

EGU22-12438, updated on 18 Aug 2022
<https://doi.org/10.5194/egusphere-egu22-12438>
EGU General Assembly 2022
© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Updated assessment suggests >1.5°C global warming could trigger multiple climate tipping points

David Armstrong McKay^{1,2,3}, Arie Staal^{1,2,4}, Jesse Abrams³, Ricarda Winkelmann⁵, Boris Sakschewski⁵, Sina Loriani⁵, Ingo Fetzer^{1,2}, Sarah Cornell^{1,2}, Johan Rockström^{1,5}, and Timothy Lenton³

¹Stockholm Resilience Centre, Stockholm University, Stockholm, Sweden

²Bolin Centre for Climate Research, Stockholm University, Stockholm, Sweden

³Global Systems Institute, University of Exeter, Exeter, UK

⁴Copernicus Institute of Sustainable Development, Utrecht University, Utrecht, Netherlands

⁵Potsdam Institute for Climate Impact Research, Potsdam, Germany

Climate tipping points occur when change in a part of the climate system becomes self-perpetuating beyond a forcing threshold, leading to abrupt and/or irreversible impacts. Synthesizing paleoclimate, observational, and model-based studies, we provide a revised shortlist of global 'core' tipping elements and regional 'impact' tipping elements and their temperature thresholds. Current global warming of ~1.1°C above pre-industrial already lies within the lower end of some tipping point uncertainty ranges. Several more tipping points may be triggered in the Paris Agreement range of 1.5-2°C global warming, with many more likely at the 2-3°C of warming expected on current policy trajectories. In further work we use these estimates to test the potential for and impact of tipping cascades in response to global warming scenarios using a stylised model. This strengthens the evidence base for urgent action to mitigate climate change and to develop improved tipping point risk assessment, early warning capability, and adaptation strategies.

Preprint: <https://doi.org/10.1002/essoar.10509769.1>