

Clim. Past Discuss., author comment AC4
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Reply on CC2

Andrew L. A. Johnson et al.

Author comment on "Sclerochronological evidence of pronounced seasonality from the late Pliocene of the southern North Sea basin and its implications" by Andrew L. A. Johnson et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2021-142-AC4>, 2022

CC2 comments in normal typeface; response in **bold**)

I would like to thank the authors for their detailed replies to my comment on their work. I accept their solutions to the issues I raised, and concede that some of these were based on a misunderstanding (most notably my point about the rejection of d18O transfer functions based on fossil data). I appreciate the authors' clarification of this point.

I remain of the opinion that selecting the right transfer function for d18O-temperature conversion based on which temperatures fit better with (ostracod and dinoflagellate) assemblage results is prone to some uncertainty, especially if the authors want to make the point later in the paper that the nearest living relative approach underpinning these assemblage studies may not always be reliable. However, since I am not an expert on dinoflagellates and ostracods and since it would be hard to come up with an independent third line of evidence to (dis)prove their validity as temperature proxies, I think the authors' solution of presenting and discussing the data together and concluding what may be the most likely temperature seasonality given the evidence is a good one. I would just caution future authors in taking this discussion as evidence for the validity of one d18O-temperature relationship over another.

We thank de Winter for his further comments. We certainly accept that our preference for one $\delta^{18}\text{O}$ -temperature relationship over another because the outcomes fit with assemblage evidence of temperature in this case is no proof that the relationship is the best choice generally. More exacting $\delta^{18}\text{O}$ work on modern shells (with accurate, location- and time-specific data on temperature and water $\delta^{18}\text{O}$) is one way to gain more certainty, as is Δ_{47} and/or biomineral-unit investigation of temperature alongside the $\delta^{18}\text{O}$ approach in fossil shells. We suggest follow-up work using the last two techniques in this paper, and de Winter's expertise in Δ_{47} thermometry would certainly find a useful application here.