

Interactive comment on “Analytically tractable climate-carbon cycle feedbacks under 21st century anthropogenic forcing” by Steven J. Lade et al.

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We thank the reviewers for their considered and constructive comments that have improved the manuscript.

Reviewer Jones wrote “[t]his is a nicely designed study, and well presented manuscript” and “I very much like the approach and the intention”. In line with the reviewer’s suggestions, we now compare our model against additional existing models, clarify our use of the terms “mechanistic” and “analytical”, include additional speculations on future work, and responded to some specific requests for clarification.

Reviewer Heimann raised concerns about the novelty of our model compared to previous models and about how accurately our numerical and analytical results compare to previous ESM results as well as to each other. We believe there exists a gap in the literature for our mechanistically-based but highly stylized model, as we have sought to make clearer in the revised manuscript. For a model as extremely simple as ours, and given the wide spread in the results of ESMs, we believe our results are sufficiently accurate. In line with Heimann's very perceptive technical corrections we have modified our feedback calculations to bring them into closer agreement than in the initially submitted version.

We also appreciate Heitzig's comment to modify the mathematical presentation of the model. We have modified the model to achieve Heitzig's overall goal of presenting the model solely in terms of differential, instead of integro-differential, equations, although not exactly by the route he suggested.

Please find attached our proposed revised manuscript, with changes tracked.

Please also note the supplement to this comment:

<https://www.earth-syst-dynam-discuss.net/esd-2017-78/esd-2017-78-AC5-supplement.pdf>

Interactive comment on Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2017-78>, 2017.

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