Comment on essd-2022-212
Anonymous Referee #1

Referee comment on "Global climate-related predictors at kilometre resolution for the past and future" by Philipp Brun et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2022-212-RC1, 2022

This study produces high spatial resolution climate datasets including 15 variables as complement to already existing temperature and precipitation datasets over the recent past period. For the future period, the delta-change method was used to obtain the future climatic anomalies of precipitation and temperature. Such dataset is indeed really important as it offers us an opportunity to understand the climate dominance on other processes at higher spatial resolution and it can also facilitate the high-resolution process-based model simulation as forcing datasets. However, I find the data description mainly focused on northern hemisphere, and some sentences are just common sense, which should be revised a bit. I have a few concerns about the dataset validation and its performance in terms of the comparison with other existing available products. The validation part should be extended to include the comparison at different time scales: seasonal cycle, inter-annual variability, etc as the monthly dataset is provided.

Major comments:

1 Please describe the method you used to create the dataset in abstract as well (in one sentence) about interpolation.

2 The author spent a lot of words on the performance of each climate variable, but not on the process to create high spatial resolution dataset. Does the interpolation really introduce new information during the downscaling process?
3 Please use a table to summarize the dataset you used including the external data, specifying the spatial and temporal resolution, time period, and the source.

4 Can you provide other evidence to justify the process of wind speed data?

5 The validation part should be extended, including comparison with other climate datasets not only the station-based measurement.

6 I see that some figures show the difference between climatological means of 2071-2100 and 1981-2010, and others show the range of monthly means for the period 1981-2010. The former one is for variables that use temperature and precipitation only, right? You can also show range of monthly means for the common time period.

Minor comments:

Line 33 live -> lives

Line 35 key to what

Line 51 please add references for the usage in macroecology

Line 59 please use unit mm yr$^{-1}$

Line 99 why the period 1981-2010 was chosen rather than 1980-2018?

Line 150 to amount of

Line 189 Please also mention the ERA5 spatial resolution here.
Line 231 Why is clt downscaled to 1.5 arcmin here?

Line 481 is it really an east-west belt from Ethiopia to Sierra Leone?

Figure 2 why did you only focus on the northern hemisphere?

Figure 4 Have you checked whether the wind data also shows stilling reversal around 2010 like Zeng et al (2018)?

Line 560 is this potential NPP based on Miami model really meaningful? What are the benefits of this NPP dataset relative to CMIP5/6 outputs?

Line 716 please also specify the comparison time period.

Can you use other related (not exactly the same) variables to validate the performance of fourth-order and fifth-order climatic variables?

Line 743-744, can you provide references more recently?

Reference