

Earth Syst. Sci. Data Discuss., referee comment RC2
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Comment on **essd-2022-367**

Anonymous Referee #2

Referee comment on "CHELSA-W5E5: daily 1 km meteorological forcing data for climate impact studies" by Dirk Nikolaus Karger et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-367-RC2>, 2022

This paper developed a new long-term daily 1 km meteorological forcing dataset for air-temperature, precipitant and shortwave solar radiation, using the CHELSA topographic downscaling algorithm. This work is useful for climate impact studies. However, there are several things that need to be addressed before the paper can be accepted. The authors should go over the comments that I listed below and carefully address them.

- As shown in Table 2 and Figure 2, the performance of the CHELSA-W5E5 generally outperform the W5E5 for air temperature, precipitation, and downward shortwave radiation. Is the performance of the CHELSA-W5E5 varied with different regions of the world? I suggest more description and justification of the spatial-temporal accuracy of this dataset.
- In Figure 3, for example in the sub-graph "Absolute Bias Reduction", it is hardly to identify the negative and positive values in the eastern North American. The color bar should be changes.

- As shown in Figure 3 and 4, the obvious improvement of the CHELSA-W5E5 is observed in the western North American with complex terrain. For the eastern North American, does the CHELSA-W5E5 show the worse performance compared to W5E5? I suggest that the authors also give this information.

Minor comments

- Page 14 line 15 "Shortwave downwelling radiation" can be changed to "downwelling shortwave solar radiation".
- Page 19 line 14 "Then" should be changed to "than".
- Page 20 Line 5 The color represented WRF data should be added in the title of Figure 5.