Martínez Montero et al. present a simple model with the aim to estimate sea level rise from greenhouse gas emissions and solar radiation management. There is clear motivation for such work, but to me two important issues need to be clarified or added before an in-depth review and potential path towards publication:

a) the authors state to model sea level rise in the title and at several points in the manuscript. The model however only captures the ice sheet contributions to sea level rise from Greenland and Antarctica. This is far from the complete picture on sea level rise. This fuzziness is in particular difficult as the authors motivate their work with the aim to improve cost-benefit analysis. In such analysis the total impacts of sea level rise need to be captured, which need to incorporate all major contributors to sea level rise.

b) Reading from the abstract and introduction, sea level rise is a key output metric of the model. This is in contrast to the very short section 2.4.3 on the calibration of the ice sheet components. There is no figure that allows the reader to grasp how well the model performs in comparison to the datasets it aims to emulate. This section needs more details and graphics so the reader can get a clear picture on the performance of the model. It would also be of interest how it performs with respect to historical period for which direct observations of sea level components are available, for example from Frederikse et al. 2020. I would also like to see a more detailed discussion to set this work in context with similar studies on simple sea level models like Wong et al (2017), Nauels et al. (2017) or Palmer et al (2020).

Minor comments

L4 what does accurate mean? be more precise?

L13 "(but critizised …)" please simplify sentence construction

L22 "… than they should be" reads like your personal judgement. what do you mean exactly?

L30 " commit future generations …" here the works of Nauels and Mengel may be interesting to cite:

https://www.nature.com/articles/s41467-018-02985-8

https://www.pnas.org/doi/full/10.1073/pnas.1907461116

L333 The Pattyn and Huybrecht models are largely different from PISM underlying Garbe et al. 2020. It seems a zoo of different sources to calibrate your parameters. How do you justify this?

L382ff please extend and make this easier to grasp for the reader. As now the reader does not know from the manuscript how well your model performs.

Intro in general:

You largely motivate your work through a critique on short-sighted solar radiation management studies. I would suggest to broaden this motivation. At least I would extend a bit the "sea level commitment" point as this is a key issue in the climate policy to impacts relation.

References

Frederikse, Thomas, et al. "The causes of sea-level rise since 1900." *Nature* 584.7821 (2020): 393-397.

Nauels, Alexander, et al. "Synthesizing long-term sea level rise projections–the MAGICC sea level model v2. 0." *Geoscientific Model Development* 10.6 (2017): 2495-2524.

Palmer, M. D., et al. "Exploring the drivers of global and local sea-level change over the 21st century and beyond." *Earth's Future* 8.9 (2020): e2019EF001413.

Wong, Tony E., et al. "BRICK v0. 2, a simple, accessible, and transparent model framework for climate and regional sea-level projections." *Geoscientific Model Development* 10.7 (2017): 2741-2760.