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Climate of the Past Discussions

Interactive comment on "Warm-season hydroclimate variability in Central China since 1866 AD and its relations with the East Asian Summer Monsoon: evidence from tree-ring earlywood width" *by* Yesi Zhao et al.

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Response to referee comment 2

1. Referee's comment: Using reanalyzing tree-ring material from Shi et al. (2012), this manuscript found that EWW was a better hydroclimatic index in central China than TRW and LWW. The author reconstructed the growing season scPDSI based on standard procedure of dendroclimatology, and proved the fidelity of the reconstruction. I totally agreed another reviewer's comments, and suggest publication after they fully

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consider the comments. My confusions are listed as following: Author's Response: Thank you very much for your review and comments. We have revised the manuscript according to your suggestions. Please see details below.

2. Referee's comment: Pinus tabulaeformis may stop radial growth during November and December in the study area. It may be unreasonable to consider these months for Pearson's correlation in line 8 of page 4 and Figure 6. Author's Response: Many thanks for suggestion. We have deleted the climate response analysis for these months. Please refer to the line 3-4 of page 6 and Figs. 3-4 in the revision.

3. Referee's comment: The MJJ scPDSI was reconstructed based on downloaded scPDSI (32âŰę-35âŰęN, 110âŰę-112âŰęE), it is unnecessary to compare them again in Figure 9. Author's Response: Thanks. We have removed this comparison. Please refer to Fig. 7 in the revision.

4. Referee's comment: I'm confused about the contents in lines 18-19 of page 5. Since the calculation of scPDSI was based on multi-proxies including precipitation and temperature, the result of partial correlation ($r = 0.59$, $p < 0.01$) that removed the effects of temperature and precipitation could only indicate that factors other than precipitation and temperature control tree-ring growth. It's not helpful for your conclusion. Author's Response: Thank you very much for pointing out this unreasonable analysis. We deleted this analysis.

5. Referee's comment: After you reconstructed MJJ scPDSI using the linear model, do you deal the reconstruction with special method to make it match the variance of instrumental scPDSI? and how? (Page 6, line 12-13). I'm interested in it. Author's Response: Yes, we have adjusted the variance of reconstructed MJJ scPDSI so that it has the same variance with the actual MJJ scPDSI. The detail method was shown as the equation 1 in Page 6 Line 25 in the revised manuscript.

6. Referee's comment: The reasons for the unstable relationship between scPDSI reconstruction and EASM are simply discussed. Is it caused by the calculation method of

EASM? Because there are several EASM indices calculated in different ways. Do you try to compare your reconstruction with other EASMI, such as EASMI from Jianping Li? Author's Response: Thank you very much for this question. We added more discussion for the unstable relationship between scPDSI reconstruction and EASM. Please refer to Section 3.4. It is well known that there are many EASMI. We could get different results if we used different EASMI. However, before the analysis, it is necessary to select an EASMI which had the best ability to capture the precipiation over East Asia and with clear physical mechanisms. The EASMI of Zhao et al., (2015) has been proved to show better ability in depicting the precipiation and temperature over East Asia compared with previous indices, this can be referred to Zhao et al., (2015). As shown in Fig.1, the EASMI of Zhao et al., (2015) had significant positive correlations ($p < 0.05$) with the May-July precipitation over the south of the Yangtze River on the decadal and longer timescales during the period 1901-2005, indicating that it can capture the Meiyu precipitation which is a good indicator of EASM as suggested by Wang et al., (2008). In comparison, the EASMI of Li and Zeng (2005) had limited ability in depicting the precipitation variability.

Reference: Li, J., and Zeng, Q.: A new monsoon index, its interannual variability and relation with monsoon precipitation, Climatic and Environmental Research, 10, 351–365, 2005. Wang, B., Wu, Z., Li, J., Liu, J., Chang, C.-P., Ding, Y., and Wu, G.: How to measure the strength of the East Asian Summer Monsoon, J. Climate, 21, 4449–4463, https://doi.org/10.1175/2008jcli2183.1, 2008. Zhao, G., Huang, G., Wu, R., Tao, W., Gong, H., Qu, X., and Hu, K.: A new upper-level circulation index for the East Asian Summer Monsoon variability, J. Climate, 28, 9977–9996, https://doi.org/10.1175/jcli-d-15-0272.1, 2015.

Please also note the supplement to this comment:
https://www.clim-past-discuss.net/cp-2018-141/cp-2018-141-AC4-supplement.zip

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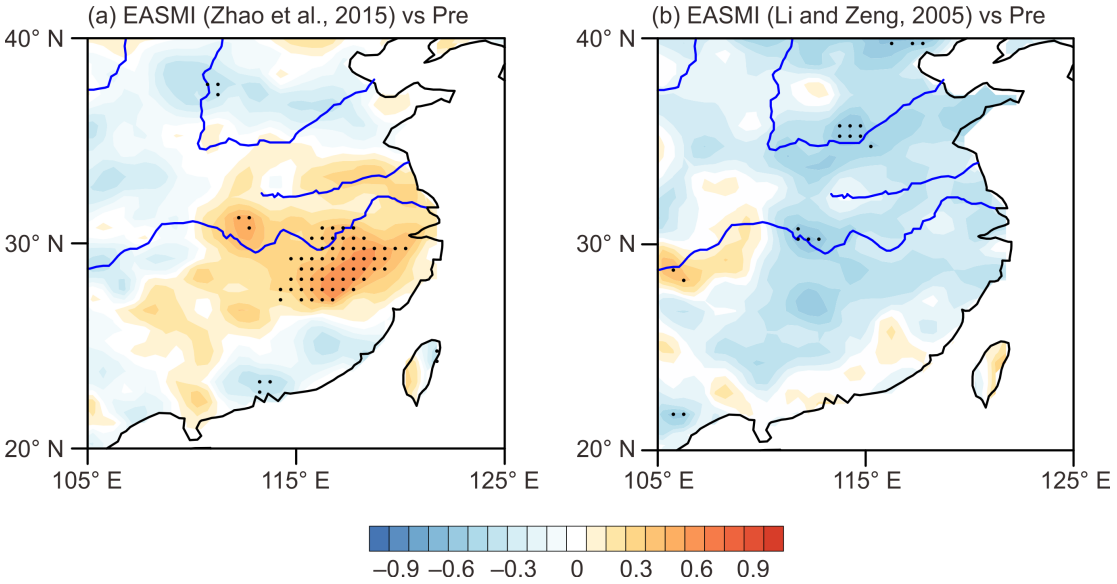

Fig. 1. Pearson correlation coefficients between the decadal-filtered May-July precipitation and EASMI ((a) Zhao et al., 2015; (b) Li and Zeng (2005)) during the period 1901-2005 over East Asia.

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