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# *Interactive comment on* "A chironomid-based mean July temperature inference model from the south-east margin of the Tibetan Plateau, China" *by* Enlou Zhang et al.

**Enlou Zhang et al.**

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This manuscript presents two nested chironomid-temperature calibration set from China and a reconstruction of July temperature over the last 150 years from a mountain lake. The manuscript is well written. The rationale for using both the 47 and 100 lake calibration sets is unclear. The paper would be greatly simplified if only the larger calibration set was used.

Response: We agreed with the reviewer that we were not explicit about the rationale for using both the 47 and 100 lake calibration sets. The purpose was to compare the performance and the reconstruction results on the same site by applying a local vs. regional transfer functions. However, we agreed that the paper would be simplified



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and more concise if we focus only on the large calibration set. We plan to modify our manuscript by reducing the sections related to the 47 calibration set.

The correlation between the instrumental data and the reconstruction appears to be good (r = 0.45) given the small magnitude of the variability in the instrumental record and the large uncertainty on the reconstruction. However, the statistical significance may be overstated because of the lack of independence between samples due to autocorrelation, both inherent in the data and induced by the three-point moving average of the instrumental data.

Response: We compared the transfer function model reconstructed results with the instrumental record as an additional diagnostic method because these instrumental data are available from the weather station. We have already applied the 'standard diagnostics' such as goodness-of-fit, modern analogues etc., which all suggested that the results are reliable. The well-compared result with the instrumental record is reassuring that the model is capable to reconstruct the long-term temperature trend that is realistic. We will acknowledge this point in the revision.

###Minor points Line 183 Böhner 2004 is not in the reference list. It is probably worth clarifying that Böhner uses reanalysis data.

Response: we will clarify this in the text.

A histogram showing the distribution of lakes along the temperature gradient should be given, or at least discussed, as WAPLS is sensitive to an uneven distribution of lakes.

Response: we will discuss about the relationship between the WAPLS model and the lake distribution issue.

Line 217 If N (number of lakes) is less than two, Hill's N2 is guaranteed to be less than two.

Response: we will clarify this in the statement.

Line 223. Variance inflation factors are useful for diagnosing multi-collinearity amongst the predictors, but is less useful for identifying which variable should be deleted. Simply deleting the variable with the highest VIF is a poor strategy. Stepwise selection based on pseudo-F is probably better.

Response: we will clarify that we used VIF as one of the methods when considering removing variables in the CCA. We will also run the CCA with stepwise selection to check these results.

Line 250. A 2-component WAPLS model is selected although the improvement in model performance is only about 1%, less than the 5% threshold reported. A randomisation t-test is probably a better test than a simple threshold.

Response: we will run a randomisation t-test to check if component 2 is outperformed much more when comparing to component 1.

Line 296. I think it would be better to show that temperature is an important predictor with the ordination before discussing species temperature preferences.

Response: we will state that temperature is an important predictor before the discussion on the chironomid species and temperature relationship.

Line 309. Move the section on Lake Tiancai chironomids to after transfer function development.

Response: we will move this section accordingly.

Line 398. It is expected that weighted-averaging with inverse deshrinking and weighted averaging partial least squares component-one will give similar models. Under certain circumstances, they will be identical.

Response: we will make a statement about this in the text.

Line 401. Please don't use novel abbreviations. The space they save is not worth the cognitive load on the reader. No need to report all the performance statistics that are

in table 4.

Response: we will reduce the use of abbreviations where necessary. We will only present the important performance statistics (i.e. only those have discussed/mentioned in the text) in Table 4.

Line 438. Please provide a statistical comparison of the reconstruction and the instrumental data. Reporting that they have a "comparable trend" is not sufficient - don't leave it to the discussion to give the correlation.

Response: we will move the statistical p value up to this line instead of leaving it to the discussion.

Line 621. The text suggests that the instrumental data are lapse-rate corrected, whereas the figure suggests that anomalies are compared. Obviously, the former test is much more powerful.

Response: We will add the plot of the lapse-rate corrected curve of the chironomid-inferred mean July temperatures in Fig 6e along with the plot of the temperature anomalies.

Figure 2 is impossible to interpret as the reader does not know the lake numbers. Sorting the lakes by temperature (and including this information), would make this figure much better.

Response: we will modify Figure 2 by sorting the lakes by mean July temperatures.

Table 3 is rather large and needs to be condensed by extracting just the most important parts (eg L1/L2 for temperature).

Response: we will condense Table 3. This table will be greatly simplified when we remove the results for the 47 calibration set.

Table 4 needs proper headers, not simply the output from C2.

Response: we will modify the caption for Table 4 to provide a clearer description of the data presented in the table.

The authors should state where the data will be archived.

Response: all data will be uploaded to State Key Lab of Lake Science and Environment's website.

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