

Biogeosciences Discuss., referee comment RC1
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Comment on bg-2021-179

Anonymous Referee #1

Referee comment on "Not all biodiversity rich spots are climate refugia" by *Ádám T. Kocsis et al.*, *Biogeosciences Discuss.*, <https://doi.org/10.5194/bg-2021-179-RC1>, 2021

This is a well-written manuscript that describes an analysis of the correlation between biodiversity richspots and climate change refugia. The results are not surprising but still good to have as evidenced.

I only have a few comments, mostly have the presentation of the results. The opening of section 3.3 seems like an important conclusion that is unnecessarily downplayed in the abstract (although the marine part is appropriately highlighted there). Contrast the wording there to this in the abstract, which almost seems like spin that does not appropriately represent the results, "The results suggest that although terrestrial and freshwater richspots have been and will be somewhat less affected than other areas, they are not excluded from the impacts of global warming. Their characteristic biota is expected to witness similar forcing as other areas, including range shifts and elevated risk of extinction." It seems like this is worded to get attention to a misunderstanding that I don't/didn't think exists - that people think that climate refugia, and thus biodiversity hot/richspots, and thus perhaps biodiversity?, will be completely unaffected by climate change.

The message that refugia will warm is not novel; indeed this has been repeatedly stated in the literature (eg see Morelli et al. 2020 or any of the papers in the Special Issue on Climate-Change Refugia in *Frontiers in Ecology and the Environment*). It is probably worthwhile to show that globally though.

The difference between marine and terrestrial richspots is likely (also) related to what drives diversity in marine versus terrestrial systems, where connectivity is so different and geography often differing drastically between life stages. There is a short mention on line 192 but I suggest saying more. The connection to tropical marine diversity is mentioned but the distinction between processes there (187-190) and in the terrestrial tropics is not clear.

A few minor suggestions:

107: Move "(hereafter called Myers)" to after (2015)

120: into not to

155: seems a bit repetitive

156-159: This is a bit hard to follow. Suggest listing the Terrestrial richspots...part before talking about freshwater. Also not clear what "less within than outside with all three stages" means

161: suggest rewording as "with highest and lowest projected warming in the northern and southern polar regions, respectively."