

Biogeosciences Discuss., referee comment RC2
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Comment on bg-2021-179

Anonymous Referee #2

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-RC2>, 2021

In their manuscript entitled "Not all biodiversity richspots are climate refugia", Kocsis et al. explore the vulnerability of marine, terrestrial and freshwater biodiversity richspots (regions that currently have exceptionally high endemism and/or number of species) to anthropogenic climate change. They specifically test whether these regions are likely to provide refugia under future climate change. The results bring valuable evidence for the need to protect a representative network of biodiversity-rich areas that also considers species' vulnerability to climate change.

The paper is well written, and I enjoyed reading it. The analyses are straightforward and use sound methodology. In fact, I have virtually no concern with seeing the paper published in its current form. I will only make a few suggestions to improve the manuscript, which the authors can choose to consider.

- It is somewhat confusing that "climate velocity" is interchangeably used in the manuscript to refer to long-term climate change since the last glacial maximum and recent/future anthropogenic climate change velocity over a few decades. I understand that both concepts refer to similar mechanisms and are called like this in the literature (e.g. Sandel et al. 2011, Loerie et al. 2009), but as mentioned in L.194, the consequences are very different, owing to the different time scale considered (evolutionary origin of richspots and driver of endemism in the first case, and drivers or range shifts and vulnerability to anthropogenic climate change in the second case). Maybe it could be clarified early in the text that this analysis focus on the latter, also avoiding the use of the term interchangeably?
- At the end of the introduction, the authors mention that these "findings are of importance for policies to address biodiversity loss and climate change". However, the discussion does not further mention the relevance for policy and biodiversity management, except calling for climate change mitigation and mitigation of other threats in the conclusion. Maybe the authors could further develop the implications of their findings for the identification of conservation priority areas and management of biodiversity richspots. How are these currently used in decision making and how are these findings relevant to better prioritize biodiversity conservation in a changing

world?

- Huntley & al (2021) recently explored (terrestrial) biome consistency in the past and under projected anthropogenic climate change. This study was not published at the time of submission, but it seems that it could now be incorporated to discuss how these two approaches support each other in their findings and conclusions.

Huntley, B. et al. 2021. Projected climatic changes lead to biome changes in areas of previously constant biome. - J Biogeogr: DOI: 10.1111/jbi.14213

Minor comments:

- 20-21: This sentence could be simplified to "It has been suggested that some geographic areas (...) because they have had (...)"
- 77-78: There is no mention of invasive species anywhere else in the paper, which makes this sentence quite out of topic. Could be deleted?
- 56: Missing dot in "distance.time⁻¹"