

Interactive comment on “Neoglacial Climate Anomalies and the Harappan Metamorphosis” by Liviu Giosan et al.

Anonymous Referee #3

Received and published: 9 August 2018

Comments on Giosan et al “Neoglacial climate anomalies and the Harappan Metamorphosis”

This manuscript presents novel proxies for Indian winter monsoon variation from a core in the northeastern Arabian Sea and suggests that the intensified winter monsoon would contribute to the metamorphosis of the Harappan civilization from urban to rural society. The causal relationship between climate change and civilization has always been a question at debate due to lack of robust evidence. The variation in the winter monsoon and the distribution of the Harappan civilization archaeological sites in this paper is a great effort to answer this question. I support to be published the paper. However, there are some questions that the authors should address in next round of revision.

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Major comments: 1. The manuscript is not written in a very clear way, which make readers hard to follow what the authors said. For example, in figures 3-5, all the curves should be marked by such as a, b, c, etc., and in the text it is easy to cite such as “Fig. 3c” to indicate the exact curve, but not such as (Fig. 5; Dixit et al., 2014) in Line 425. 2. The reference list should be carefully checked. Almost all references have some format problems or mistakes. For examples, Lines 516-518, use pp. to indicate pages, Lines 519-521 the pages are used “959-962”. Also, the authors cited many published records in discussing Figure 3, but not showing any of them in the reference list. Readers and reviewers do not know what the authors discuss and compare when reading Line 259 to 322. Please check all the references in the References 3. It seems to me that the authors overinterpreted the records, though the proxies for winter monsoon variation is reasonably sounding. For example, the authors stated that the core top missed (Line 161~162). However, the authors put much effort in discussion on LNA (Line 335-345) while not showing any records from this core. Actually, the Factor 1 data do show many data points since 2000 years, which does not show the LNA though the authors claimed that Factor 1 reflects temperature change. Please explain why. 4. I am not convinced that changes in land cover and land use would affect movement of ITCZ. Please explain in detail. Does the authors mean the regions affected by heavy rains, which is not necessary the ITCZ? 5. The authors raised a very important question at the beginning in Introduction, “Moreover, our knowledge of temporal and spatial climatic patterns remains too restricted to fully address social dynamics” (Line 59~60). However, I did not see the authors address this question later in text other than discuss a little bit on interhemispheric temperature gradients. 6. The authors put much effort on distribution of Harappan sites, but did not show in any figures. It would be easier for readers to have a figures showing the distribution of the sites.

Minor comments: 1. Why the numbers of data vary so much for Factor 1, 2 and 3? Please clarify in the text. 2. Affiliations: should be consistent for all addresses. Some list to department, while others only list the university. 3. Introduction: The logic in Introduction is not clear. Please revise following clear logic. 4. Abstract: The Abstract

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is not clear. For example, Line 32~34. 5. The authors did not label various panels in figures clearly, which makes reading difficult. Please label the panels and cite in the text. 6. The temporal resolution for samples should be clearly addressed. 7. What is Calib 7.129? (Line 159) 8. Line 272, should use "cal years BP" or "years" without "BP". Please check the whole text. 9. Line 312, should be "3,000 years ago" 10. Figure 1: Please check the arrow of "summer monsoon". The direction should be wrong. 11. Figure 3-5 quality is not high. Please improve them. 12. Figure caption. Figure 1, there are three colors in the figure 1 but not two. Please change the figure or the caption; Figure 4, Line 921, better to give the full name of "ENA". Figure 5, Line 943, change "of Dixit et al. (2014)" to "(Dixit et al., 2014)"

Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2018-37>, 2018.