

## ***Interactive comment on “Climate impact on the development of Pre-Classic Maya civilization” by Kees Nooren et al.***

**Kees Nooren et al.**

k.nooren@gmail.com

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Reply on “Climate impact on the development of Pre-Classic Maya civilization” (RC-2)

We thank the two reviewers for their constructive comments on our paper “Climate impact on the development of Pre-Classic Maya civilization”. We are happy to read that according to the reviewers our two palaeo-precipitation records add valuable new sources of palaeodata for the understanding of human environmental interaction in the Central Maya Lowlands (RC-1 and RC-2).

Hereby we would like to reply on the comments of RC-2.

1. Line by line commentary (RC-2)

26 I'd change "while" to "whereas" as you are contrasting what the two records show  
Agree.

28 I believe it is more conventional to use a little pyramid symbol for the delta 14C

Both are in use.

47 I suggest something like "Evidence for such impacts is found in the fact that floods, as well as droughts, are important themes:

Agree.

49 change "Mayan" to "Maya" (the former refers to the language(s))

Agree

58 Tankersley et al. also made the pitch that the "Maya clay" had a volcanic origin. But it is important to be clear about how that is meant.

Agree, we have added a reference to Tankersley et al. (2016) and changed sentence 58: . . . ., and past volcanic activity could have been responsible for the deposition of smectite rich clay layers in inland lakes (Tankersley et al., 2016; Nooren et al., 2017a).

Tankersley, K.B., Dunning, N.P., Scarborough, V., Huff, W.D., Lentz, D.L., and Carr, Catastrophic volcanism and its implication for agriculture in the Maya Lowlands: Journal of Archaeological Science 5, 465–470, 2016.

72 delete "likely" – it appears on line 71

Agree.

85-86 It may be that many of the differences among paleo-precipitation records reflect constraints on dating.

Indeed, few well-dated records exist for the Central Maya Lowlands.

108 change "has primarily been determined" to "was primarily determined". Done.

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136 Maybe it is worth noting that this is not the Rio Dulce that drains Lake Izabal (eastern Guatemala). Done.

140 change to “exceeding a one-standard-deviation threshold”. Done.

164 change “by” to “of”. Done.

179 change “hematite stained” to “hematite-stained”. Done.

229 change “for” to “of”. Done.

233 change “last thousands of years” to “last few thousand years”. Done.

241 change “Centennial scale” to “Centennial-scale”. Done.

245 You use “The in-phase relationship between the two records is significant above a 5% confidence level at centennial timescales during the Pre-Classic Period.” As stated, I am not sure what that means. Do you really mean that you set the alpha value at 5%, and the probability of concluding the records are in-phase, when in fact they are not, is <5%. I think that should be re-worded for clarity.

We have added the following to section 2 (Methods): CWT applies Monte Carlo methods to test for significance. In this case we set the alpha value at 5%. Time periods and periodicities enclosed within the black lines of in our wavelet analysis indicate common power between timeseries with 95% confidence.

248 change to “at a centennial time scale”. Done.

252 change to “gives us confidence” (refers back to “The coherence”). Done.

254 and 257 I believe it is more conventional to use a little pyramid symbol for the delta 14C. Both are in use.

258 change to “~500-year”. Done.

266 change to “At that time”. Done.

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276 change to “centennial-scale”. Done.

279 change “due to” to “as a consequence of” and later in the line to “because of”. Done.

284 change to “During that period”. Done.

290 change to “Between 1000 and 850 BCE”. Done.

292 change “at” to “on”. Done.

295 change to “for further development”. Done.

301 change to “show strong and steady development”. Done.

304-305 Again, I wonder if it is drier conditions, or perhaps as important, how the rainfall was distributed through the year. Agriculture is practiced across a large gradient of annual rainfall today, using traditional methods.

We agree. We added after sentence 305: Changes in the distribution of rainfall probably also changed, and large floods, most evident during the Archaic and early Pre-Classical period, occurred much less frequently after approximately 1000 BCE.

623 change “extend” to “extent” or “area”. Done.

630 I did not know what was meant by “the Cariaco record is conform updated age-depth model.” Why not just say “We used an updated age-depth model for the Cariaco record.” Done.

632 and 637 I believe it is more conventional to use a little pyramid symbol for the delta 14C. Both are in use.

639 change to “500-yr”. Done.

653 insert a period after “et al”. Done.

653 change to “Long-term”. Done.

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668 Italicize “Aulacoseira” and “Pinus” (the latter in 3 places). Done.

671 change “Ti -15 point running mean” to “Ti 15-point running mean”. Done.

675 change to “1-4-cm-thick”. Done.

676 change to “light-coloured”. Done.

685 change to “concentrations”. Done.

687 change to “4-12-cm”. Done.

690 change to “events”. Done.

692 change to “linear”. Done.

693 change to “radiocarbon-dated”. Done.

704 change “at al.” to “et al.”. Done.

711 change to “linear”. Done.

711 change to “4th-order” Done.

Figure A1. How was it decided which archaeological sites to include? There are certainly many more, and this may mislead readers who are unfamiliar with the archaeology of the region. Also, might another colour be used for the Dulce River catchment. It appears that the area received >4000 mm/yr rainfall, being dark blue.

The colour of the Dulce river catchment has been adjusted, and in the figure legend ‘archaeological site’ has been changed to ‘major archaeological site’.

Figures 3, A2a, A2b. Is there any utility in indicating on those plots which way is drier and which is wetter? Also, for A2b, I suspect that the orange pollen percentages for Peten-Itza are “Montane” rather than “Montana”

We have added some arrows in Figure 4 (was Fig. 3) to indicate if excursion indicate drier or wetter conditions. We added to Figure caption A2: Notice that the y-axis is

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sometimes reversed, so that excursion above the x-axis always indicate relatively drier conditions.

Montane indeed !

Figure A10 (now Fig. A9) – change to “linear”. Done.

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Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2018-15>, 2018.

## CPD

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