

Interactive comment on “ESD Reviews: mechanisms, evidence, and impacts of climate tipping elements” by Seaver Wang and Zeke Hausfather

Anonymous Referee #1

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Review of ESD Reviews: mechanisms, evidence, and impacts of climate tipping elements, by Wang and Hausfather

This is an unusual paper to review. During a first read, it reminded me of a student assignment more than a review paper in a scientific journal. In a number of places it even made me cringe. Throughout, this paper gives the impression that the authors are not very familiar with the subject, have no real ability to assess the papers they discuss, present a questionable subset of the relevant literature (missing quite a lot) and appear to be well out of their depth. Made curious by the strange reading experience, I looked up the authors and was surprised to find that they do not have a

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track record of relevant research, and they do not work at a climate science institution but at an agenda-driven “think tank” conducting “research focused on clean energy innovation, energy efficiency, and energy for human development”, according to its self-description. Unfortunately this lack of expertise on climate tipping points shows in every paragraph. Going through everything which is wrong about this paper would require a review as long as the actual manuscript, and far more time than I am willing to dedicate to such a low-quality manuscript. Thus I will limit myself to a couple of examples. The authors introduce a thoroughly confusing terminology by mixing up tipping elements (e.g. the Greenland ice sheet or the Amazon forest) and the associated tipping points (which are not physical entities but theoretical concepts). They write: “We also evaluate which tipping elements are more imminent. . .” A tipping element cannot be “imminent”. “Some tipping elements are perhaps more accurately termed climate feedbacks” This is complete nonsense, the Greenland ice sheet or the Amazon forest are not “feedbacks”. Feedbacks are mechanisms, not physical entities. “Climate tipping elements” – large-scale mechanisms or systems” A tipping element is a system and not a mechanism. “In this report, we have adopted the convention proposed by (Kopp et al., 2016) to maximize clarity, characterizing rapidly acting (within a decade) systems as “tipping points” and otherwise utilizing the term “tipping elements”. We describe systems with a more linear, direct, predictable response to climate forcing simply as “climate feedbacks”. Again, a tipping element is a physical, tangible system like an ice sheet, and it can have a tipping point, but it can neither be a tipping point nor a feedback. I was amazed to read that the authors claim this terminology is that of Kopp et al. and checked this reference – and of course it is not. Kopp et al. explain: “In the literal example of the rail wagon of coal, the wagon itself would be the tipping element; the point at which the wagon’s physical dynamics commit it to falling on its side and emptying its contents would be the tipping point.” And they write: “We propose terminology to clarify the distinction between “tipping points” in the popular sense, the critical thresholds exhibited by climatic and social “tipping elements,” and “economic shocks.” So the distinction they propose is between the popular “tipping points” and

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the “critical thresholds” – not the tipping elements. Another random example is that the authors claim: “The first few years of observations from OSNAP have also produced findings that have dramatically changed the current understanding of the AMOC system. These measurements have revealed that in contrast to the dominant paradigm that most NADW originates from the Labrador Sea [...]” Here they uncritically repeat the wildly overblown rhetoric with which the first OSNAP results were promoted by one project scientist, which is an example for how Wang and Hausfather lack any ability to judge such claims. A few years of data in a highly variable system can hardly dramatically change the current understanding of the AMOC, and of course have done no such thing. And so it goes on. I do not see any hope that a major revision could turn this into a publishable paper, since I do not see how the authors have the expertise or understanding to do this.

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