Referee#1

I only have a few minor comment about water conservation and freshwater flux. I understand that you conserve the volume of water by adjusting the ocean volume to account for ice sheet volume change. At the same time you route the surface runoff and calving to compute the FWF. However, for one given climate year you have 10 ice sheet model years, meaning that the FWF that arrives to the ocean every year corresponds to 10 times the annual flux. I think you should explicitly mention this fact in the experimental setup section.

We now better understand the reviewer's concern about the potential influence of the acceleration technique on our model results. Indeed, if we were to calculate global ocean volume change by integrating surface freshwater fluxes, then a 10-fold acceleration would require us to aggregate these fluxes over 10 years, which would have a significant impact on model results. However, since the ocean model we use (GOLDSTEIN) is based on the rigid-lid approximation we always enforce that the net annual global surface freshwater flux is zero. In the case of interactive ice sheets, we still enforce the global annual surface freshwater flux to be zero, but then we adjust the ocean volume each year to match the change in global ice volume. This is done, as we explained in the first response, by scaling the thicknesses of the ocean layers below 1000 m depth to match the actual ocean volume derived from sea level change (Willeit et al. 2022). In doing that, we also recalculate salinity and other tracers to enforce their conservation. Since our ocean volume change is not driven by surface freshwater fluxes, we calculate them in the same way irrespective of whether we use acceleration or not. Namely, the surface freshwater flux into the ocean is equal to the sum of daily values of precipitation - evaporation, runoff from ice-free land, surface runoff from the ice sheets, plus annual mean values of calving and basal melt from the ice sheets, calculated by the ice sheet model every year, but only passed to the ocean model in the year in which the climate model is updated (every ten years in the case of the accelerated run). Of course, such an approach introduces some inconsistency between the freshwater fluxes computed in the atmospheric and ice sheet models and the fluxes entering the ocean model. However, these inconsistencies are less than 1% of the typical net freshwater fluxes to the ocean, which is of course much smaller than typical model errors in simulated components of the freshwater forcing.

Also, l.137, remove "easily".

Removed.