**We thank the reviewers for their comments which have improved our manuscript again. In particular, report 2's suggestion of adding uncertainty quantification into our results. Agreement between the models is surprisingly high even at 4K of warming. This gives our results a pleasing degree of robustness. Our responses below are in bold.**

**Response to report 1.**

The authors present a thorough analysis of model output from climate models participating in CMIP6. They show useful maps, metrics and equations that inform potential global and regional bioclimatic change due to warming. The manuscript is clearly outlined, well written and fits the journal scope.

However, as a minor comment, I think the authors should expand their discussion of the results by addressing perhaps two topics: (a) evidence of change: what evidence/examples/literature exists of warming-induced bioclimatic change? Authors mention desertification in the Amazon, as well as changes in North America and Northern Eurasia. What does the literature say about bioclimatic change in these regions?

**We agree that further discussion of the evidence of change would yield useful information around the context of the projections. We have included discussion about observed biome changes in the boreal forest and the Amazon, along with literature confirming these changes. The following text has been added to section 3.2 lines 174-180: "Although the KG scheme exclusively maps climate, the biologic implications of these changes can be seen. The Sub-arctic region has historically been dominated by the boreal forest (Kayes and Mallik, 2020) though there is evidence suggesting a slow northward migration of non-native warm-adapted tree species into historically boreal areas (Viacheslav et al., 2007; Boisvert-Marsh et al., 2014). However, the rate of global warming far exceeds the rate of boreal migration due to limits on the tree's ability to migrate (McKenney et al., 2007). With the continued reduction of the sub-arctic bioclimate we predict a likely continuation of these trends. The indicated shift in the Amazon from tropical rainforest to savanna can also be seen, an expansion of white-sand savannas in the Amazon has already been found (Flo, 2021)."**

And (b) how changes happen: how does warming induce the bioclimatic change? How do regions shift from "colder-wetter" to "warmer-drier"? can authors speculate on a timescale of change? Maybe some of the changes in Figure 4 would happen faster than others?

**The following text has been added to section 2.1 lines 71-80: "The outcome of competition between different plant types varies depending on the climatic conditions, such that the long-term equilibrium biome (which is a mixture of different plant types) will also vary with the climate. This is the underlying basis for bioclimatic schemes such as Koppen-Geiger, which is used here to classify the climate rather than to predict biome shifts. Changes in the actually distribution of vegetation also depend on the direct effects of changes in carbon dioxide and nitrogen availability, and may take decades to materialise (e.g. because the rate of climate change is significant compared to the characteristic multi-decadal timescales of a forest). These changes are best predicted with complex Dynamical Global Vegetation Models (DGVMs), which are based-on detailed representations of plant physiology and demographic processes (Argles, 2022). Although bioclimatic schemes are no substitute for DGVMs to predict vegetation changes, they have the advantage of being transparently simple and offering a more intuitive demonstration of the nature of a projected climate change. It is in this spirit that the Koppen-Geiger bioclimatic scheme is applied in this study."**

These are only some questions that I think could be discussed by the authors. Perhaps another question is: where are the 7.5M km2 that would escape major change?

**We have answered this in the discussion with the following sentences, lines 205-208:**

***'…. Bioclimatic change for over 7.5 million square kilometres of land. These bioclimatic changes being increases of 1% in land area of desert, tropical savanna and continental hot summer biomes. Sub-Arctic and Arctic tundra decrease by 1 and 0.7% respectively. Between 1.5K and 2K there are relatively small or no changes between the remaining classifications in figure 5a and figure 5b. '***

In summary, I think the manuscript would benefit from additional remarks in the discussion section, linking always the global and regional scales of the bioclimatic changes, and also looking, if possible, at literature outside of the modelling approach.

**We have now included literature for evidence of change outside of modelling as outlined previously in lines 174-180.**

Technical details.

L9: drier

**Fixed**

L71: perhaps bring out as a subsection (i.e. as 2.2 instead of 2.1.1)

**We feel that as the streamlined scheme is made entirely from the traditional, it is clearer when presented as a subsection of the traditional scheme.**

L87: Table 3

**Fixed**

L157: Please review. Maybe I am reading the matrix wrong but in Fig. 5c, Arctic Tundra goes from 6.8 to 1.8. That is a reduction of over 70%

**This has been reviewed and is correct.**

**Response to report 2.**

Analyzing Earth System models to explore regions that will undergo major bioclimatic transitions is certainly of general interest nowadays. I found this paper scientifically sound and well written. As a new reviewer, I only have two more comments for the authors.

Have the authors explored the ensemble median rather than the mean? This may be more trustworthy than the mean as it is less impacted by an outlier (e.g., if a specific model has a very different prediction from the others). I suggest exploring this option.

**As usual in climate modelling, we choose to focus primarily on the ensemble mean, although we note that ensemble mean and ensemble median climates have been found to be very similar. We have now included acknowledgement of, and justification for this decision. This can be found in section 2.4 lines 122-124: "As usual in climate modelling, we focus primarily on the ensemble**

**mean, although we note that ensemble mean and ensemble median climates have been found to be very similar (Sillmann et al., 2013; Kim et al., 2020; Li et al., 2021).”**

Also, when analyzing these models, uncertainty quantification is very important, and I was surprised that here uncertainty was not explored much. One can create a map with shifts in bioclimate classification, but the meaning of this projected shift is different in each grid cell because the uncertainty (intermodal variability) is different. I think this could be addressed by adding (at least in appendix) maps of the uncertainty (e.g., standard deviation) for 1.5, 2, and 4K. This would allow someone interested in these bioclimatic shifts to see the confidence of these projections.

**We have now included an indication for the agreement between the models on a particular classification or classification change. Hatching has been implemented in figures 3 and 4 to indicate areas where there is less than 66% agreement between the models. This demonstrates the confidence in the results given in each cell grid.**