. Therefore, all tools available for de-staining prior to DBI transformation must be considered of great value. I congratulate the authors to a fine, and from what I can tell labor intensive, experiment and I consider the manuscript suitable for publication following minor revisions and clarifications. I also look forward to learn more about the planned follow-up manuscript.

Detailed comments:

L32 I would not say BI is recently developed anymore, it has been around almost 20 years now.

L32-33 The BI technique is an alternative to the X-ray technique in producing proxy parameters such as MXD.

L37 -38 Consider changing to something like: “In contrast, BI is more affordable because of the utilization of commercial flatbed scanners to generate images of reflected blue light analyzed in potentially affordable image analysis software. . .”

L38-42 Strange sentence, some of the studies encouraging more studies were made later than the encouraged studies. Work a bit more on this sentence and consider also these references: Björklund et al., 2014, 2015; Dolgova, 2016; Fuentes et al., 2018; Kaczka et al., 2017; McCarroll et al., 2013; Rydval, Gunnarson, et al., 2017.

L45 Should perhaps add something like: “. . .not accompanied by a similar difference in density..”

L83 newly exploited lake?

L84 millennium-long?

L96 What was the purpose of the weighing? Were the laths also weighed after

C2

the chemical analysis? Could not find any more use of these measurements in the manuscript

L104 .., to identify the most effective...? Remove "(see results below)". The results are always be presented after the methods description..

L118 sensu Rydval et al., 2014?

L118-119 Great initiative

L121-122 Very strange statement. Real world observations? Do you mean: lower RGB values corresponds to lighter densities?

Section 2.2, 2.3 and 2.4 Consider re-structuring here. Perhaps one section for chemical de-staining description. One section for BI and X-ray data development and one section for chronology development for climate analysis, and sample average RGB data?

L139 Did you use the full RGB spectrum or only the blue spectrum? If the latter, it is consistent with the use of BI based parameters. Same comment in L165.

L145 N.B. residuals are most often used for density related parameters. This is not a major problem here since you compare results from BI and X-ray, but may be important in pure climate reconstructions.

L168 "coherence" can also be a type of statistical analysis, perhaps change to the more general term of "agreement", or simply not explain correlation since more or less the entire readership is familiar with this..

Figure S4 Spelling of replication

Figure s6 spelling of earlywood. It seems odd that the area of the 30% of the darkest pixels in the latewood are differently sized even though the latewood area is roughly the same (compare ring 4 and ring 5). Please check the definition you used and clarify why this is the case.

C3

L169-171 Would be great to have running Rbar or EPS, to evaluate the difference between the different parameters. Perhaps this can explain why the DBI perform so badly in the post 1960 period compared to LBI and MXD. Both in terms of trend and correlation..

L182 spelling intensities

Figs. S7-S8 Would be interesting to also present the Earlywood measurements. Would be even more interesting if you also presented Delta density and Earlywood density.

It is puzzling why LBI and DBI has such similar trends in S7. Is there a HW/SW transition in these trees, if so why so weak in the earlywood? Are the rings in the post 1960 period very narrow? If so, I think that your measurement resolution is causing some problems here. Consider that the measurement resolution is affecting your latewood measurements more than your earlywood measurements. That is, your latewood BI is deflated because of adjacent contamination of earlywood BI. Ergo the delta BI will be artificially lowered and similar in trend to LBI.

Not completely relevant to your nice study, but could not resist :)

L196 check grammar

L208 combine to wood? Not clear, rephrase..

L241-242 This is not surprising. If you would calculate delta density and correlate with delta BI you would probably find equally high correlation as between LBI and MXD. This is not needed in revision, I am merely pointing this out.

L253-260 I think you are right that the narrow ring widths are causing the problem here, but I would not say it is a healthy versus unhealthy tree problem. It is a problem of measurement resolution (see comment above for fig s7). Healthy tree can also have narrow rings..

L262 yes interesting observation. Would be better underpinned if you also presented

C4

the rbar for all the parameters.

Hope these comment can be helpful

Good luck!

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