Review Report on **“A Simple Dynamical System for Representing Climate Tipping Points with Hysteresis”**

1. General feedback

   The manuscript presents a valuable and computationally efficient framework for representing complex climate phenomena through low-dimensional models. Its primary strength lies in the detailed algebraic derivation, which serves as a "manual" for researchers to map Earth System Model (ESM) outputs onto a parameter-sparse dynamical system. This approach is particularly relevant for analyzing "overshoot" scenarios and inter-model differences.
   However, the current version contains several technical inconsistencies and typographical errors that should be addressed before final publication:

2. Comments about the structure

   The manuscript provides a robust and highly valuable mathematical framework. However, considering the target journal’s broader climate science readership (rather than a specialized mathematics journal), the current structure is excessively dense. The extensive step-by-step algebraic derivations, while excellent for reproducibility, significantly hinder the narrative flow and may alienate readers interested in the physical implications rather than the calculus.
   We strongly suggest a major restructuring:

- Main Text: Should focus on the conceptual model, the physical meaning of the parameters, and the discussion of the results.
- Supplementary Material: Move the detailed algebraic proofs to a dedicated Appendix or Supplementary Information file.

3. Comments about mathematics

- The mathematical framework is robust, but its presentation is inappropriate for a general climate science audience. The manuscript includes exhaustive, step-by-step algebraic derivations that overwhelm the narrative. We strongly recommend moving these derivations to a Supplementary Information document.
- Page 8 please indicate the implicit solver used.
- Page 9 please indicate the smooth algorithm.
- Figure 2 please use a colorbar indicating the velocity in the arrows.

4. Grammatical errors

- "Hystersis": On Page 6 (line 6), the word is misspelled as "hystersis"
- "Pre-industrial" Inconsistencies

5. Summary

   The manuscript provides a valuable and elegant mathematical framework for simplifying climate tipping points and hysteresis. However, in its current state, it is too mathematically dense for a non-mathematical journal. The paper reads more like a derivation manual than a research article. I recommend accepting only after a Major Revision that focuses on restructuring the content and fixing significant typographical and rendering errors.