

## ***Interactive comment on “Re-examining the 4.2 ka BP event in foraminifer isotope records from the Indus River delta in the Arabian Sea” by Alena Giesche et al.***

**Anonymous Referee #2**

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Giesche, et al. “Re-examining the 4.2 ka BP event in foraminifer isotope records from the Indus River delta in the Arabian Sea

### **Summary:**

A precise characterization of the timing, duration and climatic expression of the 4.2 ka event in the Indian subcontinent is crucial in order to assess its potential linkage with the transformation of the Indus valley civilization. Giesche et al. provide new foraminiferal isotope data from the northeast Arabian Sea that spans a critical interval of time (~ 3.3 to 5.3 ka) – an interval of considerable interest from both climatic and societal points of view. The new oxygen isotope data of surface-and-thermocline-dwelling foraminiferal

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species is (ultimately) interpreted by the authors in the terms of temporal variations in the strength of Indian summer and winter monsoons, respectively. The results (and proxy interpretations) while complements the results from Staubwasser et al (2003) study, I think this manuscript provides an improved (and less-speculative) discussion of plausible climatic and societal linkages. The manuscript is fairly well-written (but on the verbose side), logically-structured, but the graphical presentation of figures requires some attention. I recommend this manuscript be accepted for publication in Climate of the Past after some revisions.

**Specific Comments:** I think the title “Re-examining the 4.2 ka...Arabian Sea” would seem to suggest that the focus of this manuscript lies in the “re-examining” part but in reality, it constitutes a rather small component of this manuscript. While generally complementary, I think there are also important differences in the results between the two studies (see figure 3b), which may have important bearing in assessing the timing and abruptness of the 4.2 event. I encourage authors to find a title that is more representative of the main conclusions/results.

Text and other information on Figure 1 are hard to follow. A different color scheme would also help. Figures with scatter plots (with the exception of Figure # 3b) are also not particularly helpful. Why not show these figures like figure S2? There is also a fair bit of redundancy between sections 2, 5.1, 5.2, and 5.3. I think the manuscript will benefit from a more concise presentation. Line 134-35: Consider rephrasing “northeastern regions close to New Delhi” Line 141: “while many paleoclimate studies...” Provide some reference here. Line 180: Fleitmann et al 2007 is a tertiary reference. Remove it. Line 280-281: Provide a statement that explicitly compares the age models between Staubwasser 2003 and this study. I think there is no difference in age models between the two studies but it needs to be spelled out here. Also, indicate the temporal resolution of the new dataset. Line 333: “The bandwidth of 210 years was considered optimal time window for capturing the overall trends in the dataset”. What constitutes optimal? Why 210 years? It seems like a large window to smooth data

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to discern the onset and termination of the 4.2 event. Line 351-352: Please quantify “weak” and “strong” correlation and provide statistical significance. Line 415 and 421 : consider rephrasing “trend” with “change” or something similar. Line 432-433: Support this by a suitable reference and briefly explain why “differencing” will improve the signal-to-noise-ratio. Lines 556-565: Some of this should be in the “Introduction” and not here.

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