

## ***Interactive comment on “Using paleoclimate reconstructions to analyse hydrological epochs associated with Pacific Decadal Variability” by Lanying Zhang et al.***

### **Anonymous Referee #2**

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#### General comments

This is an interesting and mostly well-written manuscript with a topic of interest to HESS. My main comments concerns the presentation, which I think can be strengthened in places; in particular as the authors propose a new methods.

On page 11, lines 20-23 it is stated that Vanc15 is more reliable than Macd05 and Mann09. As such, does the proposed threshold method help to cover-up problems with the relatively poor quality of some of the reconstructions? If one of the reconstructions is clearly more reliable than others, should the advice not be to use Vanc15 in future studies and not Macd05 or Mann09?

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Is there a case for also looking at the magnitude of sojourns above and below a threshold in addition to duration?

Other comments

Page 2, line 14-15: semantics, but do you mean the impact of PDV has been explored at locations around the world?

Page 3, lines 8-10: Would be useful to see geographical extend and topic (flood/drought) for each of these references.

Page 4, line 11: what is the unit for the  $\pm 0.5$  threshold? See also page 8, line 12.

Page 6, line 21: SST not defined.

Page 7, line 21: define paleo proxies.

Page 8, lines 8-15: This paragraph is a very similar to page 4. Is it necessary to write all this twice?

Page 8, lines 22-23: As per my comment in the introduction: is the use of a more dynamic threshold method simply masking underlying problems with some of the reconstructed datasets. If so, should these datasets not be excluded from further analysis on the basis that more reliable datasets are now available?

Page 9: I am not sure I understand the method to a level where I could implement my own version of the dynamic threshold framework; in particular, step 1. Maybe a conceptual figure assisting the reader could be useful here?

Page 9: I have not previously come across a Butterworth filter. Are Eqs 1 and 2 filters of this type?

Page 10, line 4: unit on  $y=100$ ? Section 3.2.2: Last sentence (lines 11-13) is rather meaningless and not necessary I think.

Page 13: I am not clear on what is the difference between the conditional and uncon-

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ditional distributions.

Figure 6: There is a lot of information on this figure but the overall summary is summarised nicely on page 17-19. Could this figure somehow be simplified to be more focussed on this message?

Page 13, line 24: Is alpha not a significance level ( $\alpha=10\%$ ) rather than a confidence level as it refers back to a statistical test?

Page 13, line 25: On page 10, line 14 y is defined as 100, but here  $y=11$ ; why the difference?

Section 4: Not sure the title of this section is appropriate as 'hydrology' is not discussed at any point.

Page 15, line 9: What does 'pooled' mean? Is this run-lengths extracted from all 12 reconstructions merged together into one sample?

Page 15-16: There is a lot of information on Figure 9, but I am not sure I understand how to interpret them. Also, are the conclusions derived from Figure 9 really that different from what you have already found in the much more easily interpreted Figure 8, that there is little evidence of statistical significant differences? Same comment on the difference between Figures 10 and 11.

Page 15: Symbols  $\mu+$ ,  $\mu-$ ,  $\sigma+$  and  $\sigma-$  are not defined anywhere?

Page 18, lines 4-5. Not sure I understand the meaning of this sentence.

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