Climate
of the Past

Open Access

Discussions

[CPD]

Interactive comment on "Optimizing sampling strategies in high-resolution paleoclimate records" *by* Niels de Winter et al.

Anonymous Referee #2

Received and published: 31 January 2021

In this manuscript De Winter et al present a complex study evaluating sampling and statistical methodologies aimed at constraining uncertainties in the application of stable isotope data to reconstruct past sea water temperature. Given the rapid rate at which new sclerochronological stable isotope records are being constructed, such an investigation is both timely and pertinent. Whilst this manuscript could provide an extremely useful outline of methodologies for future isotope studies, it is extremely difficult to follow. This is not helped by the nomenclature used and jumping between virtual and real isotope data and different methodologies without sufficient explanation for what these methodologies are and why they are being used. The readability of both text and figures therefore needs to be improved. The main area of weakness in this manuscript is associated with the description of the methodology. The authors need to set out in far

clearer terms the exact application of data in each of the three analytical processes and exactly which data is used. Given the readability and lack of clarity in the methodology, I would recommend major revisions be made to this manuscript prior to publication Other comments: Why was mean annual temperature used as a target? When isotope records are developed from species that have a known growth hiatus, for example during winter, it is unlikely that mean annual temperature would be targeted. An alternative target would be used, for example mean summer or a growing season mean instead. Targeting annual mean would make the record look worse than it actually is. Pg 5 ln 89-91: The explanations for each of the methods are insufficient. Line 195: "not exactly normally distributed" remove the word exactly. Pg 29 ln 119: missing "to" between "equivalent the" Pg 30 ln 142: 144 – "Carbonate records from suitable environments include, for example, the A. islandica bivalves from considerable depth (30-50m) in the open marine Northern Atlantic (e.g. Schöne et al., 2005, on which case 33 is based)." It would b inaccurate to assume that there is no variability in ïĄď18Osw in NE Iceland. Variability in ïĄď18Osw can also derive from changes in water mass that are bathing the shells during carbonate precipitation.

Pg 30 ln 146: "the processes affecting δ18Osw on smaller scales" such as? Pg 30: 151-152: "While variability in δ18Osw compromises accurate δ18O-based seasonality reconstructions, the compilation in Fig. 3 shows that its influence on the δ18O records is too small to affect the shape of the record to such a degree that seasonality is fully obscured."

Pg 36 ln 270 "While hiatuses encompassing half of the seasonal cycle are uncommon" I would not say that they are uncommon. There are many examples of sub-tropical to polar marine bivalve species which exhibit a cessation in growth during certain months of the year.

Pg 36 ln 280 missing "in" between "simulated the"

Sections 5.4.1 to 5.4.5 should be deleted. This is already a very long manuscript and

this extra detail does not add anything to the focus of this manuscript.

All figures: Colours used in Figures need to be changed to be accessible. The website https://colorbrewer2.org/ provides a useful free resource to check colour choices. Fig 2: Whilst it is good to see a visual representation of each of the cases, the size of the panels makes it difficult to actually see what the purpose of each case is. It would be helped to add a schematic or table highlighting the purpose of each case. Fig 4A. Whilst a schematic would be a helpful figure to help the reader visualise what is a very complex methodology, the schematic presented in Fig 4A doesn't help. Currently this schematic does not help to clarify the methodology. I would suggest that the example provided in Fig 4V is removed and more space provided for panel A. This would provide space to add detail along with the arrows. Fig 6. Axis text size needs to be increased. Fig 12: Change the colours on the plot, you can't tell the difference between the d18O and the binning results.

Interactive comment on Clim. Past Discuss., https://doi.org/10.5194/cp-2020-118, 2020.