

Interactive comment on “Multi-variate factorisation of numerical simulations” by Daniel John Lunt et al.

Chris Brierley (Referee)

c.brierley@ucl.ac.uk

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Review of Lunt et al. (2020)

This paper presents a meaningful step forward and an important clarification to the methodology of (paleo)climate factorisations. As such I would be happy to see it published following some small revisions.

I found the introduction of the synergy term in the Lunt et al (2012) factorisation a little bewildering at first. The manuscript didn't seem to contain an explanation as to why there is no need for a synergy term in the two-dimensional case. Is it because the averaging process effectively removes one degree of freedom (dimension)?

The re-analysis of the Chandan & Peltier paper is really nice. You do a good job of

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describing the impact of the different factorisations on it. However I was surprised there was no mention as to whether this reanalysis alters the conclusions of that original paper. Perhaps you would like to comment on that.

I, like the authors, and am a climate modeller and so I'm not abreast of relevant advances in other fields. I could not help wondering if this problem had been found and addressed outside of our discipline. Would you be able to comment?

This manuscript has nine authors. Yet according to the "author contributions" statement only five have contributed to the work. Can you clarify why the others deserve authorship rather than a just credit in the acknowledgements?

Line-by-line comments:

L87. It took me a while to grasp this bracketed comment, although it actually seems quite important. Perhaps you could expand on it a little.

L118. This sentence jarred with the 3/4 aside earlier. Why is it not 3/6 by the same logic?

L158. The wrong form of citation command is used here.

L160. f_3 should be f_2

L255. Please move the reference to fig 4a slightly earlier in the sentence.

Fig. 4 Can you please label the columns with the factorisation types?

Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2020-69>, 2020.

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