

Authors investigated Pleistocene glacial cycles that are known to be driven by the nonlinear response of the climate to solar forcing. Though complex models accurately simulate these cycles they are computationally expensive. Simpler conceptual models lack physical detail, though. The Physical Adimensional Climate Cryosphere mOdel (PACCO) used in this study aims to balance complexity and simplicity by focusing on the interaction between climate and Northern Hemisphere ice sheets. Authors show that PACCO effectively reproduces 100,000-year glacial cycles by incorporating ice-sheet dynamics, thermodynamics, and ice aging. The study reveals that ice aging and delayed isostatic response are key to matching geological records, making PACCO a valuable tool for studying glacial cycles.

Suggestions for the improvements:

Though I see the improvements made to this manuscript some of my comments are still not fully addressed and thus, I cannot recommend this article for a publication just yet. My comment about the energy spectra and peaks that we see at 60 and 100 kyears still stands; it is not a general observation that these peaks are present, but it really depends on the sliding parameter, and it mainly seems that the peaks are present for sliding parameter of $10^{-6} \text{ m yr}^{-1} \text{ Pa}^{-1}$, the question is why? Also, what happens above 100 kyr? The energy spectra are extremely dispersed, so what does that mean? Wouldn't we expect that at one point the energy goes to zero as we mainly see with the higher values of the sliding parameter? Additionally, I think that the authors put themselves in a trap by submitting Figure 1 in their rebuttal as I have an additional question now in connection to that figure. Here, it is not explained why there is such a big change between energy spectra of the ice thickness between different experiments. I think that this Figure 1 is now a great asset to the manuscript and it should be kept as it gives a great overview of the performed experiments and changes the complexity of the model brings to the results, still it needs to be made in a systematic way. Also, many of the figures need replotting as they are not done in a systematic way (looking at the axes, colours, etc.)