Author's response to the comments received for tc-2021-31

The following pages contain a point-by-point reply to the comments provided by the two referees that reviewed our first submission (TC-2021-31)

Each of the editor's (**EC**) and referee's comment (**RC**) is numbered. If a comment contained several points, we numbered them, and address them individually in our author replies (**AR**).

We also carefully re-checked the formulation of the entire manuscript, and amended the text where appropriate."

1. EDITOR'S COMMENT

[EC 1.01] line 24: does this relation between CO2 kg and loss of glacier mass apply at the global scale or European Alps scale? This should be specified.

[AR 1.01] It applies at the global scale. We added this information in the manuscript:
ll. 23-24: '*Previous work estimated that every kg of additionally emitted CO_2 would result in a long-term global glacier mass loss of ca. 16 kg (Marzeion et al., 2018)'*

[EC 1.02] line 130: if all three GCM members are giving T < +2°C by 2100, why only one was considered in the 2100 analysis? From line 80, I understand that you took all available GCM members giving temperature between +075 and 2.25°C at 2100? Why these two members were excluded for the 2100 analysis?

[AR 1.02] This information was not clear. Of the three GCM members which go until 2300, only one has a T < +2°C by 2100, whilst the remaining two have a T > +2°C by 2100, but have a T < +2°C by 2300, i.e. the temperature after 2100 decreases. Therefore, the last two GCM members were used only for the simulations which go up to 2300.
We reformulated it in the manuscript as:
ll. 127-131:'To gain insights into glacier evolution beyond this horizon, we run GloGEMflow with three GCM members that provide climate data until 2300 and that project mean global temperature changes below +2.0°C for 2300 (see Fig. S3). Note that one of these GCM members was already considered in the simulations until 2100, whilst the remaining two were not because they show a warming beyond +2.0°C for 2100 (Fig. S3).'

2. REFEREE'S COMMENT

[RC 1.01] Line 39: please consider to remove "in-house"

[AR 1.01]: Done

[RC 1.02] Line 61: please consider to add something like " at least regionally for European glaciers " or something similar at the end of the sentence.

[AR 1.02] Please note that the study cited in the sentence mentioned by the reviewer is not specific to the European Alps. The suggested addition would thus be misleading and we therefore decided to leave the sentence unchanged.