



EGUsphere, referee comment RC1  
<https://doi.org/10.5194/egusphere-2022-1176-RC1>, 2022  
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## **Comment on egusphere-2022-1176**

Niklas Boers (Referee)

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Referee comment on "Rate-induced tipping in natural and human systems" by Paul D. L. Ritchie et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-1176-RC1>, 2022

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The authors submitted a great, concise review of the phenomenon of rate-induced tipping and showcase it nicely using conceptual models from ecology, climate, and powergrids. I very much enjoyed reading this. The authors accomplished to explain rate-induced tipping in a very accessible manner while being technically fully accurate and still giving sufficient details to allow for an easy reproduction of the examples. The authors might want to take into account some of the very minor comments below; but the manuscript could also be accepted as is I think.

Some minor comments / questions / suggestions (and most are really very minor):

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l6: "an instability that occurs when external forcing varies across some critical rate" - to me it seems this could be misunderstood, maybe "varies faster than some critical rate"

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l11: I wouldn't necessarily say that the "changes" are referred to as "tipping points", the latter are rather the points (in forcing or time) at which such changes occur?

▪

l19: I think that the seminal paper by Stocker Schmittner (<https://www.nature.com/articles/42224>) should be cited here as well - to my knowledge this is the first paper describing rate-induced tipping effects, at least in the climate context

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l52: replace "vanishing" by "sufficiently small"? Also in the next line, "instantaneously" to "fast enough"?

▪

l76: istability -> instability

▪

Fig.3: is the axis of (c) logarithmic?

▪

l109: could this sentence be simplified?

▪

l125: the system has too much inertia?

▪

l164: cite some more papers, including some of the older ones, on AMOC collapse here as well?

▪

Fig.4: show additional panel similiar to the one in Fig.5c here as well?

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