

The paper described GLOMAP, new climatology for sea-surface temperature and sea-ice extension during the Last Glacial Maximum. The climatology is created using the Data-Interpolating Variational Analysis (DIVA) software tool and based on sparse SST reconstructions.

Scientific significance: the manuscript represents a substantial contribution in the terms of data (i.e. a new climatology) and application of a method (DIVA) to a specific type of data, with a low spatial coverage. The final products (climatology) will certainly be useful to other scientists and employed in different contexts.

Scientific quality: the scientific approach and applied methods are valid: the data processing is well described, the limitations and the uncertainties on the data are clearly presented. The comparisons with other gridding techniques is particularly relevant.

Presentation quality: the manuscript and the figures are clear, the document is concise and well structured.

General comments

109-118 These 2 paragraphs are not totally clear to me: I understood that 2° by 2° averaged data are used, but then it is stated (line 117) that "DIVA method was used to interpolate the sampled points back to the 2° by 2° grid". I might miss something, but I would appreciate if you could make it clearer, maybe adding a figure.

247 when you indicate "Figures 3 and 5 show that when applied to the paleo data the interpolated fields are neither noisy nor patchy"

it would be relevant to be complete and indicate that this is true because of the selected analysis parameters. For instance, working with a very small correlation length ($L \approx 0.2^\circ$ for instance) would have led to a noisy fields.

In DIVA, one can select different coordinate systems (Section 6.2.3 in the User Manual): could you indicate which one was used (probably icoord=2, cosine projection).

255 "but thanks to the underlying global finite-element mesh with less complications..." → is there a benefit in terms of computational time that could be mentioned here?

Figure 2. In the workflow, there is a final step not visible there: the analysis itself, performed after the estimation of the analysis parameters.

Figure 3: it would be interesting to also have the number of data points for each period.

Figure 6: it seems that the GLOMAP product is the only one properly dealing with the Mediterranean Sea: the spatial resolution in Annan and Hargreaves (2013) represents the Mediterranean as two different sub-seas; in Kurahashi-Nakamura et al. (2017) the Mediterranean is absent; in Tierney et al. (2020), it appears homogeneous. I guess this does not impact the result of the studies performed at a local scale, but it might be worth mentioning this difference when comparing the methods, especially if one takes into account that there are available data in the Mediterranean Sea (Figure 1 for example).

General: the term SST is employed frequently, yet it is often referring to the temperature at 10 meters. Is it correct? I believe that in remote-sensing and in operational oceanography, SST refers to the temperature in the first millimeters of the water column. Could you address that definition early in the manuscript?

Minor comments and typos

The sea-ice mask seems to be a time-demanding product itself, is it also made available for re-use?

30 (MARGO) (Kucera et al., 2005a). → (MARGO, Kucera et al., 2005a). using the `\citep[][]{}` command in latex

35 (see also Broccoli and Marciniak (1996 and Manabe and Broccoli, 2020). → missing parenthesis

110 We used the annual-mean temperature for 10 m depth → at 10 m depth

126 we fixed the correlation length at average value of 10° → at an average value of

153 SH → please define (Southern Hemisphere I guess)

167 from the modern topography → indicate which topography was employed (including the version number)

179 the impact of advection by the western boundary currents, which is missing in our application of DIVA → the other methods don't use the advection neither in the interpolation scheme, so the difference should not come

187 There was even an 1°C → There was even a 1°C

227 Eq (5): what is the denominator u_i^2 ? Also, the sum should be written $\sum_{i=1}^{N_{data}}$

318 has no anlogs, → analogs

394 than assimilationg → than assimilation