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Interactive comment on "The PRISM4 (mid-Piacenzian) palaeoenvironmental reconstruction" *by* Harry Dowsett et al.

Anonymous Referee #2

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This manuscript presented an updated paleienviromental reconstruction of the Pliocene which is called PRISM4 datasets, that will serve as boundary conditions for the numerical models to simulate the Pliocene climate. The information on the reconstruction data source and methods are documented in detail, the differences between the previous data version PRISM3 are well reported and explained. The authors also discussed the major characters and uncertainties during Pliocene such as the closure of seaway, higher topography, smaller greenland ice-sheet coverage etc. The datasets are valuable for the paleoclimate modelling community and they have already been available online.

I have few specific comments below.

1. Based on the discussion of chronology, the authors proposed a 'new' name mid-

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Piacenzian to replace the previous mid-Pliocene, because this would appropriately represent the time interval 3.264 Ma and 3.025 Ma as shown in Fig.1. The authors already clearly claimed this reconstruction is being used as boundary condition for PlioMIP. The new name is not convenient for modellers to present their results and interpret model-data comparison. It will cause chaos to mention Pliocene, mid-pliocene and now mid-Piacenzian. Maybe it is more precise on the consideration of geological chronology, but scientifically it does not mean anything new. I would suggest to keep mid-Pliocene and add a precise number like 3.025 Ma, as is already mentioned frequently in the manuscript.

2. The most important information of the reconstructions are illustrated in Fig.3. These are global features, but the map projection makes it difficult to observe the details, especially those over the polar region. I suggest author to use other map projections e.g. Robinson to enable the observation for polar region, the same projection should be applied to Fig.5 and Fig.7. I also suggest that Fig.3 use the PRISM4 coastline as shown in Fig.5, not the modern coastline.

3. Page 8, section 3.4, Ocean temperature and sea ice, here 'ocean temperature' should be sea surface temperature. And sea ice field is missing in Fig.3, it is needed for the atmospheric model as ocean boundary condition. Since sea ice in a warm climate is a major focus for the coupled model simulations, I expect there would be more description and discussion on sea ice even though it remains unchanged from the PRISM3 reconstruction.

4. Page 8, section 3.5, in line 11-12 mentioned 'surface temperature and precipitation anomalies', these are certainly interesting climate parameters and should be included in reconstructions to enable the model-data comparison. If these reconstructions are not good to use, tell us why.

5. Page 8, section 3.6, line 23, "Based upon colour and texture each soil can be assigned an albedo value", when the soil type is used in the model, surface albedo

definitely needs to be assigned, for the PlioMIP, it would be good the assigned albedo is given together with the soil type, to avoid that different model group will assign different values.

6. The detailed descriptions on paleogeography are interesting, as shown in Fig.4 and Fig.7, as mentioned in page 10 line 20-22, there are some interior continental region has decreased the elevation but did not explain why, is it due to the dynamic topography that showed in Fig.4E? A few hundred meters decrease at the costal area would have large impact on low level flow and thus the rainfall pattern, therefore it is important to make sure that these decrease in topography elevation is not artificial.

7. High-resolution time series data in north Atlantic are mentioned in section 4.5.3, and the locations are shown in Fig.8b, it would be interesting to have one figure to show the evolution of these time series and gain some impression on the variability.

8. The provided online SST data does not follow the PRISM4 land-sea mask.

9. Quality of Fig.6 needs to be improved, Fig.4 should be larger.

Typing errors:

1. Page 3, line 3, ‘the then inability’, remove ‘then’

2. page 11, line 2, ‘modeled output’ change to ‘model output’

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